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# Advancing English Language Education through Artificial Intelligence: A Review of Benefits and Challenges

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**Abstract**

English functions as a dominant global language in sectors such as employment, commerce, tourism, communication, and international relations. Nevertheless, learners of English frequently encounter numerous obstacles in developing their language proficiency. Previous research indicates that artificial intelligence (AI) offers several benefits for enhancing English language teaching and learning (ELT/L). This paper addresses the need to explore both the specific advantages and difficulties associated with integrating AI into ELT/L. Employing a systematic review guided by PRISMA protocols, 42 relevant studies were identified. The results outline the geographical distribution of research, learner demographics, and publication timelines. Through grounded coding, the study highlights AI's contributions to improving speaking, writing, reading, pedagogical methods, and learner self-regulation. Conversely, challenges such as technical malfunctions, AI limitations, user apprehension, and the pressure to standardize language emerged. Stakeholders, including policymakers, funding bodies, educators, and administrators, can utilize these insights to obtain a comprehensive view of AI's evolving role in ELT/L. Practical recommendations are offered to inform future implementations of AI in this field.

**Keywords:** Artificial Intelligence, AI-education, English as a Foreign Language

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## 1. Introduction

In an era where international communication drives economies, research, and cultural exchange, English remains the lingua franca that links diverse societies. From boardrooms to online classrooms, the ability to use English effectively can unlock opportunities in employment, trade, tourism, and diplomacy (Lan et al., 2020). Yet for many non-native speakers, mastering the four core language skills (speaking, listening, reading, and writing) remains a demanding journey (Grabe & Stoller, 2002). Learners often contend with barriers such as limited exposure to English outside the classroom, uneven content knowledge (Tokoz-Goktepe, 2014), irregular spelling patterns (Ulicheva et al., 2018), and anxiety about making mistakes in public (Cumming et al., 2018). Such obstacles can impede learner confidence and slow language development.

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy (Baranwal, 2022; Kannan & Munday, 2018).

Applications and devices equipped with AI can see and identify objects. They can understand and respond to human language. They can learn from new information and experience. They can make detailed recommendations to users and experts. They can act independently, replacing the need for human intelligence or intervention (Yang & Kyun, 2022). AI has emerged as a promising solution to address these challenges (Baranwal, 2022; Kannan & Munday, 2018). Defined as computer systems capable of simulating human intelligence, learning from data, and processing natural language (Sindermann et al., 2021; Xiaohong & Yanzheng, 2021), AI can create safe, adaptive environments for language practice. Research demonstrates that AI can enhance specific language skills, including reading comprehension (Xu et al., 2019), repetitive practice exercises (Kim, 2019), and pronunciation correction (Noviyanti, 2020). Beyond skill-specific applications, AI also supports broader teaching functions, such as automated feedback, intelligent tutoring, adaptive learning experiences, and predictive analytics (Pokrivčáková, 2019). Mobile and voice-based AI technologies, including virtual assistants like Siri, Alexa, and Google Assistant, further expand access to authentic English input and interactive practice (Ma, 2021).

Theoretical and empirical work underpins the integration of AI in English Language Teaching and Learning (ELT/L). Scholars highlight how AI can complement pedagogical approaches (Larsen-Freeman & Anderson, 2011; Isaee & Barjesteh, 2025) and support self-regulated learning (Barjesteh & Isaee, 2024). However, prior reviews reveal limitations in the research landscape. Many studies focus on a single AI application or general language learning rather than English specifically (Yang & Kyun, 2022). Others are constrained to certain learner levels, such as K-12 or higher education, leaving adult and professional learners underrepresented. Additionally, most systematic reviews apply fixed coding schemes or predetermined theoretical frameworks (Sharadgah & Sa'di, 2022), which may obscure emergent patterns and novel applications.

In response to these gaps, this study provides a comprehensive, inductively driven review of AI in ELT/L.

By including learners of all levels, encompassing diverse AI applications, and focusing specifically on English language education, this research offers both a current snapshot and a forward-looking perspective. The findings aim to guide educators in integrating AI into their teaching strategies, inform institutional policy and funding decisions, and highlight research gaps for future investigation. Ultimately, this study situates AI not merely as a technological tool but as a theoretically informed pedagogical resource for enhancing English language education globally.

## 2. Literature Review

Within the academic and professional arenas, numerous acronyms delineate different facets and evolving trends in English language education. Terms like Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) emphasize technological tools, while designations such as English as a Second Language (ESL), English for Speakers of Other Languages (ESOL), and English as a Foreign Language (EFL) refer to the learner's relationship with English. Meanwhile, acronyms such as TESL, TESOL, and TEFL concentrate on teaching methodologies. This study adopts the umbrella term English Language Teaching and Learning (ELT/L), consistent with scholarly precedent (e.g., Margana, 2016), focusing on English acquisition for non-native speakers and encompassing both instructional and learning processes. Recent technological advancements have accelerated AI adoption in ELT/L, with studies (e.g., Crompton et al., 2024) demonstrating a growing trend in AI's application for language acquisition, particularly in writing. Technology has historically played a supportive role in ELT/L by providing resources, boosting learner motivation (Larsen-Freeman & Anderson, 2011), facilitating instructional delivery (Barjesteh & Isaee, 2024), and introducing innovative pedagogical methods (Isaee & Barjesteh, 2025).

### 2.1. ELT/L and AI

Artificial intelligence is a complex technology categorized into three main user groups: learner-oriented tools used directly by students; teacher-facing applications that assist educators in instructional tasks such as grading; and administrative systems designed for managing and analyzing learner data (Luo & Cheng, 2020). Different AI systems offer distinct functionalities depending on the user and intended purpose. Capable of processing large datasets, interacting via natural language modalities (speech, listening, and writing), and adhering to linguistic patterns, AI enhances ELT/L in various dimensions.

Mobile technology has long been recognized as pivotal in ELT/L due to its portability, accessibility, and personalized learning opportunities (Dizon & Tang, 2020). Modern AI applications on mobile platforms further augment these capabilities with features like speech synthesis, data analytics, and adaptive intelligence (Pokrivčáková, 2019). While AI remains inferior to human faculties, it simulates human-like interactions through voice assistants such as Amazon Alexa, Apple Siri, Samsung Bixby, Microsoft Cortana, and Google Home Assistant, which offer learners access to a range of English accents (Ma, 2021). Additionally, intelligent tutoring systems manifest as audio-visual aids, enhancing user engagement (Bozkurt et al., 2023). Humanoid robots, including Erica and Sophie, embody AI physically, engaging users with lifelike expressions and gestures to enrich conversational practice (Sindermann et al., 2021). Initially, chatbots were limited to basic text-based queries; however, advancements in late 2022 introduced transformer

models and large language models powering tools like ChatGPT (Microsoft), Bard (Google), Claude (Anthropic), and AppleGPT. These platforms facilitate sophisticated conversational exchanges and provide diverse writing samples, opening new avenues in language education (Isaee et al, 2024; Vuong et al., 2023). Nonetheless, maximizing these benefits depends on educators' familiarity with available technologies and aligning pedagogical strategies accordingly.

Educational stakeholders must acknowledge AI's limitations to mitigate potential drawbacks effectively. Studies indicate (e.g., Annamalai et al., 2023) AI's inability to experience genuine emotions, with only superficial mimicry of affective expressions, sometimes resulting in inaccuracies due to data constraints or technological immaturity. Other researchers have noted AI's mechanical and passive behaviors, as well as technical failures and operational glitches (Ericsson et al., 2023; Wang et al., 2023).

### 2.2. Systematic Reviews on AI in Education

The scholarly community has begun synthesizing collective knowledge through systematic reviews examining AI applications across educational contexts. Chen et al. analyzed publication trends, dominant journals, key institutions, geographic patterns, theoretical frameworks, and technologies in AI and education. Separate reviews targeted K-12 education and higher education settings (e.g., Crompton & Burke, 2023; Crompton et al., 2024; Zawacki-Richter et al., 2019), evaluating topics such as disciplines, learning levels, research aims, methodologies, yearly trends, user groups, affordances, and obstacles. Although comprehensive, these reviews generally lack a specific focus on ELT/L.Notably, language learning appeared as one of the primary domains for AI application in higher education, and K-12 studies highlighted writing and language learning as growing fields for AI integration.

Focusing specifically on ELT/L, previous reviews have addressed pedagogical approaches, language skills, and AI tools. For example, Crompton and Burke (2024) explored ChatGPT's impact and Zhang and Zou (2023) concentrated on AI's role in enhancing writing skills, employing activity theory to analyze influential factors. Loncar et al. (2023) examined broader technological use in ELT/L, including AI among other innovations. Baranwal (2022) reviewed AI teachable agents for English learning, and Yang and Kyun (2022) broadened the scope by reviewing AI in language learning, encompassing both native and non-native English speakers and various languages beyond English in formal education from 2007 to 2021. This heterogeneity complicates generalizations due to the distinct challenges faced by second language learners. Their reliance on activity theory may also restrict emergent findings. Similarly, Sharadgah and Sa'di (2022) targeted English learning at K-12 and higher education levels but applied predefined coding schemes limiting discovery. Given rapid AI advancements, such as the emergence of large language models like ChatGPT an inductive, up to-date review is warranted to explore new opportunities for ELT/L.

### 2.3. Identified Gaps

Prior systematic reviews, including those by Zawacki-Richter et al. (2019) and Crompton et al. (2022) focus on learner levels (e.g., higher education or K-12) but lack exclusive ELT/L attention. Other studies (Chen, 2016; Isaee & Barjesteh, 2023; Loncar et al., 2023) examined a broad range of technologies in ELT/L without isolating AI's role. Reviews dedicated to AI in ELT/L often concentrate on single AI types, such as teachable agents (Baranwal, 2022), omitting a comprehensive perspective across AI categories. Some investigations encompass AI applications in all language teaching (Yang & Kyun, 2022), diluting focus on ELT/L. Moreover, adult learners, including those in professional training, are underrepresented. Finally, employing predetermined frameworks risks confirmation bias and overlooks emergent insights. A grounded, inductive analysis is needed to capture the current landscape of AI's diverse uses in ELT/L.

In response to calls from Yang and Kyun (2022) and Sharadgah and Sa'di (2022) for a current systematic review of AI in English language education, this study aims to fill existing gaps by conducting an up-to-date, learner-inclusive, inductive examination of AI in ELT/L. The central research question is: How is AI currently applied in ELT/L? Four sub-questions provide additional detail:

1. What are the geographic patterns and temporal trends of AI studies in ELT/L?
2. Which educational levels do the learners in these studies represent?
3. What educational benefits does AI provide in ELT/L?
4. What challenges accompany AI use in ELT/L?

## 3. Methodology

This study employed a systematic review approach to address the five research questions guiding the investigation. The systematic review was conducted in two principal stages. The initial stage involved the search, identification, and selection of relevant studies, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

The subsequent stage consisted of analyzing the selected studies using a mixed-method approach.

Quantitative techniques provided aggregated numerical data, while qualitative analysis utilized both deductive and inductive coding methods, combining a priori and grounded coding strategies (Strauss & Corbin, 1995) to synthesize how AI is being applied in English language teaching and learning (ELT/L), and to develop emergent theories from the collective findings (Gough et al., 2017).

### 3.1. Search Procedure

The review focused exclusively on primary research studies, defined as those involving direct data collection from participants, thereby excluding theoretical articles and prior systematic reviews. To ensure research quality, only peer-reviewed journal articles were considered. Previous research highlights a significant rise in AI applications in education during the last decade (Crompton & Burke, 2022, 2023), so the search was limited to publications dated from 2014 to 2023 to capture contemporary trends and the latest technological advances in AI.

Data were gathered through two complementary methods: electronic database searches and hand searches of specialized journals. The electronic search utilized the EBSCOhost platform, encompassing education-related databases, alongside JSTOR, Science Direct, and Web of Science. A Boolean search string combining terms related to ELT/L, AI, and teaching/learning was employed (Table 1). Various ELT/L acronyms, such as ESL, CLT, and EFL, were tested in the search, but since these acronyms appeared within studies already captured by broader language learning terms, they were removed to streamline the search process.

**Table 1.** Boolean Search Terms

| Search Section | Search Terms |
|---|---|
| Part 1 | 'Language learning' OR 'language teaching' OR 'language acquisition" |
| Part 2 | Artificial intelligence' OR 'AI' |
| Part 3 | 'High school' OR 'middle school' OR 'elementary school' OR 'secondary school' OR 'k-12' OR 'higher education' OR 'tertiary education' OR 'adult learner' OR 'professional development' OR 'continuing education' OR 'training' |

### 3.2. Inclusion and Exclusion Criteria

The combined electronic and manual searches identified 370 articles eligible for screening. After removing 5 duplicates, 365 articles remained for review. These were evaluated based on the inclusion and exclusion criteria summarized in Table 2. Two independent reviewers assessed each article, achieving a 97% agreement rate (Belur et al., 2018). Discrepancies were resolved through discussion, leading to full consensus. Ultimately, 320 studies were excluded, resulting in 45 studies retained for the final analysis. Figure 1 outlines the study selection process and reasons for exclusion. Hand searches targeted specialized ELT/L journals potentially omitted from databases due to size or archival limitations. These included TESL-EJ, Computer Assisted Language Learning, International Journal of Bilingual Education and Bilingualism, Language Teaching Research, TESOL Quarterly, and Studies in Second Language Acquisition.

### 3.3. Data Analysis

Following study selection, relevant data were extracted and aligned with the research questions. Analysis employed a blend of a priori and grounded coding techniques. A priori codes were predetermined and included categories such as geographic location (continent and country), publication year, and educational levels (K–12: ages 5–18; higher education: university/tertiary; adult learners: non-formal or professional training contexts).

Grounded coding (Strauss & Corbin, 1995) was subsequently applied to inductively uncover the affordances and challenges associated with AI in ELT/L. This inductive coding avoided reliance on pre-established frameworks to reduce bias, enabling emergent themes to be drawn directly from the texts. The constant comparative method was utilized, wherein two researchers independently examined and coded textual segments. For example, phrases like “students received immediate feedback” were coded as both an “Affordance” and “Immediate Feedback.” The coding process also incorporated ‘In vivo’ coding (Saldana, 2015), which uses participants’ original language to maintain fidelity to the authors’ intended meanings.

**Table 2.** Inclusion and Exclusion Criteria

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| Peer-reviewed journal articles published between 2014 and 2023 | Conference proceedings |
| Primary research involving teaching and learning English as an additional language using AI | Editorials |
| Articles written in English | Studies focused on AI as the subject of learning (e.g., computer science classes) rather than AI as a learning tool |
| | Studies involving native English speakers learning English |

As coding progressed, codes were refined and organized into categories and subcategories (axial coding). Researchers periodically convened to compare codes, resolve discrepancies, and achieve consensus. Coding was considered theoretically saturated once all relevant data aligned with existing codes. Interrater reliability was maintained above 95%, reaching 100% after final discussions (Figure 1). The resulting codes are presented in the findings section.

## 4. Results

This section presents the outcomes of the study aligned with the four research questions guiding the investigation. The initial two questions establish the contextual background of the included studies, focusing on their geographical distribution, publication timelines, and educational levels of participants. The latter two questions delve deeper into the benefits and obstacles encountered when integrating AI in English language teaching and learning (ELT/L).

### 4.1. Geographic Distribution and Publication Trends of AI Research in ELT/L

#### 4.1.1. *Geographical Distribution*

Analysis of the geographic origin of the studies reveals a predominant concentration in Asia, with approximately 33 out of 45 studies originating from this region (Figure 2). Among these, China leads with 9 studies, followed by Taiwan with 8, and Japan with 5 contributions. This is consistent with existing literature which, prior to 2021, showed the United States as the leader in AI education research, followed by Asia (Chen et al., 2020; Crompton et al., 2022). However, more recent reviews from 2021 onward highlight Asia, especially China, as the primary contributor in the AI research arena (Crompton & Burke, 2023). Factors such as increased governmental funding and strategic incentives are believed to drive this surge in AI-related publications from China (Li et al., 2021).

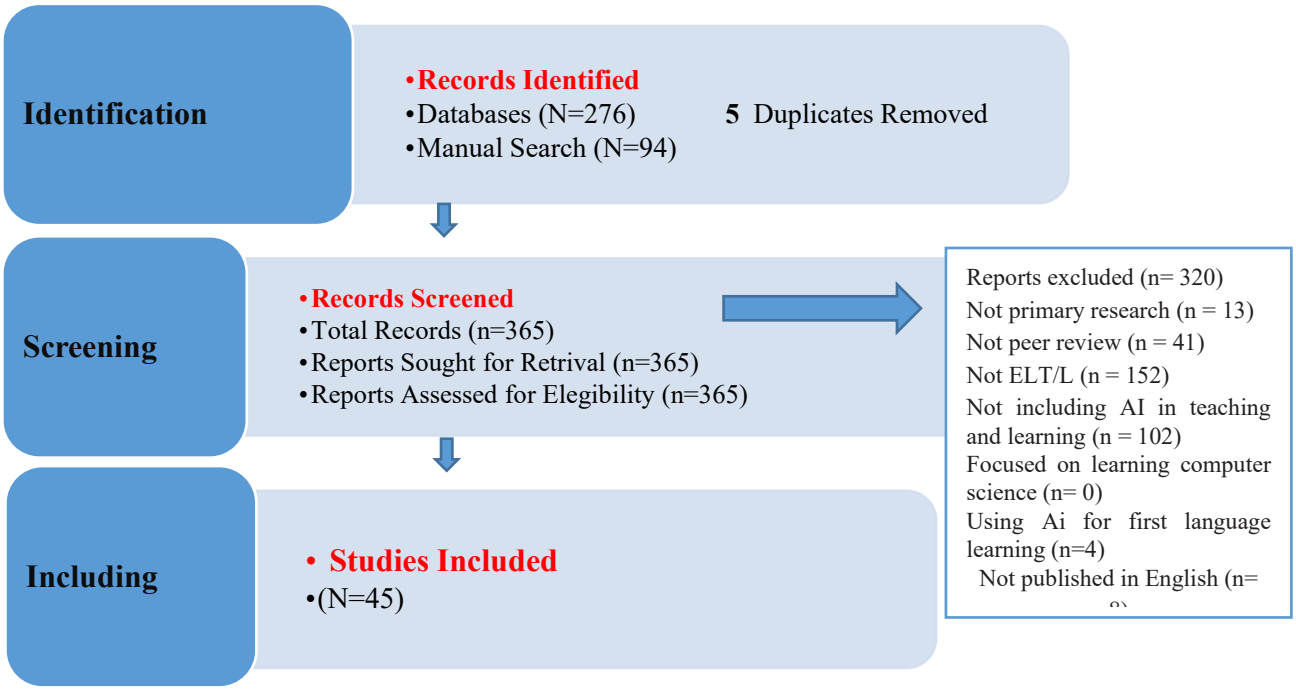


**Figure 1.** Identification of studies via databases and manual search

In the current analysis, nearly 70% of the reviewed papers originate from Asia, with China alone accounting for around 16% of the total. It is notable that most of these countries do not have English as a primary language. Although English-speaking countries like the UK host diverse populations, including migrants, the bulk of AI-ELT/L studies appear concentrated in non-native English-speaking nations. This aligns with Lan et al.'s (2020) assertion that English is widely utilized for employment, commerce, tourism, and global communication. The prominence of Asia in this field suggests a targeted research interest in ELT/L within regions where English is a secondary language. Future research might investigate whether Asia's growing AI research output extends across disciplines or is predominantly focused on language education.

#### 4.1.2. *Publication Timeline*

The data indicate a sharp increase in AI-focused ELT/L studies over the last decade (Figure 3). The initial five-year period from 2014 to 2018 featured only five publications, while the following six years till the end of 2024 saw a significant rise, with 40 papers published. This upward trajectory correlates with the rapid proliferation of AI tools and their heightened visibility in education, as well as expanded media attention on AI technologies.

One landmark development occurred in early 2018 when the International Society for Technology in Education (ISTE) launched one of the first professional development courses aimed at equipping K-12 educators to integrate AI into their teaching practices (International Society for Technology in Education, 2018). Since then, AI offerings have diversified, from Google's accessible AI experiments to sophisticated generative models like ChatGPT.

Though early research was limited, these initial studies likely seeded growing interest in AI for ELT/L.

Sharadgah and Sa'di (2022) observed a comparable surge in publications from 2015 to 2021, noting a sharp increase from 10 papers in 2020 to nearly 29 in 2021. The 2021 peak may partially reflect an influx of conference proceedings focused on AI, with some of these subsequently published as journal articles, which aligns with the patterns observed in this study's more recent data.

### 4.2. What Educational Levels Are Represented in the Studies?

The majority of studies reviewed were conducted within higher education settings (Figure 4). Similar findings were reported by Sharadgah and Sa'id (2022) and Yang and Kyun (2022), who noted a considerably greater volume of research focused on higher education compared to K-12. One potential explanation for the lower representation of K-12 learners is age-related restrictions on AI tools. For example, OpenAI initially limited access to their products to users aged 18 and over, only later lowering this to 13 with parental consent following the release of ChatGPT in late 2022. Such restrictions may have contributed to fewer K-12 studies in earlier years.Interestingly, this age-related trend does not appear to extend to adult ELT/L, where there remains a notable research gap. This systematic review is among the first to examine AI applications across all three learner categories: K-12, higher education, and adult learners. The significant disparity in peer-reviewed research targeting adults highlights the need for further investigation.

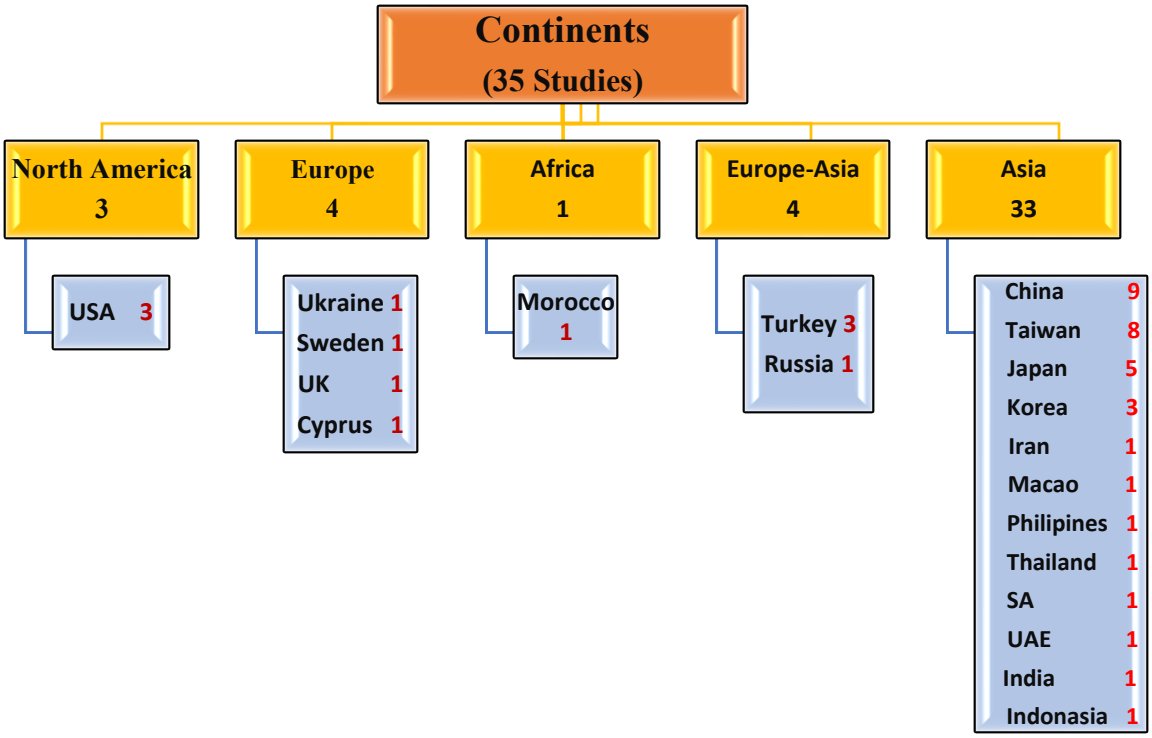


**Figure 2.** The geographic origin of the studies

The predominance of higher education studies may also be influenced by easier access to participants within university environments. Faculty researchers often have ready access to students within their institutions,

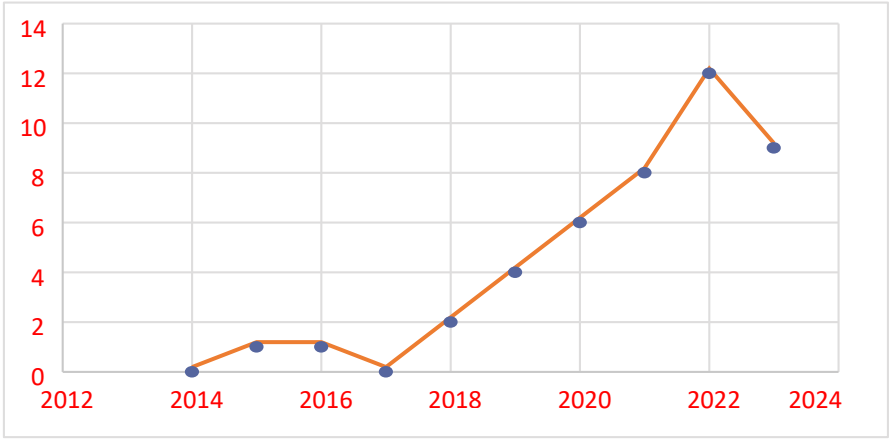


**Figure 3.** Publication years from 2018 to 2024

potentially facing fewer ethical hurdles compared to conducting research with younger learners. Nonetheless, it is critical that future research broadens its scope to understand AI's role in ELT/L across all learner levels.

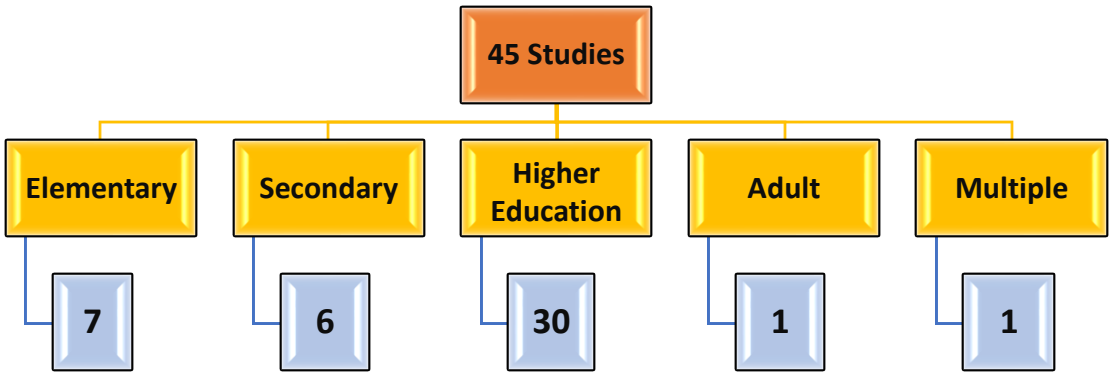


**Figure 4.** The Level of Education in 45 Studies

### 4.3. How Is AI Being Used to Support Educational Affordances in ELT/L?

Grounded coding of the selected studies revealed six major ways in which AI is being applied in ELT/L (Figure 5). Prior systematic reviews have often employed a priori frameworks focusing on core language skills such as listening, reading, speaking, and writing (e.g., Yang & Kyun, 2022). However, the inductive grounded coding approach adopted here allowed for emergent patterns beyond predetermined categories. While writing, speaking and reading skills were confirmed as key focal points, interestingly, listening did not emerge as a prominent area of study. Moreover, this approach highlighted additional trends: the use of AI to enhance and diversify pedagogical methods, support learner self-regulation, and address affective dimensions of language learning. Although some overlap occurred between these categories, each study was assigned a primary AI usage code. Further axial coding provided more detailed subcategories within each main use. The following sections present both the principal uses of AI in ELT/L and their related educational affordances.

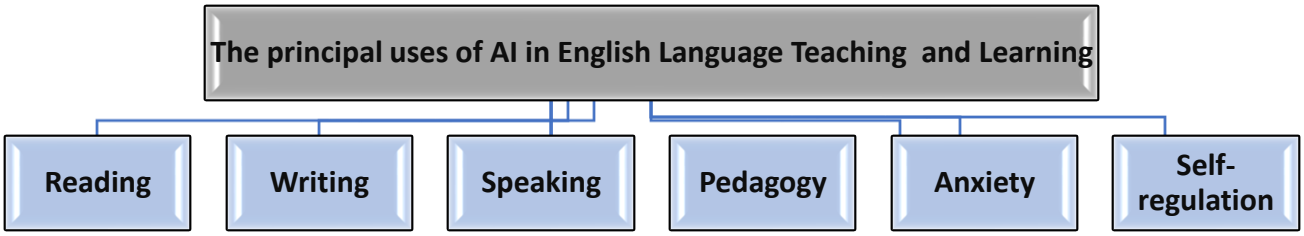


**Figure 5.** Six major ways in which AI is being applied in ELT/L

#### 4.3.1. *Reading*

Reading appeared in the grounded coding but was less prominent compared to writing and speaking, reflecting findings by Sharadgah and Sa'di (2022). This lower focus may stem from AI's natural language processing strengths aligning more closely with speaking and writing tasks. Nevertheless, AI ELT/L studies on reading addressed technology, pedagogies, and subskills, resulting in five axial codes (Figure 6).

The only reading subskill targeted was vocabulary. Within pedagogy, gaming emerged as a distinct code. Although gaming could fit under technology, some studies focused on gaming as a learning method, while others developed AI-powered gaming systems. Zheng et al. (2015) investigated vocabulary learning through gaming quest-play in *World of Warcraft* (WoW), where Japanese pupils interacted with English-speaking players. Pupils embodied as avatars encountered terms like "looting" and learned their meanings through in-game chat explanations, offering learning opportunities beyond traditional classrooms.

AI-driven gaming provides context for often decontextualized vocabulary. WoW incorporates AI through non-player characters (NPCs), pathfinding algorithms, and dynamic environments to engage learners. For educators facing unmotivated pupils, AI-enhanced gaming offers a promising method to boost engagement and language acquisition (Figure 6).

#### 4.3.2. *Writing*

Similar to reading, studies focusing on writing revealed three axial codes: technologies, pedagogies, and subskills (Figure 7).

Technology-wise, AI translation tools were frequently examined. Though some argue translation tools might undermine language learning by offering quick solutions, Chon et al. (2021) found that South Korean college pupils using Google Translate produced a larger number of complex words and reflected more deeply on

lexical choices, enhancing their written expression. This suggests that translation tools can support rather than hinder vocabulary development and writing skills.

Pedagogically, AI's role in writing mainly centered on feedback provision via spelling and grammar checkers, as seen in studies by Dizon and Gayed (2021) and Nazari et al. (2021). The latter also reported significant improvements in behavioral, emotional, and cognitive engagement, alongside increased self-efficacy in writing among ELLs. Given AI's strong capabilities in procedural knowledge and language systems (Crompton et al., 2022), it is notable—and somewhat disappointing—that feedback remains the primary pedagogical use of AI in writing. Future research could explore wider pedagogical applications.The writing subskills most frequently targeted were vocabulary

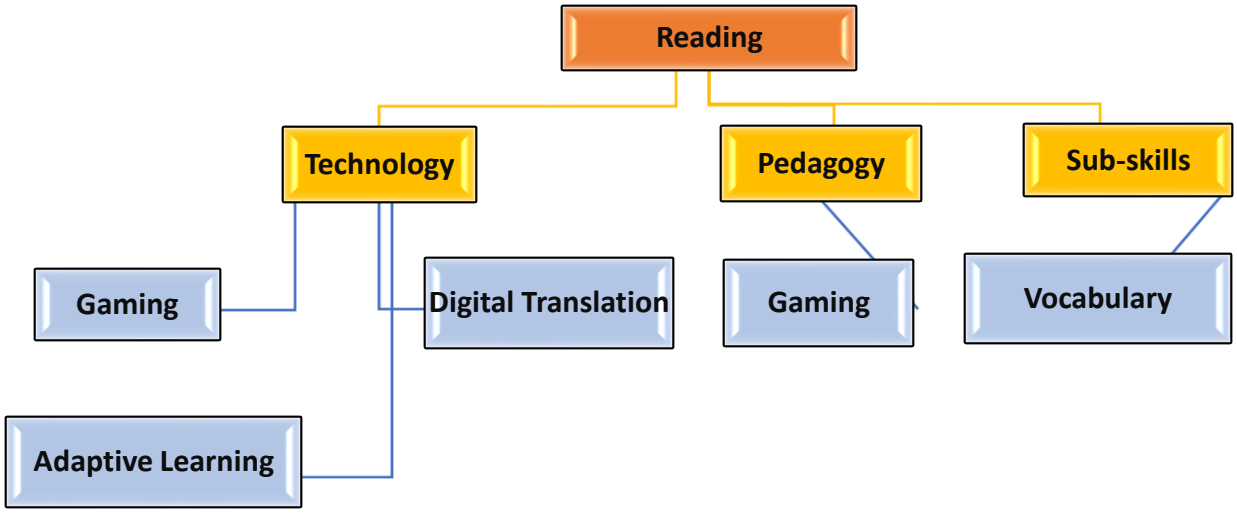


**Figure 6.** The Axial Codes for the Reading Skill

learning and grammar. Dizon and Gayed (2021) found that Grammarly significantly reduced grammatical errors and encouraged greater lexical variation among higher education ELT/L learners. The tool's predictive text and real-time feedback were particularly helpful for novice writers. AI grammar checkers were also a prevalent tool, following a cross-disciplinary trend exemplified by Grammarly (Koltovskaia, 2020). Lo (2023) reported improvements in vocabulary retention through the use of neural machine translation systems. While some educators worry that AI tools might encourage complacency or shortcuts (Bozkurt et al., 2023), these findings suggest AI-powered tools can effectively support writing skill development by providing timely corrective feedback and extending learners' vocabulary (Figure 7)

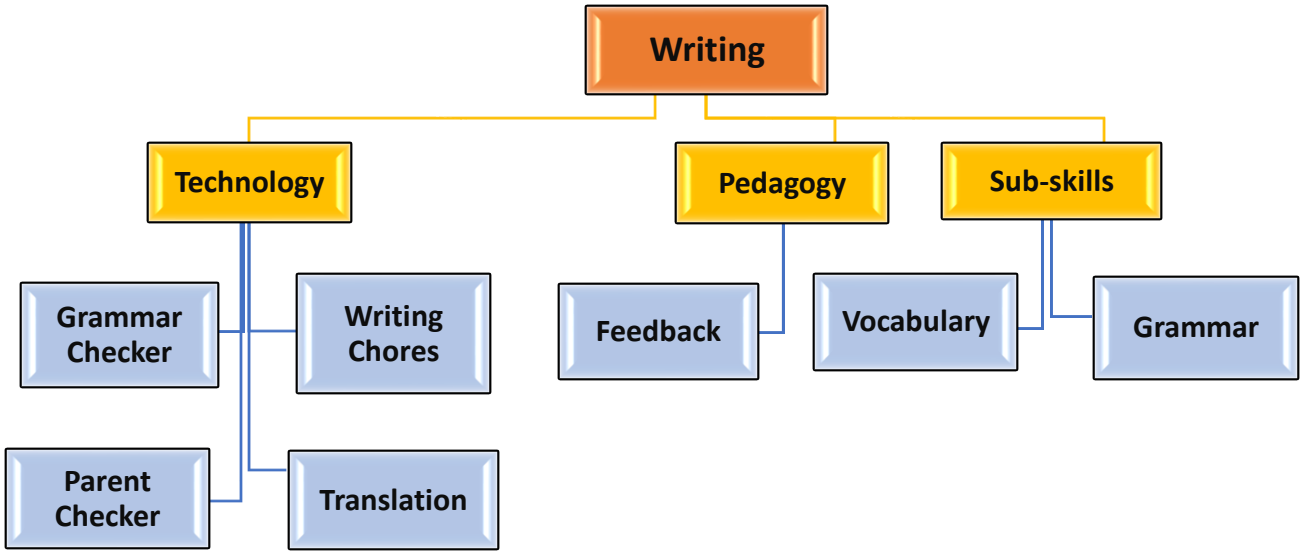


**Figure 7.** The Axial Codes for the writing Skill

4.3.3. *Speaking*

Further analysis of studies where pupils practiced speaking skills as the primary use of AI revealed three axial codes: technology, pedagogy, and subskill (Figure 8). Among speaking subskills, pronunciation was the sole focus, yet it appeared frequently across the studies. Various AI systems and programs targeted this area, addressing a common ELT/L challenge: limited opportunities for authentic English interaction outside

the classroom (Tokoz-Goktepe, 2014). For instance, Liu and Hung (2016) implemented an AI-based pronunciation system for Taiwanese pupils, which significantly improved their pitch variation and intonation. The system's visual pitch representation via spectrograms proved especially helpful in supporting pronunciation skills.

Three pedagogical uses of AI for teaching English speaking emerged: as a thorough multimodal system, a language coach, and a conversational partner. Dizon and Tang (2020) had pupils converse with Alexa, a voice assistant, finding that pupils enjoyed the interaction, improved vocabulary acquisition, and developed language skills meaningfully. Interestingly, although conversations typically involve both speaking and listening, this review found no focus on listening skills in the studies examined, which is an important consideration for educators implementing AI in language classrooms

Technological affordances focused on speech recognition, automatic speech analysis, adaptive learning, and voice assistance. Kazu and Kuvvetli (2023) developed an AI-supported pronunciation model for high school pupils in Turkey that allowed practice, recording, and feedback on pronunciation, showing enhanced retention and particular benefit in consonant and vowel sound learning. Generative AI tools like ChatGPT now provide speech options, enabling pupils to verbally converse with AI, offering virtually unlimited practice with advanced vocabulary. While promising, these tools may lack the targeted, detailed feedback provided by specialized pronunciation programs.

Studies also highlighted coaching approaches, where AI tailored instruction to individual learners using multimodal presentations such as text, images, audio, and video. For example, Lin and Mubarok (2021) used videos, pictures, memes, and songs to facilitate more fluent and accurate speaking among university students. Shivakumar et al. (2019) similarly demonstrated that such multimodal coaching was especially effective for young English Language Learners (ELLs) in higher education.

Tai et al. (2022) combined virtual reality (VR) with AI speech recognition for middle and high school pupils learning vocabulary. The AI agents' kinesic signals (e.g., gestures, eye contact) and linguistic cues (e.g., "pardon me") were found to significantly enhance pupils' speaking skills. This contextual interaction supports vocabulary learning, underscoring the advantage of multimodal feedback, which generative AI currently does not offer (Figure 8).

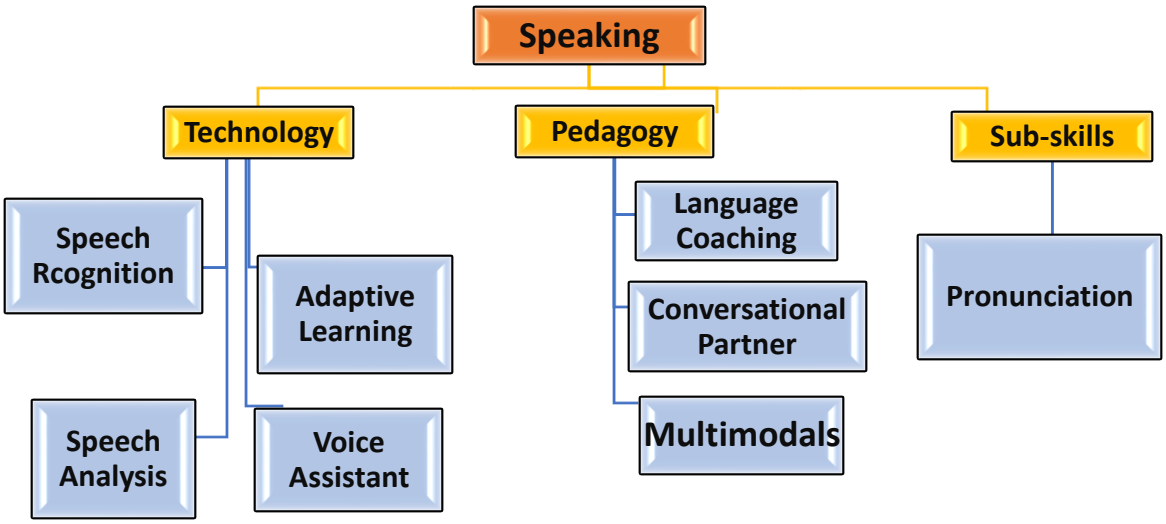


**Figure 8.** The Axial Codes for the Speaking Skill

4.3.4. *Pedagogy*

As a reminder, Table 3 provides a summary of those pedagogies that appeared in the earlier axial codes for language skills.

The pedagogy code identified methods, strategies, and techniques used to facilitate ELT/L with AI. Unlike axial codes tied to specific skills, pedagogy here is a primary code, indicating a research focus on teaching approaches themselves. These studies spanned formal, informal, and non-traditional settings, targeting various language skills and pedagogies (Figure 9).

Five axial codes emerged from pedagogy coding (Figure 9), with some studies combining multiple pedagogical approaches to offer personalized learning. For example,

**Table 3.** Pedagogies for targeted language skill learning.

| Speaking | Writing | Reading |
|---|---|---|
| Conversational partner<br>Language coaching<br>Multimodal approach | Feedback | Gaming |

Kim (2022) examined the AI system Soljam, which provided score predictions, lectures, explanations, and practice tests tailored to Korean pupils preparing for the

TOEIC exam. AI delivered content via both computers and mobile devices, with some learning aspects better suited to larger screens.

Lee et al. (2023) explored a learner-generated context (LGC) approach, where AI designs and applies digital technology that adapts to learner actions and preferences, fostering autonomous learning. This context-based pedagogy reflects a recent, student-centered method aligned with AI's capabilities.

Despite these innovations, traditional pedagogies like lectures and explanations remain prevalent. Crompton and Burke (2020) critique this as "using 21st Century technologies, with 20th Century teaching." AI's potential to analyze large datasets quickly, especially for assessment, remains underexplored, signaling a key future research direction.

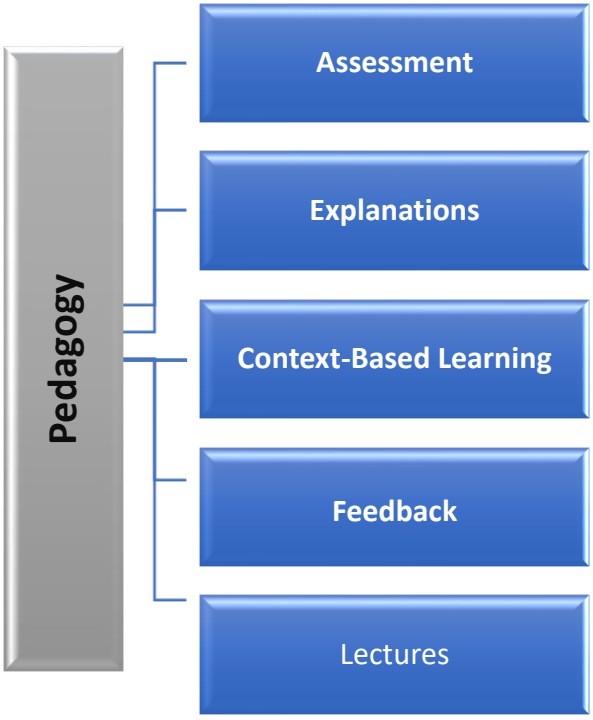


**Figure 9.** The Axial Codes for the Pedagogy

4.3.5. *Anxiety*

Anxiety was the final axial code, referring to learners' apprehension about speaking English, making mistakes, or interacting. Several studies found AI tools help reduce language learning anxiety. For example, Çakmak (2022) reported that AI interventions raised pupil skills while lowering anxiety, highlighting an important emotional benefit of AI in ELT/L. Similarly, Chen, Koong, and Liao (2022) used AI automatic speech recognition with fifth graders in Taiwan, finding improvements in speaking skills accompanied by reduced anxiety.

4.3.6. *Self-regulation*

Self-regulation emerged as a significant theme, with five axial codes (Figure 10). It refers to managing one's thoughts, emotions, behaviors, and physiological responses to achieve goals and maintain well-being. Affect influences choices; for instance, a negative mood may lead to impulsive or avoidant behavior.

Its appearance in this review is notable. While some scholars warn of risks that pupils might over-rely on AI (He, 2021), many studies indicate AI's role in fostering active thinking, goal setting, and learner independence. AI-powered tools, like chatbots, can promote self-regulation by helping pupils set goals and manage learning anxiety. Chen, Hsu, et al. (2022) combined AI and virtual reality in robot-assisted language learning, training English-speaking tour guides. Pupils engaged in interactive exercises and developed autonomy, motivation, and engagement. Hew et al. (2023) used chatbots in online ELT/L courses to support goal setting and social presence. Pupils often feel isolated and struggle with self-regulation online, but chatbots helped

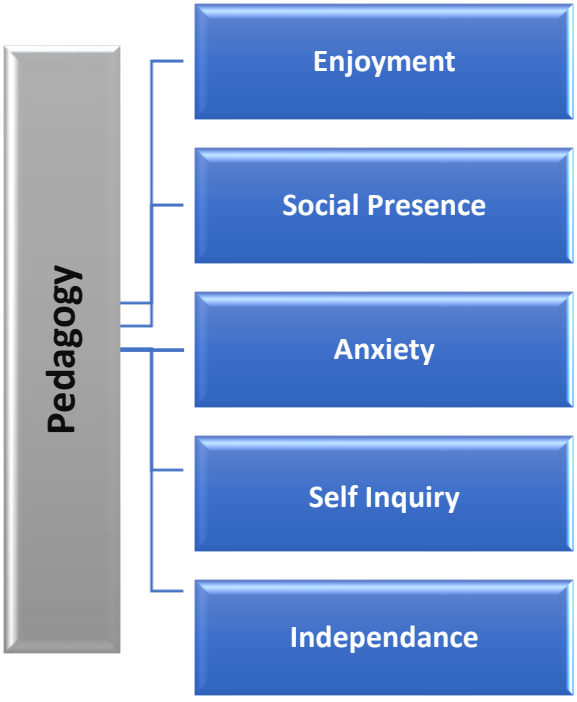


**Figure 10**. The Axial Codes for the Self-regulation

clarify goals, develop goal-setting techniques, and raise awareness of learning strategies, enhancing engagement and enjoyment.

### 4.4. What are the challenges of using AI in ELT/L?

Across the studies, challenges of using AI in ELT/L were not well reported, as researchers tended to focus more on the affordances of AI systems. This reflects a common issue known as positive publication bias, where journals prefer publishing positive findings rather than challenges or problems (Mlinarić et al., 2017). Of the 45 studies in this systematic review, 28 (70%) did not report any challenges. Those that did often mentioned challenges only briefly and usually after positive comments. However, grounded coding revealed four main categories of challenges: standardizing language, limited capabilities, technology breakdowns, and fear (Figure 11)

One of the most compelling challenges identified was AI's role in potentially standardizing languages and ideologies. Rowe (2022) studied a second-grade classroom in the USA where 17 of 24 pupils were emergent bilinguals supported by Google Translate. The study revealed that Google Translate's programming conveyed messages about what constitutes appropriate and standard language. For instance, a pupil speaking Tagalog was required to use the AI's chosen label "Filipino" instead of her family's language name. As AI systems become more widespread, educators and leaders must recognize these issues and work to mitigate them. AI developers should also adapt their systems to better represent all pupils' cultures and linguistic needs. Additionally, fostering digital literacy among English learners to navigate AI tools carefully is essential.

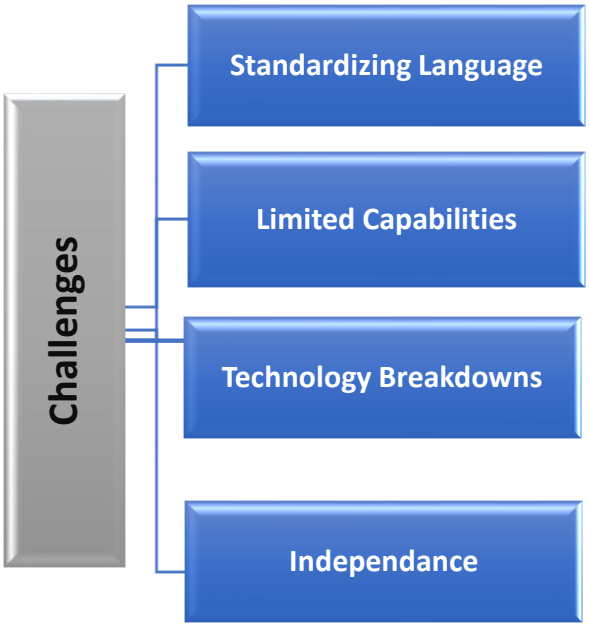


**Figure 11.** The Challenges with the use of AI in ELT/L

Fear associated with AI use emerged as another significant challenge, linked to several factors. Pupils experienced three types of fear: concerns about sharing personal information without clarity on data storage or access, fear of the unknown due to unclear AI operations, and fear of losing natural environments and authentic emotions when interacting with AI (e.g., Viktorivna et al., 2022).

Technology breakdowns are a frequent issue across all technologies, including connectivity problems or failures in programs or computer functions. A specific AI-related breakdown identified was when AI gave incorrect answers. Limited capabilities refer to users' desire for AI systems to perform more advanced functions. For example, Thompson et al. (2018) reported that pupils wanted improvements in the AI chatbots they used, with some finding the chatbot interactions unnatural, leading to disinterest. Ericsson et al. (2023) similarly found that while pupils enjoyed using virtual humans as conversational agents, some felt misunderstood or unheard at times. These pupils called for further advancements to overcome such limitations.

## 5. Discussion

This review confirms several trends in AI's integration into English language teaching and learning while also offering new insights. Echoing earlier systematic reviews (Crompton et al., 2022; Crompton & Burke, 2023), we found a strong concentration of studies in Asia, with China, Taiwan, and Japan leading. This pattern differs from the pre-2021 landscape, when the United States dominated AI-in-education research (Chen et al., 2020). A likely driver is the combination of targeted government investment, national AI strategies, and the region's recognition of English as a gateway to global communication (Li et al., 2021; Lan et al., 2020). Significantly, many of these studies originate in contexts where English is an additional language, which may explain AI's appeal as a tool to close proficiency gaps.

The timeline analysis revealed a marked rise in AI-ELT/L publications after 2018, consistent with trends in broader educational contexts (Sharadgah & Sa'di, 2022; Yang & Kyun, 2022). The period after 2021 saw particularly rapid growth, likely influenced by the release and mainstream adoption of large language models and more accessible AI tools (Isaee et al., 2024; Vuong et al., 2023). The finding aligns with Zawacki-Richter et al. (2019), but here we provide ELT/L-specific evidence of this acceleration.

A notable imbalance emerged in educational levels studied: higher education dominates, K-12 receives less attention, and adult education is particularly underrepresented. Previous reviews acknowledge the higher education bias (Sharadgah & Sa'di, 2022), but the lack of research on adult learners, especially in professional or community settings, remains a major gap, also noted by Baranwal (2022). While age-related access restrictions partly explain the limited K-12 work, the near absence of adult-learning studies suggests a need for targeted investigation.

Our grounded coding approach revealed a wider spectrum of AI uses than frameworks in earlier reviews often allowed (e.g., Zhang & Zou, 2023). While speaking and writing remain the most common skills addressed, supporting Crompton et al.'s (2024) observations, listening was largely overlooked. Additionally, affective and self-regulatory benefits emerged, indicating AI's potential to support learner confidence and autonomy. Studies showing reduced language anxiety (Çakmak, 2022; Chen, Koong, & Liao, 2022) illustrate AI's role as a low-pressure practice partner, but whether these gains transfer to real-world communication remains an open question.

The focus on corrective feedback in writing aligns with earlier findings on grammar checkers and translation tools (Chon et al., 2021; Dizon & Gayed, 2021; Lo, 2023). However, this emphasis risks underutilizing AI's potential for developing higher-level writing processes, as noted by Crompton & Burke (2020). Likewise, AI-supported gaming for vocabulary acquisition (Zheng et al., 2015) appears promising but remains under-researched given its potential for immersive, adaptive learning. Challenges reported in this review parallel those found in wider AI-in-education research (Ericsson

et al., 2023; Wang et al., 2023) but include ELT/L-specific issues. For example, AI's tendency to impose standardized language norms (Rowe, 2022) can marginalize local linguistic identities, reflecting broader concerns about cultural bias in AI systems (Annamalai et al., 2023). Other recurring issues include privacy worries, limited system capabilities, and technology breakdowns, all of which can hinder classroom adoption. By taking an inductive, exploratory approach, this study answers calls from Yang & Kyun (2022) and Sharadgah & Sa'di (2022) to capture emerging applications and concerns that predetermined coding schemes may overlook. The results not only confirm known areas of AI use but also highlight neglected skills, learner groups, and ethical considerations. Together, these insights provide a clearer picture of AI's evolving role in ELT/L and outline priorities for research and practice.

## 6. Conclusion

This study presents several key findings relevant to practitioners. Previous reviews (Crompton et al., 2022, 2024) show that AI use in English language learning is more prevalent than in any other subject. English language teachers must make informed, principled decisions about AI use, but rapid technological developments pose ongoing challenges for maintaining up-to-date AI literacy. This raises important questions about how initial teacher education and in-service training can prepare educators to integrate AI effectively. The study highlights that AI can carry implicit messages about appropriate or standard language use, which may promote specific ideologies or privilege some groups while excluding others. Practitioners need to critically consider how pronunciation models and other language choices are made and by whom, to avoid implicit biases that elevate one variety of English over global Englishes.

AI also shows promise in reducing learners' anxiety by providing neutral, non-judgmental language practice partners outside the classroom. However, it remains unclear whether AI use fully prepares learners for real-life conversations or if anxiety persists when interacting with human interlocutors. Improving digital literacy among both teachers and learners is critical. Broader AI literacy should include transparency, trust, surveillance, and privacy concerns. Practitioners require support from policymakers to raise awareness of AI's limitations and ethical considerations. Ignoring these issues risks exacerbating the digital divide.

Fear around AI usage often stems from the opacity of data processing, potentially undermining trust. Without clear data privacy policies and ethical guidelines, AI deployment in ELT/L could negatively affect teaching and learning. Therefore, regulatory and ethical frameworks are urgently needed to protect users and build trust. Policymakers should prioritize creating accessible, unambiguous ethics statements for AI in ELT/L. However, they must also consider the digital divide, as some countries may lack the capacity to implement such frameworks, potentially leading to unequal adoption and benefits. Finally, practitioners should be cautious about "AI hype" and maintain realistic expectations about AI's current capabilities, given the gap between expectations and actual performance.

This review identified several gaps warranting further research. Notably, most AI in ELT/L studies originate from Asia (74%), which should interest researchers, policymakers, and industry leaders globally. There is also a predominance of research conducted in higher education contexts, despite ELT/L occurring across diverse settings. Future studies should therefore explore a broader range of geographical locations and educational levels, including adult learning and K-12, to increase generalizability.

The limited reporting on challenges relative to affordances may be due to positive publication bias, emphasizing the need for more explicit investigation of AI's difficulties in ELT/L. Emerging AI technologies like ChatGPT and large language models require further research to understand their potential support for ELT/L, with increased attention expected from 2024 onward. Current research focuses heavily on speaking and writing, raising questions about AI's effectiveness across different language skills. Additionally, subskills related to these main skills remain underexplored. Future studies should investigate AI's role in developing these subskills. In writing, feedback was the only pedagogical focus identified; however, AI's potential to assist with procedural knowledge in writing offers a promising area for further research. There is also a need to explore AI-powered gaming's place in ELT/L and examine specific design features that facilitate language learning in multiplayer online games. While translation tools can enhance learners' lexical resources, it is unclear how these tools affect skill development when removed. Future research should clarify the role and impact of machine translation tools in ELT/L. This systematic review explored the use of AI in English language teaching and learning (ELT/L), providing a comprehensive overview of the contexts, applications, affordances, and challenges associated with AI in this field. The study is distinctive in three ways: (1) it covers all learner levels from K-12 to higher education and adult learners; (2) it employs grounded analysis to examine AI use in ELT/L; and (3) it offers an up-to-date synthesis incorporating recent AI advances.

Findings indicate that most research originates from Asia, with over half of the studies conducted there. The upward trend in AI-related publications in ELT/L began around 2017. While studies span all educational levels, 65% focused on higher education, followed by young children and secondary school contexts.

Six key areas of AI application emerged: writing, speaking, reading, pedagogy, Anxiety and self-regulation. Within these areas, gaps were identified, particularly regarding receptive skills, subskills, and the exploration of specific AI tools. Reporting on challenges was limited, though five main challenges were noted: technology breakdowns, limited AI capabilities, user fear, and the potential for AI to standardize language use, sometimes marginalizing lesser-known languages or forcing conformity to AI-imposed language norms.

The study underscores the urgent need to prepare English language teachers to understand AI technologies, leverage their benefits effectively, and recognize associated limitations. It is important to acknowledge this review's limitations, including the focus on English-language publications and the potential for additional insights from other databases.
Ultimately, this review serves as a foundation for future research to address identified gaps and deepen understanding of AI's role in ELT/L. Policymakers, funders, practitioners, and educational leaders can use these findings to inform decisions and strategies, gaining a holistic view of current trends in AI integration within English language education.

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## Ethics Statement

Institutional Review Board approval is not needed for this systematic review.

**Authors Contribution**
All authors have contributed equally to prepare the paper.

**Availability of data and materials**
The data that support the findings of this study are available from the corresponding author, upon reasonable request.

**Conflict of interests**
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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