

## TEACHING ENGLISH WITH TECHNOLOGY

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### ABSTRACT

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*This article explores the role of technology in English language teaching (ELT), focusing on recent innovations such as virtual reality (VR), artificial intelligence (AI), mobile learning, computer-supported collaborative learning (CSCL), blended learning, and emerging tools like ChatGPT. Methodologies from meta-analyses, systematic reviews, and experimental studies are synthesized to evaluate technological impact. Results indicate statistically significant improvements in learners' grammar, vocabulary, writing, motivation, autonomy, and achievement. Challenges such as teacher confidence, academic integrity, and implementation barriers are also discussed. The study concludes with recommendations for integrating technology effectively in ELT and outlines future research directions.*

### Introduction

In recent years, the integration of technology into English language teaching (ELT) has markedly transformed pedagogical approaches. Technology-enhanced language learning (TELL) modalities such as VR, AI, mobile platforms, and blended learning have gained prominence, offering immersive, personalized, and flexible learning experiences. Meta-analytic evidence shows TELL outperforms traditional methods in areas such as grammar, vocabulary, and writing achievement [5]. Innovations like VR combined with machine

translation (MT) yield exceptionally high performance metrics—translation accuracy up to 98.5% and F1-score near 93% [10]. Additionally, mobile applications enhance vocabulary and autonomy [15]. Despite these advances, effective integration depends on teachers' confidence, training, and pedagogical readiness [8]. Ethical concerns and over-dependence on AI (e.g., ChatGPT) also pose challenges in maintaining learning integrity and critical thinking skills [13, 22].

#### Methodology

This article is based on synthesizing findings from:

1. A meta-analysis of technology-enhanced language learning effectiveness, particularly within Turkish contexts, assessing grammar, vocabulary, and writing [5].
  2. Systematic reviews of technology use in ELT, covering emerging technologies, mobile applications, and AI tools [2, 15, 13].
  3. Select experimental studies, such as VR + MT integration [10] and tablet-based adaptive learning in low-resource contexts [20].
  4. Review of frameworks and theories, including CSCL, blended learning, and technological pedagogical content knowledge (TPACK) [31, 34, 29].
- All sources are peer-reviewed, recent (mostly within five years), and/or meta-analytically rigorous.

#### Results

- Meta-analysis outcomes: Technology-enhanced instruction significantly improves English achievement, including grammar, vocabulary, and writing, with medium-to-large effect sizes compared to traditional methods [5].
- VR + MT experiment: The integration of VR and a new deep-learning MT model achieved 98.5% translation accuracy, F1-score  $\approx$  93%, and semantic recall  $\approx$  92%. Learner trials confirmed enhanced translation quality and efficiency [10].
- Tablet adaptive learning: In Malawi, adaptive tablets delivered 4.2 months' worth of literacy gains in 13 months, with cost-effectiveness yielding \$106 social return per \$1 invested [20].
- Mobile vocabulary apps: Emerging tech, including mobile vocabulary learning tools, significantly boosted learners' fluency and vocabulary range [15].
- CSCL environments: Computer-supported collaboration enhanced learner confidence, motivation, reduced anxiety, and supported autonomous language acquisition [31].

- Blended learning: Combining online and face-to-face instruction enhances achievement, learner satisfaction, and provides data-driven customization and cost benefits [34].

- ChatGPT in ESL/EFL: Systematic review of 70 empirical studies reveals affordances—personalization, increased opportunities, teacher support—but also limitations: misinformation, academic integrity issues, and over-reliance. Most studies focus on writing; speaking, reading, and listening are under-researched [13]. Further, teacher perspectives show challenges in maintaining students’ critical thinking due to AI reliance [22].

### Analysis and Discussion

Technology in English language teaching (ELT) has undergone a profound transformation over the last two decades, reshaping both pedagogical approaches and learner experiences. A growing body of evidence—from meta-analyses, experimental trials, and systematic reviews—has highlighted significant benefits of technology-enhanced instruction on learner achievement, engagement, and autonomy. At the same time, researchers caution about challenges, including teacher preparedness, equity of access, and the risks of over-reliance on artificial intelligence (AI).

This section synthesizes findings from recent scholarship, focusing on five interrelated themes: (1) learner achievement, (2) motivation and autonomy, (3) emerging technologies such as virtual reality (VR) and AI, (4) teacher readiness and professional development, and (5) implementation challenges. Comparative data are presented in two tables to illustrate differential outcomes across contexts.

### Learner Achievement in Technology-Enhanced Contexts

Research consistently shows that technology improves English language learning outcomes. Karabulut and Karadağ’s meta-analysis of technology-enhanced instruction in Turkey reported medium-to-large effect sizes in grammar, vocabulary, and writing compared to traditional methods [1]. Their analysis of 42 studies involving 3,127 participants indicated that students in technology-assisted environments outperformed control groups across skill areas, with the largest effects in writing achievement.

Similarly, a systematic review of technology-supported learning by Chien et al. found consistent gains in listening comprehension and speaking fluency when digital tools were integrated with communicative tasks [2]. Learners exposed to multimedia input (e.g., videos, podcasts, captioned texts) demonstrated superior comprehension and retention compared with print-based instruction.

These findings suggest that technology not only augments traditional methods but also facilitates multimodal input—an essential factor in second language acquisition theories such as Krashen’s Input Hypothesis. However, learning outcomes vary by technology type, as summarized in Table 1.

**Table 1. Comparative Outcomes of Technology Types in ELT (Based on Meta-analyses and Experimental Studies)**

Technology Type	Primary Outcomes Reported	Effect Size / Accuracy	Source
Multimedia & CALL tools	Improved listening comprehension, reading fluency	Medium–large	[2], [3]
Mobile learning (apps, SMS)	Vocabulary retention, learner autonomy	Medium	[4], [5]
VR + Machine Translation	Translation accuracy 98.5%, F1-score ≈ 93%	Very large	[6]
Blended learning	Higher satisfaction, flexible achievement gains	Medium–large	[7]
ChatGPT/AI tools	Writing fluency, grammar accuracy; risks of over-reliance	Mixed	[8], [9]

**Motivation, Autonomy, and Learner Attitudes**

Beyond achievement, motivation and learner autonomy have emerged as critical benefits of technology-enhanced language learning (TELL). According to Ye et al. [4], mobile vocabulary applications increased learner motivation by allowing students to control their own pace, reinforcing self-regulated learning strategies. Their experimental data showed that learners with access to mobile apps practiced 37% more words weekly than those in the control group.

Computer-Supported Collaborative Learning (CSCL) has also been shown to reduce anxiety and increase learner confidence [10]. In group-based online activities, students reported greater willingness to take risks in speaking, especially when anonymity was possible. These findings echo Dörnyei’s theories of motivational dynamics, suggesting that technology enhances both the “ideal L2 self” and “learning experience” components of motivation.

Autonomy, however, is not evenly distributed. In low-resource contexts, lack of consistent internet access limits students’ ability to benefit from mobile or cloud-based

platforms [11]. The Malawi tablet study demonstrated that while adaptive technology produced impressive literacy gains (equivalent to 4.2 months of progress in 13 months), such interventions required significant financial and infrastructural investment [12].

**Emerging Technologies: Virtual Reality, AI, and ChatGPT**

Virtual reality (VR) combined with deep-learning translation systems represents one of the most advanced applications in ELT. Su and Rue [6] demonstrated that VR environments paired with neural machine translation reached 98.5% translation accuracy with an F1-score near 93%, outperforming traditional translation tools by a wide margin. Participants also reported higher satisfaction and perceived authenticity of language use, aligning with theories of situated learning.

Artificial intelligence, particularly generative tools like ChatGPT, has sparked both enthusiasm and concern. Lo et al.'s systematic review of 70 empirical studies revealed that ChatGPT improves writing fluency, provides instant feedback, and personalizes learning pathways [8]. Teachers noted its potential for scaffolding weaker learners, yet also expressed concerns about misinformation, plagiarism, and reduced critical thinking [9].

Zhou and Du Preez [13] found that AI-assisted grammar instruction improved accuracy in academic writing tasks, but students tended to adopt AI outputs uncritically, underscoring the need for teacher-led critical digital literacy. Thus, AI's benefits are substantial but contingent on responsible integration.

**Table 2. Opportunities and Risks of AI Tools (ChatGPT) in ELT**

Dimension	Reported Opportunities	Reported Risks	Sources
Writing Skills	Increased fluency, real-time grammar feedback	Plagiarism, reduced originality	[8], [13]
Teacher Support	Time-saving in feedback, scaffolding weaker learners	Over-reliance, diminished teacher role	[9], [14]
Learner Autonomy	Personalized learning, anytime access	Risk of misinformation	[8], [15]
Ethical Concerns	Accessibility to diverse learners	Academic integrity issues	[9], [16]
Teacher Readiness and Professional Development			

Effective use of technology in ELT is inseparable from teacher readiness. Ghavifekr and Athirah [17] identified teacher confidence, competence, and attitudes as critical determinants of ICT integration success. Teachers lacking training often underutilize digital tools or revert to traditional methods.

The Technological Pedagogical Content Knowledge (TPACK) framework has been proposed as a model for equipping teachers with the integrated knowledge required for successful adoption [18]. Recent studies emphasize the necessity of embedding TPACK into pre-service teacher education and continuous professional development [19]. Without such preparation, the benefits of advanced tools like VR or AI may remain unrealized.

#### Implementation Challenges

Despite clear advantages, several challenges hinder the widespread adoption of technology in ELT.

- Infrastructure gaps: Low-bandwidth environments limit access to VR, AI, or cloud-based learning [11].
- Cost barriers: Adaptive technologies such as tablets offer significant returns but require upfront investment [12].
- Ethical dilemmas: AI introduces concerns about plagiarism, critical thinking, and fairness [9].
- Teacher workload: While technology promises efficiency, improper integration may initially increase workload due to training and adaptation requirements [17].

These challenges underscore the need for systemic support—policies, training, and ethical guidelines—to ensure that technology serves as an enabler rather than a barrier.

#### Synthesis of Findings

The cumulative evidence affirms that technology significantly enhances English language learning when integrated effectively. Meta-analytic data [1], [2], [3] demonstrate measurable gains in language achievement, while experimental innovations such as VR [6] push the boundaries of immersion and authenticity. Mobile and adaptive learning expand access in diverse contexts [4], [12]. At the same time, AI tools like ChatGPT highlight the delicate balance between opportunity and risk [8], [9], [13].

Ultimately, the human element remains indispensable. Teachers' confidence, competence, and ethical oversight determine whether technology deepens or diminishes learning outcomes. Future directions must prioritize teacher training, critical digital literacy, and long-term evaluations across underexplored skill areas such as speaking and listening.

#### Conclusion

Technology offers powerful affordances for ELT—enhanced achievement, personalization, engagement, and access. Yet, the human element—especially teacher capacity and ethical oversight—remains critical. Future research should emphasize rigorous experimental designs, explore under-studied skills (e.g., speaking, listening), and evaluate long-term impacts. Additionally, developing scalable teacher training models and integrity frameworks for AI use will be imperative.

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