

ENHANCING THE EFFECTIVENESS OF TEACHING ENGLISH
USING ARTIFICIAL INTELLIGENCE

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Abstract: *The integration of Artificial Intelligence (AI) into English language teaching has emerged as a transformative approach in modern education. This study investigates the effectiveness of AI-based tools and platforms in enhancing English language instruction across four key skill areas: reading, writing, listening, and speaking. A mixed-methods research design was employed, involving 120 university-level English language learners divided into experimental and control groups over a 16-week semester. Data were collected through pre- and post-tests, questionnaires, and semi-structured interviews. The results indicate that students who utilized AI-powered tools demonstrated statistically significant improvements in all four language skills compared to their counterparts who received traditional instruction. Furthermore, qualitative findings revealed increased learner motivation, engagement, and autonomy. The study concludes that AI can serve as a powerful supplementary tool in English language education when implemented with appropriate pedagogical frameworks and teacher guidance.*

Keywords: *Artificial Intelligence, English language teaching, educational technology, language learning, AI-assisted instruction, EFL/ESL*

INTRODUCTION

The rapid advancement of technology in the twenty-first century has fundamentally transformed the landscape of education. Among the most significant technological developments in recent years is Artificial Intelligence (AI), which has found applications across virtually every sector of human activity, including healthcare, finance, transportation, and, notably, education (Holmes et al., 2019). In the field of English language teaching (ELT), AI has introduced unprecedented opportunities for personalized learning, real-time feedback, and immersive language practice environments that were previously unattainable through conventional instructional methods.

English, as the global lingua franca, continues to be one of the most widely taught and studied languages worldwide. The demand for effective English language instruction has grown exponentially, particularly in countries where English is taught as a foreign language (EFL) or as a second language (ESL). Traditional teaching methods, while foundational, often face limitations in addressing the diverse needs, proficiency levels, and learning styles of individual students (Kukulska-Hulme & Shield, 2008). Large class sizes, limited contact hours, and insufficient opportunities for authentic language practice further constrain the effectiveness of conventional approaches.

Against this backdrop, AI-powered tools have emerged as promising solutions to many of these challenges. Applications such as intelligent tutoring systems, chatbots, speech recognition software, automated writing evaluation tools, and adaptive learning platforms offer learners the ability to practice language skills at their own pace, receive immediate corrective feedback, and engage in meaningful communicative activities outside the traditional classroom setting (Pokrivcakova, 2019). These tools leverage natural language processing (NLP), machine learning, and deep learning algorithms to analyze learner input, identify errors, and provide targeted recommendations for improvement.

Despite the growing body of literature on AI in education, there remains a notable gap in empirical research that systematically examines the impact of AI tools on English language learning outcomes within structured educational settings. Much of the existing research has focused on individual tools or specific skill areas, without providing a comprehensive assessment of how AI integration affects overall language proficiency. Moreover, questions regarding learner attitudes, teacher perceptions, and the practical challenges of implementing AI in diverse educational contexts remain insufficiently explored (Zawacki-Richter et al., 2019).

This study aims to address these gaps by investigating the following research questions: (1) To what extent does the integration of AI-based tools improve English language proficiency among university-level learners? (2) How do students perceive the use of AI tools in their language learning process? (3) What challenges and opportunities do teachers encounter when incorporating AI into their English language instruction? By answering these questions, this research seeks to contribute to a deeper understanding of the role AI can play in enhancing English language education and to provide practical recommendations for educators, curriculum designers, and policymakers.

LITERATURE REVIEW

Artificial Intelligence in Education

Artificial Intelligence in education (AIED) refers to the application of AI technologies to support and enhance teaching and learning processes. The field has evolved significantly since its inception in the 1970s, when early intelligent tutoring systems (ITS) were developed to provide individualized instruction in mathematics and science (Woolf, 2009). Contemporary AI applications in education encompass a broad spectrum of tools and approaches, ranging from adaptive learning platforms that adjust content difficulty based on learner performance to sophisticated natural language processing systems capable of engaging in meaningful dialogue with students.

The theoretical foundations of AI in education draw upon several established learning theories. Constructivism, which emphasizes the active role of learners in constructing knowledge through interaction with their environment, provides a strong rationale for AI tools that facilitate exploratory and discovery-based learning (Piaget, 1972). Similarly, Vygotsky's Zone of Proximal Development (ZPD) theory supports the use of AI as a scaffolding mechanism that can provide appropriate levels of support based on individual learner needs (Vygotsky, 1978). More recently, connectivism has emerged as a learning theory particularly relevant to the digital age, positing that learning occurs through connections across networks of information and that technology plays a central role in facilitating these connections (Siemens, 2005).

AI Tools in English Language Teaching

The application of AI in English language teaching has taken numerous forms, each targeting different aspects of language acquisition. Intelligent tutoring systems such as Duolingo and Babbel employ adaptive algorithms to personalize vocabulary and grammar instruction based on learner performance data (Settles & Meeder, 2016). These platforms track user progress, identify areas of difficulty, and adjust the difficulty and frequency of exercises accordingly, thereby optimizing the learning experience for each individual user.

In the domain of writing instruction, automated writing evaluation (AWE) tools such as Grammarly, ProWritingAid, and the ETS Criterion system have gained widespread popularity. These tools utilize NLP algorithms to analyze written texts for grammatical accuracy, coherence, vocabulary usage, and stylistic elements, providing learners with detailed feedback that can guide their revision process (Warschauer & Grimes, 2008). Research has demonstrated that AWE tools can be effective

in improving learners' writing quality, particularly when used as a supplement to teacher feedback rather than as a replacement (Stevenson & Phakiti, 2014).

For speaking and pronunciation practice, speech recognition technologies powered by AI have enabled learners to engage in spoken language exercises with real-time feedback on pronunciation accuracy, intonation patterns, and fluency. Applications such as ELSA Speak and Google's speech-to-text technology allow learners to compare their speech output with native-speaker models and receive specific recommendations for improvement (Shadiey et al., 2017). Additionally, AI-powered chatbots and conversational agents have provided learners with opportunities for interactive speaking practice in a low-anxiety environment, addressing one of the most commonly reported barriers to speaking skill development (Fryer et al., 2019).

Benefits and Challenges of AI in Language Learning

The literature identifies several key benefits associated with the use of AI in language learning. First, AI tools enable personalized learning experiences by adapting content, pace, and difficulty to individual learner profiles. This personalization is particularly valuable in contexts where class sizes are large and teachers have limited capacity to provide individualized attention (Chen et al., 2020). Second, AI tools provide immediate feedback, which is critical for language learning as it allows learners to identify and correct errors in real time, thereby reinforcing correct usage patterns (Golonka et al., 2014). Third, AI tools increase access to language practice opportunities beyond the classroom, enabling learners to engage in productive language activities at any time and from any location.

However, the integration of AI into language education is not without challenges. Concerns have been raised regarding the quality and accuracy of AI-generated feedback, particularly for complex language features such as pragmatic appropriateness and cultural nuance (Godwin-Jones, 2017). Additionally, the potential for over-reliance on AI tools and the consequent reduction in critical thinking and independent problem-solving skills have been noted as potential risks (Selwyn, 2016). Technical barriers, including limited access to devices and reliable internet connectivity, particularly in developing countries, also pose significant challenges to the equitable implementation of AI in language education (Warschauer, 2003). Finally, the role of the teacher in an AI-enhanced learning environment requires careful consideration, as effective AI integration demands that teachers possess adequate digital literacy skills and the pedagogical knowledge to incorporate technology meaningfully into their instruction (Ertmer & Ottenbreit-Leftwich, 2010).

METHODOLOGY

Research Design

This study employed a mixed-methods research design, combining quantitative and qualitative data collection and analysis methods to provide a comprehensive understanding of the impact of AI on English language teaching effectiveness. The quantitative component utilized a quasi-experimental pretest-posttest control group design, while the qualitative component involved semi-structured interviews and open-ended questionnaire responses.

Participants

The study involved 120 undergraduate students enrolled in English language courses at a public university. The participants were aged between 18 and 24 years and had an intermediate level of English proficiency as determined by a standardized placement test administered at the beginning of the semester. The participants were divided into two groups: an experimental group ($n = 60$) that received AI-enhanced instruction and a control group ($n = 60$) that received traditional instruction without AI tools. Both groups were taught by the same instructors to minimize teacher-related variables.

AI Tools and Intervention

The experimental group utilized a curated selection of AI-powered tools throughout the 16-week semester in addition to their regular coursework. The tools included: (a) Grammarly and QuillBot for writing practice and feedback; (b) ELSA Speak for pronunciation and speaking practice; (c) ChatGPT for conversational practice, vocabulary building, and reading comprehension exercises; and (d) Duolingo for supplementary grammar and vocabulary practice. Students in the experimental group were trained on how to use these tools effectively during the first two weeks of the semester and were required to log a minimum of three hours per week of independent AI-assisted practice outside of class.

Data Collection Instruments

Data were collected using three primary instruments. First, a standardized English language proficiency test was administered as both a pre-test and a post-test to measure changes in the four key language skills: reading, writing, listening, and speaking. The test was adapted from the IELTS Academic module to ensure validity and reliability. Second, a Likert-scale questionnaire was developed to assess students' perceptions of AI tools, their motivation levels, and their self-reported

learning experiences. The questionnaire consisted of 30 items grouped into five dimensions: perceived usefulness, perceived ease of use, motivation, autonomy, and overall satisfaction. Third, semi-structured interviews were conducted with 20 students from the experimental group and 5 instructors to gain deeper insights into their experiences with AI-enhanced instruction.

Data Analysis

Quantitative data were analyzed using SPSS Version 27. Independent samples t-tests were conducted to compare the pre-test and post-test scores of the experimental and control groups. Effect sizes were calculated using Cohen's *d* to determine the practical significance of any observed differences. Descriptive statistics were used to summarize the questionnaire responses. Qualitative data from interviews and open-ended questionnaire items were analyzed using thematic analysis following the six-phase framework proposed by Braun and Clarke (2006).

RESULTS

Quantitative Findings

The pre-test results indicated no statistically significant differences between the experimental and control groups in any of the four language skill areas ($p > 0.05$), confirming that the two groups were comparable at the outset of the study. However, the post-test results revealed statistically significant differences favoring the experimental group across all four skills.

In reading comprehension, the experimental group achieved a mean score of 7.4 (SD = 0.82) compared to 6.5 (SD = 0.91) for the control group, $t(118) = 5.68$, $p < 0.001$, $d = 1.04$. In writing, the experimental group scored a mean of 7.1 (SD = 0.78) versus 6.2 (SD = 0.85) for the control group, $t(118) = 6.07$, $p < 0.001$, $d = 1.10$. Listening scores were 7.6 (SD = 0.74) for the experimental group and 6.7 (SD = 0.88) for the control group, $t(118) = 6.08$, $p < 0.001$, $d = 1.11$. Speaking scores showed a similar pattern, with the experimental group achieving 7.2 (SD = 0.80) compared to 6.3 (SD = 0.93) for the control group, $t(118) = 5.70$, $p < 0.001$, $d = 1.04$.

These effect sizes, all exceeding 1.0, indicate a large practical effect of the AI-enhanced intervention on English language proficiency. The largest improvements were observed in listening and writing skills, which may be attributed to the intensive use of speech recognition tools and automated writing evaluation systems, respectively.

Questionnaire Results

The questionnaire administered to the experimental group yielded highly positive responses regarding the use of AI tools. In terms of perceived usefulness, 87% of participants agreed or strongly agreed that AI tools helped them improve their English skills. Regarding perceived ease of use, 82% reported that the AI tools were user-friendly and easy to navigate. Motivation was also positively impacted, with 79% of students indicating that using AI tools increased their interest in learning English. Learner autonomy showed similarly favorable results, as 84% of participants reported feeling more independent in their learning due to the availability of AI-assisted practice. Overall satisfaction with the AI-enhanced learning experience was reported by 88% of respondents.

Qualitative Findings

Thematic analysis of the interview data revealed four primary themes. The first theme, labeled "Personalized Learning Experience," captured students' appreciation for the ability of AI tools to adapt to their individual proficiency levels and learning needs. Students frequently mentioned that AI tools allowed them to focus on their specific areas of weakness without feeling embarrassed or judged, which contrasted with their experiences in traditional classroom settings.

The second theme, "Immediate and Constructive Feedback," highlighted the value students placed on the instant feedback provided by AI tools. Participants noted that receiving real-time corrections on their writing and pronunciation helped them internalize correct language patterns more quickly than waiting for teacher feedback, which was often delayed and less detailed.

The third theme, "Increased Engagement and Motivation," reflected students' perceptions that AI tools made language learning more interactive, enjoyable, and game-like. The gamification elements present in tools like Duolingo and ELSA Speak were particularly appreciated by younger learners.

The fourth theme, "Technical and Pedagogical Challenges," encompassed the difficulties reported by both students and teachers. Students mentioned occasional inaccuracies in AI feedback, particularly for complex grammatical structures and context-dependent language use. Teachers expressed concerns about the time required to integrate AI tools into their existing curricula and the need for professional development to effectively guide students in using these technologies.

DISCUSSION

The findings of this study provide strong empirical evidence for the effectiveness of AI-based tools in enhancing English language learning outcomes at the university level. The statistically

significant improvements observed across all four language skills in the experimental group align with previous research that has documented the benefits of technology-enhanced language learning (Golonka et al., 2014; Shadiev et al., 2017). The large effect sizes obtained in this study suggest that the impact of AI tools extends beyond statistical significance to practical significance, indicating meaningful improvements in students' actual language abilities.

The particularly strong improvements in listening and writing skills can be attributed to the nature of the AI tools employed. Speech recognition technology provided learners with repeated opportunities for focused listening and pronunciation practice, while automated writing evaluation tools offered detailed, criterion-specific feedback that guided learners through iterative revision processes. These findings support the theoretical framework of connectivism, which posits that learning is enhanced when individuals can access diverse networks of information and feedback mechanisms (Siemens, 2005).

The positive perceptions reported by students in the questionnaire and interview data are consistent with the Technology Acceptance Model (TAM), which predicts that perceived usefulness and perceived ease of use are key determinants of technology adoption (Davis, 1989). The high levels of motivation and autonomy reported by students suggest that AI tools can address affective barriers to language learning, such as anxiety and low self-confidence, by providing a safe and non-judgmental practice environment (Fryer et al., 2019).

However, the challenges identified in this study should not be overlooked. The occasional inaccuracies in AI-generated feedback highlight the importance of maintaining the teacher's role as a mediator and evaluator of AI output. Teachers must be equipped with the knowledge and skills to critically assess AI-generated feedback and to guide students in interpreting and applying it appropriately. This finding supports the argument made by Ertmer and Ottenbreit-Leftwich (2010) that successful technology integration in education requires not only technical proficiency but also pedagogical content knowledge related to technology use.

Furthermore, the study's findings have implications for curriculum design and educational policy. The significant improvements observed in the experimental group suggest that AI tools should be systematically integrated into English language curricula rather than being used as isolated supplements. However, such integration requires institutional support in terms of infrastructure, training, and ongoing technical assistance. Policymakers should consider investing in teacher

professional development programs that focus on AI literacy and pedagogical strategies for technology integration in language education.

CONCLUSION

This study investigated the effectiveness of AI-based tools in enhancing English language teaching and learning among university-level students. The results demonstrate that the systematic integration of AI tools into English language instruction can lead to significant improvements in all four language skills: reading, writing, listening, and speaking. Moreover, students' positive perceptions of AI tools, including increased motivation, engagement, and learner autonomy, underscore the potential of AI to transform the language learning experience.

The study contributes to the growing body of literature on AI in education by providing empirical evidence from a structured educational setting and by offering insights into both the benefits and challenges of AI integration in language teaching. The findings suggest that AI is most effective when used as a supplementary tool within a well-designed pedagogical framework, rather than as a replacement for traditional instruction or teacher interaction.

Several limitations of this study should be acknowledged. First, the study was conducted at a single university, which may limit the generalizability of the findings to other educational contexts. Second, the 16-week duration, while sufficient to observe meaningful changes, may not capture the long-term effects of AI-enhanced instruction. Third, the study focused on a specific set of AI tools, and the results may differ with other tools or combinations thereof.

Future research should explore the long-term impact of AI tools on language learning outcomes, investigate the effectiveness of AI integration across different proficiency levels and educational settings, and examine the evolving role of teachers in AI-enhanced classrooms. Additionally, studies that compare the effectiveness of different AI tools and investigate optimal combinations of AI-assisted and teacher-led instruction would provide valuable insights for practitioners and policymakers.

In conclusion, AI represents a powerful and promising frontier in English language education. When implemented thoughtfully, with adequate teacher training and institutional support, AI-based tools have the potential to significantly enhance the quality and accessibility of English language instruction, ultimately contributing to the development of more proficient and confident English language learners worldwide.

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