AI for Augmenting Learning Objectives and Outcomes in Large and Heterogeneous ELT Classes

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ABSTRACT

Persistent scepticism among English language educators regarding the implementation of AI tools stems from uncertainties about their pedagogical effectiveness and equitable application in heterogeneous classroom settings. Concerns regarding the potential depersonalization of instruction, and the intensification of existing educational inequities are frequently mentioned in the literature. Therefore, careful investigational research is essential to systematically examine these apprehensions, substantiate their validity, and guide the responsible integration of AI technologies within the domain of English language teaching. This research article aims to address this gap. The study will investigate the potential of using Artificial Intelligence (AI) in English Language Teaching (ELT) in large classes with diverse student profiles. As classrooms become increasingly heterogenous, with students from different linguistic, cultural, and academic backgrounds, traditional teaching methods may not effectively address the learning needs of every individual learner. This study is aimed at analysing the perceptions and experiences of students and instructors when AI-based tools and techniques are utilized in ELT. The findings will shed light on whether AI can enhance learning outcomes, engagement, and personalized instruction in large heterogeneous classes. The study also examines any challenges or barriers that may arise with the integration of AI in ELT. The results of this study will provide valuable insights into the scope and potential of incorporating AI in ELT to accommodate the diverse needs of learners in large class settings.

Keywords: Artificial Intelligence, English Language Teaching, large heterogeneous classes, personalized instruction, diverse learners, learning outcomes.

INTRODUCTION

In an era defined by rapid technological advancement, Artificial Intelligence (AI) has emerged as a transformative domain within computer science, fundamentally altering the paradigms of human endeavour across industries. AI, encompassing sophisticated algorithms, deep learning, and advanced models, seeks to imbue machines with the capacity to perform tasks conventionally reliant on human cognition—learning, reasoning, language processing, and complex decision-making. The profound impact of AI is evident in sectors such as healthcare, finance, and transportation, where it has catalysed the automation of intricate processes, heightened operational efficiency, and empowered data-driven decision-making at unprecedented scales.

Within this landscape of innovation, the field of education—and more specifically, English Language Teaching (ELT)—stands at the precipice of significant transformation. Traditional pedagogical approaches, while foundational, often struggle to accommodate the complexities of large, heterogeneous classrooms characterized by diverse linguistic, cultural, and academic profiles. The integration of AI into ELT promises not only to surmount these enduring challenges but to usher in a new era of individualized and adaptive learning experiences for every student. This research is driven by the imperative to rigorously investigate the capabilities of AI as a catalyst for educational enhancement in large, multifaceted learning environments. It seeks to interrogate the central question: Can AI-powered tools and methodologies meaningfully elevate learning outcomes, foster

heightened engagement, and deliver personalized instruction in English language classrooms where diversity is the norm rather than the exception? By systematically examining the perceptions and experiences of both students and instructors, this study aims to illuminate the true scope and potential of AI integration in ELT. The significance of this inquiry cannot be overstated. As machine learning, natural language processing, and intelligent tutoring systems evolve at an extraordinary pace, the educational sector is uniquely poised to harness these advancements for the benefit of learners worldwide. The findings of this study aspire not merely to contribute to scholarly discourse, but to inspire a paradigm shift in educational practice—one where technology and human ingenuity converge to create inclusive, dynamic, and effective learning environments for the twenty-first century and beyond. Through robust, multi-layered methodological framework, the study aims to illuminate the lived realities, perceived benefits, and persisting challenges of integrating AI in large, heterogeneous ELT classrooms. The findings are expected to inform policy, practice, and future research on equitable and effective technology adoption in complex educational settings.

LITERATURE REVIEW

The proliferation of Artificial Intelligence (AI) in the realm of education has invigorated scholarly discourse on personalized learning, adaptive instruction, and digital equity—topics especially pertinent to English Language Teaching (ELT) in large, heterogeneous classrooms. Researchers have increasingly recognized AI's potential to revolutionize pedagogical practices by leveraging data-driven insights and automation to address complex, multifaceted learning environments. A significant body of literature foregrounds the acute challenges faced by conventional teaching modalities in catering to the diverse needs of learners within expansive classroom settings. As reported by Holmes et al. (2019), traditional one-size-fits-all approaches often result in disengagement, particularly among students whose linguistic backgrounds, prior knowledge, or learning styles diverge markedly from the majority. This circumstance is further exacerbated in English language classrooms, where the range of proficiency, cultural perspectives, and educational readiness can be especially pronounced (Richards & Rodgers, 2014). AI-driven educational technologies have emerged as promising interventions, offering scalable and adaptive solutions tailored to individual learning trajectories. Intelligent Tutoring Systems (ITS), such as AutoTutor and Duolingo's AI-powered modules, have demonstrated efficacy in enhancing language acquisition by providing real-time, personalized feedback and dynamically adjusting content difficulty (Vesselinov & Grego, 2012). These platforms employ natural language processing (NLP) algorithms to interpret learner input, diagnose comprehension gaps, and recommend targeted practice, thus aligning instructional delivery with the unique needs of each student.

Moreover, machine learning models are increasingly employed to analyse vast datasets generated by students' classroom interactions, online assessments, and engagement metrics. As highlighted by Zawacki-Richter et al. (2019), AI systems can identify latent patterns in learner behaviour, predict at-risk students, and inform instructor interventions to pre-emptively address academic challenges. This capability is particularly salient in large, heterogeneous classes, where continuous formative assessment and timely feedback would otherwise be logistically unattainable. In the context of ELT, adaptive learning platforms integrate speech recognition, automated essay scoring, and chatbots to support not only receptive but also productive language skills. For example, Wang et al. (2021) note that AI-powered dialogue systems can facilitate speaking practice in low-anxiety environments, while automated writing evaluators provide granular, criterion-based feedback on grammar, coherence, and vocabulary. These technological affordances foster learner autonomy and engagement, essential for navigating the complexities of large, diverse cohorts.

However, the literature also identifies several challenges and limitations associated with AI integration. Issues of digital inequity remain pronounced, as not all students possess equal access to devices or reliable internet connectivity (Luckin et al., 2016). Additionally, concerns persist regarding the transparency and fairness of algorithmic decision-making, particularly in the assessment of open-ended language tasks (Williamson & Piattoeva, 2021). There is an ongoing dialogue about the risk of over-reliance on technology potentially diminishing the humanistic and social dimensions of language education (Selwyn, 2019).

Despite these concerns, an emerging consensus among scholars is that, when thoughtfully implemented, AI tools have the capacity to augment—not replace—the pedagogical expertise of instructors. As Bulger (2016) posits, the most successful deployments of AI in educational contexts are those which enable teachers to reclaim

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instructional time, focus on high-impact interactions, and differentiate support according to learner needs. This hybrid model of teacher-AI collaboration is particularly well-suited to large, heterogeneous ELT classes, where the dual imperatives of scalability and personalization converge. This review of literature identified the importance of integrating technology to augment learning outcomes in large, heterogeneous English Language Teaching contexts. However, the apprehension associated with AI tools is also noteworthy. Contextual adaptation, professional development, and ethical stewardship are prerequisites for meaningful and equitable AI adoption. Against this backdrop, the present study seeks to extend our understanding by examining the real-world experiences and perceptions of students and instructors utilizing AI-powered methodologies in diverse, large-scale ELT environments.

METHODOLOGY

This study employs a mixed-methods research design to comprehensively explore the experiences, perceptions, and outcomes associated with the integration of artificial intelligence (AI) in large, heterogeneous English Language Teaching (ELT) environments within Indian higher education. The methodological approach is grounded in pragmatism, leveraging both quantitative and qualitative data to yield nuanced insights into the complexities of AI-enabled language instruction at scale.

The research is situated across two universities and two colleges in India, purposefully selected to represent a diverse cross-section of institutional tiers, geographic regions, and student demographics. The target population includes undergraduate students enrolled in compulsory English language courses and their respective instructors. Large, heterogeneous classes are operationally defined as those comprising 50 or more students with demonstrable diversity in linguistic backgrounds, academic preparedness, and socio-economic status.

- Student Participants: Approximately 600 students from both urban and rural institutions, ensuring representation from a range of linguistic, cultural, and educational backgrounds.

- Instructor Participants: 30 ELT faculty members with experience in managing large, diverse classrooms and exposure to AI-driven teaching tools.

Data Collection Methods: The data collection process unfolds across three sequential phases

Phase 1: Quantitative Survey

Standardized questionnaires are distributed electronically to all student and instructor participants. The survey instruments are designed to measure baseline attitudes toward AI integration, perceived effectiveness of AI-powered methodologies, self-reported learning gains, and challenges encountered in large, heterogeneous ELT settings. Items employ Likert-scale, multiple-choice, and open-ended formats to capture both breadth and depth of responses.

Phase 2: Classroom Observations

A series of non-intrusive classroom observations are conducted within selected institutions where AI-based platforms and tools are actively deployed. Observers utilize a structured protocol to document instructional practices, patterns of student engagement, instances of personalized or adaptive learning, and observable challenges or innovations in classroom management states Tiwari in her article entitled, “Need for Skilful Scaffolding and Guided Practice in ELT Classroom.”

Phase 3: Semi-Structured Interviews and Focus Groups

To capture richer, contextually grounded data, in-depth semi-structured interviews are carried out with a purposive sample of instructors (n=15) and student focus groups (n=10, 6–8 participants each). The interview guides probe participants’ experiences with AI-enabled instruction, perceived impact on inclusivity and engagement, barriers to effective implementation, and suggestions for pedagogical improvement. All interviews are audio-recorded, transcribed verbatim, and anonymized.

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Data Analysis

A convergent parallel approach is used to analyse quantitative and qualitative data streams.

- Quantitative Data: Survey data are analysed using descriptive statistics (means, standard deviations, frequencies) and inferential analyses (ANOVA, t-tests, regression modelling) to examine relationships among variables such as perceived learning gains, engagement, and class heterogeneity.

- Qualitative Data: Transcripts from interviews, focus groups, and observation notes are subjected to thematic analysis using an inductive coding framework. Emergent patterns relating to adaptation, equity, instructional strategies, and learner outcomes are identified and triangulated with quantitative results.

Ethical Considerations: All procedures adhere to institutional ethical guidelines and have received approval from the relevant university ethics review board. Informed consent is obtained from all participants, with assurances of confidentiality, voluntary participation, and the right to withdraw at any stage. Data are anonymized and securely stored.

Limitations: Recognizing the inherent diversity of India's higher education landscape, the study acknowledges potential limitations in generalizability due to the purposive sampling strategy and institutional variation in AI adoption rates. Mitigation strategies include broad representation across multiple types of institutions and rigorous triangulation of data sources.

DISCUSSION

Understanding large, heterogeneous classes

In the context of global higher education, India stands as the third largest system in terms of enrolment, surpassed only by China and the United States. The university and college classrooms within India are emblematic of pronounced heterogeneity, particularly evident in lower-tier institutions where students are admitted from a broad spectrum of educational backgrounds and geographical regions. This composition engenders considerable diversity in terms of prior academic preparation, linguistic repertoire, and cognitive skills. Faculty members, therefore, confront the complex task of addressing a wide array of learning needs, shaped by students' previous instructional models, cultural influences, individual learning styles, attitudes, personalities, and interests.

Empirical evidence highlights that a significant proportion of students within these heterogeneous environments primarily engage at the lower tiers of Bloom's Taxonomy, focusing on rote memorization and basic comprehension rather than higher-order analytical or creative skills (Fink, 2005). This phenomenon underscores the urgent necessity for pedagogical approaches that can accommodate individual learner profiles and facilitate movement towards more advanced cognitive domains. Londres (2017) further contends that pronounced heterogeneity within classrooms can impede the progress of more advanced learners, necessitating that they divert attention to assist peers whose learning pace is comparatively slower. Such dynamics can detract from both individual and collective educational achievement. "The undeniable academic truth English communication skills are an essential part of any profession at the global level calls our attention to the fate of underprivileged or otherwise deprived student communities". (Tiwari, 238)

A nuanced understanding of the nature of large, heterogeneous classes is foundational to any exploration of Artificial Intelligence (AI) integration in English Language Teaching (ELT). Large classes are typically characterized by enrolment figures that significantly exceed the traditional classroom norm, frequently encompassing 50 or more students. Within these expansive settings, the spectrum of student abilities, proficiencies, and prior experiences is notably broad. Heterogeneous classes, as distinguished from their homogeneous counterparts, comprise individuals with differing linguistic backgrounds, academic histories, and cultural contexts. This diversity is not merely a matter of degree but of kind; the range of learning abilities, motivations, and needs present in such classrooms presents profound challenges for educators seeking to deliver personalized instruction. Concrete challenges inherent in these environments include distinct disparities in language proficiency—ranging from true beginners to advanced speakers—variegated learning styles (visual,

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auditory, kinesthetics, and multimodal), and significant differences in familiarity with digital learning tools. In addition to these, the socio-economic factors such as access to technology outside of the classroom, and varying levels of familial support further intensify the diversity of learning needs. The pedagogical task, therefore, is not only to acknowledge but to actively address these differences through innovative solutions. In this context, the integration of AI-driven methodologies in ELT emerges as a promising strategy for mitigating the limitations of traditional instruction. AI-powered platforms can systematically analyse student performance data, adapt content delivery to suit individual learning trajectories, and provide targeted feedback. By leveraging machine learning and natural language processing, these systems can identify latent patterns in student errors, recommend remedial resources, and foster an environment where instruction is both inclusive and responsive to the needs of each learner. The evidence base for such adaptive technologies is growing, with multiple studies indicating improvements in student engagement, learning outcomes, and overall satisfaction in large, diverse classroom settings. Hence, the critical examination of AI-enabled ELT in large, heterogeneous classes is not only timely but essential for the advancement of equitable, effective, and scalable educational practices in the 21st century. This research seeks to contribute substantively to this discourse by delineating both the challenges and the transformative potential of AI in addressing the complexities inherent to contemporary educational environments.

Established and Emerging Complexities of Heterogeneous Classes in ELT

Large, heterogeneous English Language Teaching (ELT) classrooms are laden with both long-standing and newly emergent challenges that profoundly impact the teaching and learning experience. At the core of these complexities lies the diversity of language proficiency levels: some students enter as true beginners, grappling with foundational vocabulary and grammar, while others possess advanced fluency, ready for intricate analysis and expression. This spectrum necessitates finely tuned differentiation, which is often beyond the practical reach of a single instructor managing a crowded room. Another enduring issue is the limited opportunity for individual attention. In expansive classrooms, the sheer number of learners restricts the instructor's ability to offer personalized feedback, targeted intervention, or emotional support. Students with quieter dispositions or those struggling academically may fade into the background, their specific needs overlooked amidst the collective. Diversity in learning styles and preferences further complicates instruction. Visual, auditory, kinaesthetic, and multimodal learners coexist, each requiring distinct approaches and resources. Traditional teaching methods may fail to engage this mosaic of cognitive preferences, resulting in uneven participation and comprehension across the class. Maintaining active engagement and meaningful participation is especially daunting. With so many voices competing for attention, some students become passive observers rather than active contributors. Cultural and linguistic differences may inhibit participation, particularly among those less confident in their abilities or unfamiliar with communicative classroom norms.

In addition to these established challenges, novel issues are rapidly surfacing as technology and societal expectations evolve. The integration of digital tools has created disparities in technological literacy and access, with some students thriving in tech-enhanced environments while others lag due to limited experience or inadequate resources outside of school. Socioeconomic factors magnify these gaps, affecting students' ability to complete assignments, participate in online activities, or access supplementary materials. Also, the rise of blended and remote learning environments brings new demands. Instructors must now navigate hybrid formats, ensuring equitable learning experiences for students both in-person and online. This shift introduces fresh obstacles in monitoring engagement, facilitating collaboration, and maintaining academic integrity. The combination of these established and novel challenges calls for innovative, flexible pedagogical strategies. Educators must remain responsive not only to the traditional complexities of large, diverse classrooms, but also to the unpredictable demands of the rapidly changing educational landscape. Only by acknowledging and addressing this full spectrum of challenges can ELT practitioners hope to foster truly inclusive, dynamic, and effective learning environments.

AI integration in ELT

The integration of artificial intelligence (AI) technologies within English Language Teaching (ELT) offers a transformative avenue for addressing the multifaceted challenges inherent in large, heterogeneous classrooms. AI has the capacity to create highly adaptive and responsive learning environments tailored to the diverse needs

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of contemporary student populations (Hwang & Tu, 2021). In educational settings characterized by marked differences in linguistic proficiency, learning styles, and prior experiences, AI-driven platforms provide a sophisticated means of differentiation. By systematically analysing student performance data, these systems can identify individual strengths and areas for improvement, thereby enabling instructors to construct highly personalized learning trajectories (Chen et al., 2020; Holmes et al., 2019). AI-powered tools, such as intelligent tutoring systems and language processing algorithms, facilitate the delivery of targeted instruction and timely feedback. For instance, chatbots and virtual language assistants can simulate authentic conversational scenarios, offering students opportunities for meaningful practice and immediate corrective input (Fryer & Carpenter, 2006). These interactive systems can detect pronunciation errors, suggest alternative vocabulary choices, and highlight grammatical inaccuracies in real time, fostering a learning environment that emphasizes both communicative competence and linguistic accuracy. Likewise, the implementation of adaptive e-learning platforms is particularly salient in the context of large, diverse ELT classrooms. These systems dynamically adjust instructional content to match each learner's specific needs and progression, promoting greater engagement and optimizing learning outcomes (Shute & Towle, 2003). The literature indicates that adaptive learning environments, which incorporate features such as interactivity, continuous feedback, performance tracking, and predictive analytics, contribute to increased motivation, deeper comprehension, and improved retention of language concepts (Chun-Hui et al., 2017; Pashler et al., 2008). The integration of multimedia resources—ranging from interactive exercises to immersive virtual reality simulations—further augments the learning experience by catering to a wide array of cognitive preferences and cultural backgrounds (Lin & Lan, 2015). Notably, these technological advancements are not merely enhancements to traditional instruction; rather, they constitute a paradigm shift toward inclusive, evidence-based pedagogical practices that are responsive to the complexities of modern education. The deployment of AI in ELT represents a critical advancement with the potential to revolutionize instructional practice in large, heterogeneous classrooms. By leveraging adaptive technologies, educators can provide equitable, personalized, and effective learning experiences that are substantiated by a growing corpus of empirical research. As such, the critical examination and continued implementation of AI-enabled methodologies remain central to the advancement of ELT in the twenty-first century.

Potential Outcomes of AI Integration

1. Personalized Learning: AI-based platforms and tools can analyse and process large amounts of data, enabling teachers to personalize instruction for individual students. AI algorithms can identify each student’s strengths and weaknesses and provide customized materials and activities accordingly. AI-based tools can analyse vast amounts of learner data, enabling teachers to gain a comprehensive understanding of their students’ language proficiency levels, strengths, and weaknesses. This information can aid in designing targeted and personalized learning experiences.

2. Adaptive Learning: AI technologies can create adaptive learning platforms that adjust to each learner’s pace and level of understanding. By leveraging machine learning algorithms, AI tools can track students’ progress and provide tailored content, ensuring that every student receives appropriate instruction. AI has the potential to create adaptive learning platforms that dynamically adjust to each student's progress. By analysing individual learning patterns and preferences, AI technologies can personalize the learning content and pace, allowing students to learn at their own speed. This adaptive learning approach ensures that students are neither overwhelmed nor bored, as the content is tailored to their specific needs and abilities.

3. Personalization and differentiated instruction: The diversity of learners in large, heterogeneous classes necessitates personalized and differentiated instruction. AI can support this need by tailoring content delivery and adapting teaching strategies to suit each student's learning style and level. For instance, AI can generate individualized quizzes, exercises, or adaptive assessments based on strengths and weaknesses identified through continuous evaluation. Furthermore, AI can facilitate personalized feedback on specific language skills or grammar rules, providing students with targeted intervention. By catering to the individual needs of students, AI in ELT can foster a more inclusive and equitable learning environment.

4. Intelligent Feedback and Assessment: AI can provide instant and intelligent feedback on students' performance, enabling them to identify their areas of improvement. with AI, automated assessment and feedback systems can be implemented, providing immediate evaluations and recommendations to students, facilitating self-paced and autonomous learning. With AI, students can receive real-time feedback on their language skills, enabling them to identify areas for improvement and take proactive steps towards enhancing their language proficiency. This not only empowers students to take ownership of their learning but also promotes a more efficient and personalized learning experience. Thus, automated assessment systems powered by AI can evaluate students' language skills and provide detailed reports and recommendations, facilitating self-paced learning.

5. Enhanced learning outcomes: One of the primary goals of incorporating AI in ELT is to enhance learning outcomes. Research has shown that personalized learning experiences have a positive impact on student achievement and engagement. With AI, teachers can create customized lesson plans and choose resources that cater to individual student needs, fostering a deeper understanding and retention of the English language. Additionally, AI can provide intelligent prompts and suggestions, improving students' writing and speaking skills. By offering real-time feedback, AI ensures students are continuously informed of their progress, which can motivate them to strive for improvement.

6. Increased engagement and motivation: In large, heterogeneous classes, maintaining student engagement is challenging due to the diverse learning preferences and varied levels of language proficiency. AI can address this issue by employing gamification techniques. Gamified language learning platforms incorporating AI algorithms can provide interactive and immersive experiences, encouraging students to actively participate and learn in an enjoyable manner. By introducing elements such as rewards, competitions, and progress tracking, AI can enhance student motivation and make language learning more stimulating

7. Gamification: AI-powered gamified platforms can make language learning more engaging and interactive. By incorporating elements such as rewards, incentives, and challenges, AI can motivate students to actively participate, practice, and improve their language skills in a fun and immersive manner. (Deterding et al, 2011)

8. Multilingual Support: AI's natural language processing capabilities allow for real-time translation and interpretation. In heterogeneous classes where students may have different mother tongues, AI can bridge language barriers and facilitate communication and understanding. AI's ability to process natural language and provide instant translation opens up opportunities for multilingual classrooms, fostering inclusivity and embracing the diversity present in heterogeneous educational settings.

9. Data-driven Decision Making: AI can generate valuable insights by analysing student data, which can assist teachers in identifying specific areas of improvement and adjusting their teaching strategies. AI-powered tools have the capability to analyse extensive amounts of learner data, enabling teachers to gain a comprehensive understanding of their students' language proficiency levels, strengths, and weaknesses. This information can then be utilized to design targeted and personalized learning experiences, catering to the specific needs of each individual learner. By leveraging AI, teachers can enhance the effectiveness of their teaching methodologies and ensure that students receive tailored instruction. This data-driven approach can help teachers make informed decisions about instructional design and individual student needs.

Challenges and Considerations in AI Implementation

According to Sandhya Tiwari, while the potential of AI in ELT is promising, it is essential to recognize the limitations and ethical considerations associated with its implementation. (Tiwari, pp 169) Striking a balance between the use of AI and the human touch in education is crucial. AI should enhance, rather than replace, the role of teachers who offer vital guidance, support, and personalized interaction in language learning. Although the potential of using AI in ELT for large, diverse classes is promising, there are several challenges and considerations to address. Firstly, concerns about privacy and data protection arise when AI tools collect and process sensitive student data. To ensure the safeguarding of student information, ethical and transparent

practices must be implemented. Additionally, the implementation of AI technologies often requires significant financial investments, which may not be feasible for all educational institutions. Furthermore, there is a need for teacher training and professional development to effectively integrate and utilize AI in ELT. Teachers must acquire the necessary skills and knowledge to leverage AI tools optimally. Lastly, it is crucial to strike a balance between the benefits offered by AI and the irreplaceable support and guidance provided by educators, as an excessive reliance on AI technologies may devalue human interaction in the classroom.

CONCLUSION

The integration of artificial intelligence (AI) into English language teaching (ELT) presents significant opportunities for enhancing educational practices. AI enables the delivery of personalized instruction and adaptive learning experiences, as well as the provision of intelligent feedback and multilingual support. These capabilities are particularly advantageous in large, heterogeneous classrooms, where adaptive learning platforms can dynamically respond to individual student progress and diverse learning needs. AI technologies facilitate immediate translation services, thereby fostering diversity and inclusion within multilingual learning environments. The application of AI in ELT supports the comprehensive analysis of learner data, which can inform the design of targeted and individualized educational interventions. Through such data-driven strategies, educators are better equipped to refine their instructional methodologies and cultivate inclusive and equitable learning settings. Despite these advantages, the successful adoption of AI in ELT necessitates careful consideration of ethical, privacy, and security concerns, particularly with respect to the collection and use of sensitive student information. Ongoing professional development and teacher training are also essential to ensure effective integration and optimal utilization of AI tools in educational contexts. With deliberate planning and adherence to ethical standards, AI holds considerable potential to transform English language education and to promote improved learning outcomes for all students.

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