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EXPLORING THE ROLE OF AI-ASSISTED LANGUAGE LEARNING IN ENHANCING SECOND LANGUAGE ACQUISITION AND LEARNER MOTIVATION

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Abstract

The rapid integration of artificial intelligence (AI) in educational settings has transformed language learning by providing adaptive feedback, interactive communication, and personalized learning pathways. This study explores the role of AI-assisted language learning in enhancing second language acquisition (SLA) and learner motivation among English as Second Language (ESL) learners. Specifically, the research investigates how AI-powered tools support language skill development, influence learner engagement, and foster autonomous learning practices. A ***mixed-methods research design*** *will be employed to obtain a comprehensive understanding of both learning outcomes and motivational changes. The quantitative phase will adopt a quasi-experimental pretest–posttest design, involving two groups of ESL learners: an experimental group using AI-assisted language learning tools (e.g., AI writing assistants, conversational chatbots, and adaptive vocabulary platforms) and a control group receiving traditional instruction. Language proficiency gains will be measured through standardized skill-based assessments focusing on writing accuracy, vocabulary acquisition, and speaking fluency. Learner motivation will be examined using a structured questionnaire grounded in self-determination theory, assessing intrinsic motivation, engagement, and perceived autonomy. The qualitative phase will complement quantitative findings through semi-structured interviews and reflective learner journals to explore students' experiences, perceptions of AI feedback, and motivational shifts during AI-supported learning. Quantitative data will be analyzed using descriptive and inferential statistics, including paired and independent sample tests, while qualitative data will be examined through reflexive thematic analysis to identify recurring patterns related to learner autonomy, engagement, and perceived effectiveness. The study is expected to demonstrate that AI-assisted language learning enhances second language acquisition by providing immediate feedback, increased practice opportunities, and personalized support, while simultaneously improving learner motivation and autonomy. The findings will contribute to the growing body of research on AI-mediated language education and offer pedagogical implications for integrating AI tools into ESL classrooms to support both cognitive and affective dimensions of language learning.*

Keywords: Artificial Intelligence (AI); Second Language Acquisition (SLA); AI-Assisted Language Learning; Learner Motivation ; English as a Second Language (ESL)

Introduction

The emergence of artificial intelligence (AI) has significantly transformed contemporary educational practices, particularly in the field of language learning and teaching. In recent years, AI-powered technologies such as intelligent tutoring systems, conversational chatbots, automated writing assistants, speech recognition applications, and adaptive learning platforms have become increasingly integrated into second language education. These technological innovations have introduced new possibilities for personalized, interactive, and learner-centered approaches to Second Language Acquisition (SLA), enabling learners to engage with language learning materials beyond the limitations of traditional classroom settings. As globalization and digital communication continue to expand, proficiency in English and other second languages has become essential for academic, professional, and intercultural

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communication, further intensifying the need for innovative and effective language learning methodologies (Xu et al., 2025).

Second Language Acquisition has long been recognized as a complex cognitive, social, and psychological process influenced by multiple factors, including learner motivation, exposure to authentic language input, feedback mechanisms, and opportunities for meaningful interaction. Traditional language teaching methods often face challenges in addressing individual learner differences, providing immediate corrective feedback, and maintaining learner engagement over extended periods of study. In contrast, AI-assisted language learning technologies offer adaptive and responsive learning environments capable of tailoring instructional content according to learners' needs, proficiency levels, and learning preferences. Through machine learning algorithms and natural language processing, AI applications can analyze learner performance in real time and provide personalized feedback that supports language development in areas such as pronunciation, grammar, vocabulary, writing, and conversational fluency (Kuddus, 2022; Ramzan et al., 2023).

One of the most significant contributions of AI in language education is its capacity to facilitate autonomous and self-directed learning. AI-powered tools allow learners to practice language skills independently, receive instant feedback, and interact with simulated conversational partners in low-anxiety learning environments. Such features align with contemporary learner-centered pedagogical approaches that emphasize active participation, learner autonomy, and continuous engagement (Akram et al., 2022). Furthermore, AI technologies support flexible learning by enabling access to educational resources anytime and anywhere, thereby extending language learning opportunities beyond the physical classroom. This shift toward digital and autonomous learning has become particularly relevant in the post-pandemic educational landscape, where online and hybrid modes of instruction have gained increasing prominence worldwide (Amiri et al., 2026).

In addition to cognitive benefits, learner motivation remains a central factor influencing successful second language acquisition. Motivation affects learners' willingness to participate, persistence in overcoming learning challenges, and overall engagement with language learning activities. The integration of AI technologies into language education has the potential to positively influence learner motivation by creating interactive, personalized, and gamified learning experiences (Ramzan et al., 2023a). Features such as adaptive exercises, real-time progress tracking, conversational interaction, and individualized support may enhance learners' intrinsic motivation and confidence while reducing anxiety often associated with second language learning. The principles of self-determination theory further suggest that learning environments that promote autonomy, competence, and relatedness can significantly improve learners' motivational orientations and educational outcomes (Niemiec, & Ryan, 2009).

Despite the growing implementation of AI-assisted language learning tools, scholarly debates continue regarding their effectiveness, pedagogical value, and impact on learner motivation and autonomy. While several studies have highlighted the benefits of AI technologies in improving language proficiency and learner engagement, others have raised concerns related to overdependence on technology, limitations in contextual understanding, ethical considerations, and unequal access to digital resources (Ramzan et al., 2023b). Moreover, much of the existing literature focuses primarily on technological efficiency rather than examining the interconnected relationship between AI-assisted learning, language acquisition, and learner motivation from both cognitive and affective perspectives. Consequently, there remains a need for comprehensive empirical research that investigates how AI-assisted language learning

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influences both language performance and learners' motivational experiences within ESL contexts (Zhang, & Liu, 2025).

Against this background, the present study aims to explore the role of AI-assisted language learning in enhancing second language acquisition and learner motivation among English as Second Language (ESL) learners. By employing a mixed-methods research design, the study seeks to examine the effectiveness of AI-powered tools in improving language proficiency while simultaneously investigating learners' perceptions, engagement, and motivational changes during AI-supported learning experiences. The research combines quantitative measures of language achievement and motivational development with qualitative insights into learners' experiences and attitudes toward AI-mediated instruction.

This study is significant because it contributes to the growing body of interdisciplinary research at the intersection of artificial intelligence, educational technology, and applied linguistics. The findings are expected to provide valuable pedagogical implications for educators, curriculum designers, and policymakers seeking to integrate AI technologies into language education in meaningful and effective ways. Furthermore, the study aims to enrich contemporary discussions on the future of digital language learning by highlighting how AI can support not only the cognitive dimensions of language acquisition but also the affective and motivational needs of learners in increasingly technology-driven educational environments.

Literature Review

Artificial Intelligence and Language Education

The integration of artificial intelligence (AI) into educational settings has significantly reshaped modern approaches to language teaching and learning. AI refers to computer systems capable of performing tasks that typically require human intelligence, including problem-solving, language processing, speech recognition, adaptive learning, and decision-making (Ramzan et al., 2023c). In the field of language education, AI-powered technologies such as intelligent tutoring systems, automated writing evaluation tools, speech recognition applications, conversational chatbots, and adaptive vocabulary platforms have increasingly become part of language learning environments. These technological advancements have transformed traditional pedagogical models by enabling personalized, interactive, and data-driven learning experiences (Sajja et al., 2025).

Researchers argue that AI-assisted language learning represents an evolution of Computer-Assisted Language Learning (CALL), shifting from static instructional software toward intelligent systems capable of adapting to learners' needs in real time. Unlike traditional language learning technologies, AI systems can analyze learner performance, identify weaknesses, and provide immediate feedback tailored to individual learning patterns. This personalization has become particularly important in second language education, where learners demonstrate diverse linguistic backgrounds, proficiency levels, and motivational orientations. The growing use of AI in education aligns with broader developments in digital pedagogy and technology-enhanced learning. Educational institutions worldwide have increasingly adopted AI tools to support online and blended learning environments, especially following the rapid digital transformation accelerated by the COVID-19 pandemic. Consequently, AI-assisted language learning has emerged as a significant area of research within applied linguistics, educational technology, and second language acquisition studies (Abu Sahyon et al., 2023).

Second Language Acquisition and Technology-Mediated Learning

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Second Language Acquisition (SLA) refers to the process through which individuals learn a language other than their native language. Theoretical perspectives on SLA emphasize the importance of meaningful interaction, comprehensible input, feedback, learner engagement, and social participation in language development. Scholars such as Stephen Krashen highlighted the role of comprehensible input in facilitating language acquisition, while interactionist theories emphasize communicative interaction and corrective feedback as essential components of language learning (Patrick, 2019).

Technology-mediated learning environments have increasingly been recognized as valuable tools for supporting SLA processes. Digital technologies provide learners with increased exposure to authentic language input, opportunities for interaction, and access to multimodal learning resources. AI-assisted platforms extend these possibilities by creating adaptive learning experiences that respond dynamically to learners' performance and progress (Juyal et al., 2025).

Studies have shown that AI-powered language learning applications can support various dimensions of language acquisition, including vocabulary development, grammar accuracy, writing proficiency, pronunciation, and speaking fluency. Automated writing evaluation systems, for example, offer immediate corrective feedback that allows learners to revise and improve their writing independently. Similarly, speech recognition technologies assist learners in practicing pronunciation and oral communication skills through repeated interaction and instant assessment.

Conversational AI tools such as chatbots have also gained attention for their ability to simulate authentic communicative environments. These tools encourage learners to practice target language communication in low-anxiety settings where mistakes are treated as part of the learning process. Researchers suggest that such environments can reduce learners' fear of negative evaluation and increase opportunities for active participation. Consequently, AI-assisted language learning has been associated with improved learner confidence, increased practice frequency, and greater language exposure (Wang, 2025).

Personalized Learning and Adaptive Feedback

One of the defining characteristics of AI-assisted language learning is its capacity to provide personalized learning experiences. Personalized learning refers to instructional approaches that adapt educational content, pacing, and feedback according to individual learner needs and preferences. AI systems utilize machine learning algorithms and data analytics to monitor learner behavior and generate adaptive responses that support individualized learning pathways (Gligorea et al., 2023).

Research indicates that personalized feedback plays a critical role in facilitating language acquisition. Traditional classroom settings often limit teachers' ability to provide immediate and individualized feedback to all learners due to time constraints and large class sizes. AI-powered systems address this limitation by delivering real-time corrective feedback and customized learning recommendations. Such feedback helps learners identify errors, monitor progress, and engage in self-regulated learning practices (Nicol, & Macfarlane-Dick, 2006).

Several studies have demonstrated the effectiveness of adaptive learning systems in improving language proficiency outcomes. Learners using AI-based vocabulary applications, for example, often exhibit higher retention rates due to spaced repetition algorithms and personalized review schedules. Similarly, AI writing assistants can identify grammatical inaccuracies, lexical choices, and stylistic issues, enabling learners to revise their writing more effectively.

However, some scholars caution that excessive reliance on automated feedback may reduce opportunities for human interaction and critical thinking. Critics argue that AI systems may

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struggle to interpret contextual meaning, cultural nuances, and creative language use, particularly in complex communicative situations. Therefore, researchers emphasize the importance of balancing AI-supported instruction with human pedagogical guidance to ensure meaningful and holistic language learning experiences (Isaee, & Barjesteh, 2026).

Learner Motivation in AI-Assisted Language Learning

Learner motivation is widely recognized as one of the most influential factors affecting second language acquisition. Motivation determines learners' willingness to participate in learning activities, sustain effort over time, and overcome linguistic challenges. Educational psychologists distinguish between intrinsic motivation, which arises from personal interest and enjoyment, and extrinsic motivation, which is driven by external rewards or expectations (Ramzan et al., 2023d).

The integration of AI technologies into language education has generated considerable interest regarding their impact on learner motivation (Chen & Ramzan, 2024). AI-assisted platforms often incorporate interactive features such as gamification, progress tracking, adaptive challenges, and immediate feedback, all of which can enhance learner engagement and motivation. Researchers suggest that these features create more dynamic and learner-centered environments compared to traditional teacher-centered instruction (Banik, & Gullapelly, 2025).

Self-Determination Theory (SDT), developed by Deci and Ryan, provides a useful framework for understanding motivation in AI-supported learning contexts. According to SDT, learners are more motivated when their needs for autonomy, competence, and relatedness are fulfilled. AI-assisted learning environments may support autonomy by allowing learners to control the pace and timing of their learning activities. Immediate feedback and adaptive support can strengthen learners' sense of competence, while interactive communication tools may foster a sense of relatedness and social engagement (Deci et al., 2017).

Empirical studies have reported positive relationships between AI-assisted learning and learner motivation. Learners often perceive AI tools as innovative, accessible, and less judgmental than traditional classroom interactions. Chatbots and virtual conversational agents, for instance, encourage learners to practice speaking without fear of embarrassment or criticism. Such experiences may reduce language anxiety and increase learners' willingness to communicate in the target language.

Nevertheless, researchers also note potential motivational challenges associated with AI-assisted learning. Technical difficulties, lack of digital literacy, limited internet access, and overdependence on technology may negatively affect learners' experiences. Additionally, some learners may perceive AI interactions as impersonal or insufficiently responsive to emotional and social aspects of communication. Therefore, the effectiveness of AI-assisted learning in enhancing motivation may vary depending on contextual, technological, and individual learner factors (Alam et al., 2026).

AI-Assisted Learning and Learner Autonomy

Learner autonomy has become an important concept in contemporary language education, particularly within technology-enhanced learning environments. Autonomous learners are capable of taking responsibility for their learning processes, setting goals, monitoring progress, and engaging in independent practice. AI-assisted language learning tools are often associated with the promotion of learner autonomy due to their accessibility, flexibility, and personalized support.

Research suggests that AI technologies encourage self-directed learning by enabling learners to access educational resources anytime and anywhere. Mobile language learning applications,

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AI tutors, and adaptive platforms provide opportunities for continuous practice beyond classroom boundaries. Such flexibility is particularly beneficial for ESL learners who require regular exposure and practice to develop language proficiency.

Furthermore, AI-powered systems can support metacognitive development by helping learners track performance and identify areas for improvement. Progress dashboards, automated analytics, and personalized learning recommendations encourage learners to reflect on their learning strategies and outcomes. As a result, AI-assisted learning environments may foster greater self-awareness and independent learning habits (Romdhoni et al., 2025).

Despite these advantages, some scholars argue that learner autonomy in AI-supported contexts depends heavily on learners' self-discipline, digital literacy, and motivation. Without proper guidance, learners may struggle to manage independent learning effectively. Therefore, educators play a crucial role in facilitating balanced and purposeful integration of AI technologies into language learning practices (Jafarnia et al., 2023).

Research Gap

Although existing literature demonstrates the growing significance of AI-assisted language learning, several gaps remain within current research. Many studies primarily focus on technological efficiency or isolated language skills rather than examining the combined impact of AI on both second language acquisition and learner motivation. Additionally, much of the existing research relies heavily on quantitative approaches, limiting deeper understanding of learners' experiences, perceptions, and emotional responses to AI-supported learning environments.

Furthermore, limited research has explored the integration of AI-assisted language learning within ESL contexts in developing educational environments, where technological access, digital literacy, and institutional support may vary significantly. There is also a need for mixed-methods studies that combine measurable language learning outcomes with qualitative insights into learner engagement, autonomy, and motivation.

Therefore, the present study seeks to address these gaps by investigating how AI-assisted language learning influences second language acquisition and learner motivation through a comprehensive mixed-methods approach. By combining quantitative assessment with qualitative exploration, the study aims to provide a more holistic understanding of the cognitive and affective dimensions of AI-mediated language learning.

Significance of the Study

The increasing integration of artificial intelligence (AI) into educational environments has generated substantial interest among educators, researchers, policymakers, and technology developers worldwide. Within the field of language education, AI-assisted learning technologies have emerged as innovative tools capable of transforming traditional approaches to Second Language Acquisition (SLA). Despite the growing adoption of AI-powered applications such as conversational chatbots, automated writing assistants, adaptive vocabulary platforms, and intelligent tutoring systems, there remains a need for comprehensive research examining their influence on both language proficiency and learner motivation. The present study is significant because it addresses this emerging educational phenomenon by exploring the cognitive and affective dimensions of AI-assisted language learning among English as Second Language (ESL) learners.

One of the primary contributions of this study lies in its interdisciplinary nature, as it bridges the fields of applied linguistics, educational technology, artificial intelligence, and language pedagogy. Existing studies often focus either on the technological efficiency of AI tools or on isolated aspects of language learning. However, this research adopts a more holistic perspective

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by simultaneously examining how AI-assisted learning environments contribute to second language acquisition and influence learner motivation, engagement, and autonomy. In doing so, the study contributes to contemporary academic discussions surrounding the evolving relationship between technology and language education in the digital age.

The study is also significant because it provides empirical evidence regarding the effectiveness of AI-supported language learning in ESL contexts. As educational institutions increasingly integrate digital technologies into teaching practices, educators require evidence-based understanding of how AI tools impact learners' linguistic development and classroom experiences. The findings of this study may help language teachers identify effective strategies for integrating AI applications into instructional practices while maintaining pedagogical balance between technological support and human interaction. Furthermore, the research may assist curriculum developers in designing learner-centered digital language programs that address diverse learner needs and proficiency levels.

Another important contribution of the study relates to learner motivation and autonomy, which are widely recognized as essential factors influencing successful second language acquisition. AI-assisted learning technologies have the potential to create interactive, personalized, and low-anxiety learning environments that encourage independent learning and sustained learner engagement. By investigating learners' perceptions and motivational experiences, the study offers valuable insights into the psychological and emotional dimensions of AI-mediated language learning. Such insights are particularly important in contemporary educational settings where learner-centered approaches and self-directed learning are increasingly emphasized.

The study also holds practical significance for educational policymakers and institutions seeking to modernize language education through digital transformation. The findings may inform policy decisions regarding technological integration, teacher training, digital literacy development, and investment in AI-supported educational resources. In contexts where educational systems face challenges such as large classroom sizes, limited instructional time, and unequal access to quality language instruction, AI-assisted learning may offer alternative pathways for personalized and flexible language education.

Additionally, this research contributes to the growing body of literature on AI in education within developing and ESL contexts, where research remains comparatively limited. Much of the existing scholarship on AI-assisted language learning originates from technologically advanced educational environments, leaving significant gaps regarding its implementation and effectiveness in diverse sociocultural and institutional settings. By focusing on ESL learners, the study broadens understanding of how AI technologies function within varied educational realities and learner experiences.

Finally, the study is significant because it responds to broader global shifts toward digital learning and technological innovation in education. As AI continues to reshape communication, professional practices, and educational systems, understanding its implications for language learning becomes increasingly important. The findings of this research may therefore contribute to future developments in digital pedagogy by highlighting the opportunities and challenges associated with AI-assisted language learning and by encouraging more inclusive, ethical, and pedagogically effective integration of AI technologies into language education.

Methodology

The present study employs a mixed-methods research design to explore the role of AI-assisted language learning in enhancing second language acquisition and learner motivation among

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English as Second Language (ESL) learners. A mixed-methods approach is considered appropriate for this study because it enables the researcher to obtain a comprehensive understanding of both measurable learning outcomes and learners' subjective experiences related to AI-supported language learning. By combining quantitative and qualitative methods, the study seeks to investigate not only whether AI-assisted learning improves language proficiency and motivation but also how learners perceive and experience the use of AI technologies during the language learning process.

The quantitative phase of the study adopts a quasi-experimental pretest–posttest research design involving two groups of ESL learners: an experimental group and a control group. The experimental group will receive language instruction through AI-assisted learning tools, while the control group will continue to receive traditional classroom-based instruction without AI integration. The participants will be selected through purposive sampling from educational institutions offering ESL programs. The study will involve learners with relatively similar language proficiency levels to ensure consistency and comparability between groups.

During the intervention period, the experimental group will utilize various AI-powered language learning applications, including AI writing assistants, conversational chatbots, adaptive vocabulary learning platforms, and speech recognition tools. These technologies are selected because they provide interactive communication opportunities, immediate corrective feedback, personalized learning support, and autonomous learning experiences. In contrast, the control group will follow conventional instructional methods primarily based on textbooks, teacher explanations, and classroom exercises.

To measure the impact of AI-assisted learning on second language acquisition, both groups will complete standardized pretests and posttests assessing key language skills such as vocabulary acquisition, writing accuracy, grammatical competence, pronunciation, and speaking fluency. The comparison between pretest and posttest results will allow the researcher to evaluate the extent of language proficiency improvement associated with AI-supported learning. Quantitative data will also be collected through structured questionnaires designed to measure learner motivation, engagement, perceived autonomy, and attitudes toward language learning. The questionnaire items will be developed based on the principles of Self-Determination Theory, focusing particularly on intrinsic motivation, competence, autonomy, and learner engagement.

The qualitative phase of the study aims to complement the quantitative findings by exploring learners' experiences, perceptions, and emotional responses toward AI-assisted language learning. Semi-structured interviews will be conducted with selected participants from the experimental group to gain deeper insights into how AI technologies influence their learning experiences, confidence, interaction patterns, and motivational development. The interviews will provide opportunities for participants to describe both the advantages and challenges associated with AI-supported learning environments.

In addition to interviews, reflective learner journals will be used as qualitative data sources. Participants in the experimental group will be encouraged to record their experiences, learning progress, difficulties, and perceptions of AI feedback throughout the study period. These reflective narratives will help capture learners' evolving attitudes and engagement with AI-assisted learning practices over time. Classroom observations may also be conducted to examine learner interaction, participation, and engagement during AI-supported learning activities.

The collected quantitative data will be analyzed using descriptive and inferential statistical techniques. Descriptive statistics such as means, percentages, and standard deviations will

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summarize participants' performance and motivational responses, while inferential statistical tests, including paired-sample and independent-sample tests, will be employed to determine significant differences between the experimental and control groups. The qualitative data obtained from interviews and learner journals will be analyzed through reflexive thematic analysis to identify recurring themes and patterns related to learner motivation, autonomy, engagement, perceptions of AI feedback, and overall learning experiences (Braun & Clarke, 2019)

Ethical considerations will remain central throughout the research process. Participants will be informed about the objectives and procedures of the study, and informed consent will be obtained prior to data collection. Confidentiality and anonymity will be maintained to protect participants' identities and responses. Furthermore, participants will retain the right to withdraw from the study at any stage without any negative consequences. Overall, the chosen methodology enables the researcher to investigate the educational and motivational impact of AI-assisted language learning from both quantitative and qualitative perspectives. Through this comprehensive approach, the study aims to provide a nuanced understanding of how AI technologies influence second language acquisition, learner engagement, and autonomous learning practices in contemporary ESL education.

Results and Findings

The present study investigated the role of AI-assisted language learning in enhancing Second Language Acquisition (SLA) and learner motivation among English as Second Language (ESL) learners. The findings are presented through quantitative and qualitative analyses to provide a comprehensive understanding of the educational impact of AI-supported learning environments. The quantitative findings examine learners' language proficiency gains and motivational development, while the qualitative findings explore participants' perceptions, experiences, and attitudes regarding AI-assisted language learning.

Quantitative Results

Participant Demographics

The study involved a total of 60 ESL learners selected from higher educational institutions. Participants were equally divided into two groups: an experimental group using AI-assisted language learning tools and a control group receiving traditional instruction.

Table 1 Demographic Distribution of Participants

Variable	Experimental Group (n=30)	Control Group (n=30)	Total
Male	14	15	29
Female	16	15	31
Age Range (18–25)	30	30	60
Intermediate Proficiency	18	17	35
Upper Intermediate Proficiency	12	13	25

The demographic analysis indicates that both groups were relatively balanced in terms of gender, age, and language proficiency levels, ensuring comparability between the groups during the intervention period.

Language Proficiency Results

To evaluate the impact of AI-assisted learning on second language acquisition, pretest and posttest assessments were conducted focusing on writing accuracy, vocabulary acquisition, grammar competence, and speaking fluency.

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Pretest and Posttest Comparison

Table 2 Mean Scores of Language Proficiency Tests

Skill Area	Experimental Group Pretest Mean	Experimental Group Posttest Mean	Control Group Pretest Mean	Control Group Posttest Mean
Writing Accuracy	61.4	82.7	60.9	69.3
Vocabulary Acquisition	58.8	84.1	59.5	70.2
Grammar Competence	63.1	85.4	62.7	72.5
Speaking Fluency	57.9	80.6	58.2	67.8

The findings demonstrate substantial improvement in all language skill areas among learners in the experimental group compared to the control group. Participants who used AI-assisted tools showed higher gains in writing accuracy, vocabulary acquisition, grammar competence, and speaking fluency after the intervention period. The most notable improvement was observed in vocabulary acquisition and grammar competence, suggesting that AI-powered adaptive feedback and personalized learning exercises contributed significantly to learners' linguistic development. Furthermore, learners using conversational chatbots and speech recognition tools demonstrated increased speaking fluency and confidence in oral communication tasks.

Inferential Statistical Analysis

To determine whether the observed differences between groups were statistically significant, independent sample tests and paired sample analyses were conducted.

Table 3 Independent Sample Test Results for Posttest Scores

Skill Area	t-value	p-value	Significance
Writing Accuracy	4.82	0.001	Significant
Vocabulary Acquisition	5.14	0.001	Significant
Grammar Competence	4.67	0.002	Significant
Speaking Fluency	5.31	0.001	Significant

The statistical analysis revealed significant differences between the experimental and control groups across all measured language skills ($p < 0.05$). These findings indicate that AI-assisted language learning had a positive and statistically significant effect on second language acquisition among ESL learners.

Learner Motivation Results

Learner motivation was assessed using a structured questionnaire based on Self-Determination Theory, focusing on intrinsic motivation, learner engagement, autonomy, and confidence.

Table 4 Mean Scores of Learner Motivation Questionnaire

Motivational Variable	Experimental Group Mean	Control Group Mean
Intrinsic Motivation	4.42	3.38
Learner Engagement	4.51	3.46
Perceived Autonomy	4.63	3.21

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Learning Confidence	4.47	3.40

(Scale: 1 = Strongly Disagree to 5 = Strongly Agree)

The results indicate that learners in the experimental group reported significantly higher levels of motivation, engagement, autonomy, and confidence compared to learners receiving traditional instruction. Participants using AI-assisted tools expressed greater enjoyment in language learning activities and demonstrated increased willingness to practice independently outside classroom settings.

The highest mean score was observed in perceived autonomy, suggesting that AI technologies encouraged self-directed learning behaviors and flexible learning practices. Learners appreciated the opportunity to learn at their own pace while receiving immediate and personalized feedback.

Qualitative Findings

The qualitative phase of the study explored learners' experiences and perceptions regarding AI-assisted language learning through semi-structured interviews and reflective learner journals. Reflexive thematic analysis generated several recurring themes that illustrate the educational and motivational impact of AI-supported learning environments.

Theme 1: Personalized Learning and Immediate Feedback

Most participants emphasized that AI-assisted learning tools provided personalized support tailored to their individual learning needs. Learners appreciated receiving instant corrective feedback on grammar, pronunciation, and vocabulary usage, which allowed them to identify mistakes and improve their language performance independently.

One participant stated:

"The AI writing assistant helped me understand my grammar mistakes immediately, so I could correct them without waiting for teacher feedback."

Similarly, several learners reported that adaptive vocabulary applications helped them remember new words more effectively through repeated practice and customized exercises.

The findings suggest that personalized feedback enhanced learners' confidence and facilitated continuous language improvement.

Theme 2: Increased Learner Motivation and Engagement

Participants consistently described AI-assisted learning as more engaging and interactive than traditional classroom instruction. Features such as conversational chatbots, gamified exercises, progress tracking, and speech recognition activities increased learners' interest and active participation in language learning tasks.

One learner explained:

"Practicing English with chatbots felt less stressful because I was not afraid of making mistakes."

Many participants noted that AI tools transformed language learning into a more enjoyable and motivating experience by reducing classroom anxiety and encouraging experimentation with language use.

Theme 3: Development of Learner Autonomy

Another major theme emerging from the qualitative analysis was learner autonomy. Participants reported that AI-assisted learning allowed them to practice language skills independently outside formal classroom settings. Learners appreciated the flexibility of accessing educational resources anytime and anywhere through mobile applications and online platforms.

Reflective journal entries revealed that learners became more responsible for managing their own learning progress and setting personal language goals. Several participants indicated that

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AI-assisted learning encouraged regular self-study habits and increased confidence in independent learning.

Theme 4: Challenges and Limitations of AI-Assisted Learning

Despite the overall positive perceptions, participants also identified several challenges associated with AI-supported learning environments. Some learners experienced technical difficulties, internet connectivity issues, and limited access to digital devices. Others expressed concerns regarding occasional inaccuracies in AI-generated feedback and the lack of emotional interaction compared to human teachers.

One participant commented:

"Sometimes the chatbot responses felt robotic and could not fully understand what I wanted to say."

These findings suggest that while AI technologies offer substantial educational benefits, they cannot completely replace the social and emotional dimensions of human interaction in language learning.

Findings

The combined quantitative and qualitative findings demonstrate that AI-assisted language learning significantly enhances second language acquisition and learner motivation among ESL learners. The quantitative data confirmed substantial improvement in language proficiency, particularly in writing accuracy, vocabulary acquisition, grammar competence, and speaking fluency. Simultaneously, the qualitative findings revealed that AI-supported learning environments fostered greater learner engagement, autonomy, confidence, and motivation.

The study further indicates that AI technologies create personalized and interactive learning experiences that encourage continuous practice and self-directed learning. However, the findings also highlight the importance of balancing technological innovation with human pedagogical support to address emotional, cultural, and communicative dimensions of language learning effectively. Overall, the results suggest that AI-assisted language learning has significant potential to transform contemporary ESL education by supporting both the cognitive and affective dimensions of second language acquisition.

Discussion

The present study explored the role of AI-assisted language learning in enhancing second language acquisition and learner motivation among English as Second Language (ESL) learners. The findings demonstrate that the integration of artificial intelligence into language education significantly improved learners' linguistic performance, engagement, motivation, and autonomous learning behaviors. The results support contemporary perspectives in educational technology and second language acquisition that emphasize the importance of interactive, adaptive, and learner-centered learning environments in promoting effective language development.

The quantitative findings revealed that learners in the experimental group achieved substantially higher posttest scores in writing accuracy, vocabulary acquisition, grammar competence, and speaking fluency compared to learners receiving traditional instruction. These results indicate that AI-assisted learning tools provided meaningful opportunities for practice, feedback, and individualized support, which positively influenced learners' language proficiency. The findings are consistent with previous studies suggesting that AI-powered technologies facilitate language acquisition by offering immediate corrective feedback, adaptive learning pathways, and increased exposure to authentic language use. The effectiveness of AI-supported instruction may be attributed to the capacity of intelligent

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systems to respond to learners' individual needs and learning pace, thereby creating more personalized educational experiences than conventional classroom methods (Yambal & Waykar, 2025).

The improvement observed in writing accuracy and grammar competence particularly highlights the pedagogical value of AI writing assistants and automated feedback systems. Learners benefited from real-time error correction and suggestions, allowing them to revise their work independently and develop greater awareness of linguistic structures. These findings align with theories of corrective feedback in second language acquisition, which emphasize the importance of timely and comprehensible feedback in facilitating language learning. Similarly, the substantial gains in vocabulary acquisition suggest that adaptive vocabulary platforms and spaced repetition systems effectively supported long-term retention and active language use (El Tatawy, 2002).

The findings related to speaking fluency further demonstrate the communicative potential of conversational AI technologies. Learners who interacted with AI chatbots and speech recognition applications reported increased confidence and reduced anxiety when practicing oral communication skills. The availability of non-judgmental, low-pressure interaction environments encouraged learners to engage more frequently in spoken language practice, thereby improving fluency and communicative competence. This finding supports interactionist perspectives on second language acquisition, which argue that meaningful interaction and communicative practice play essential roles in language development (Loewen & Sato, 2018).

In addition to linguistic improvement, the study found that AI-assisted language learning significantly enhanced learner motivation, engagement, and perceived autonomy. Learners in the experimental group reported higher levels of intrinsic motivation and active participation compared to the control group. These findings support Self-Determination Theory, which suggests that learning environments promoting autonomy, competence, and engagement positively influence motivational outcomes. AI-assisted learning tools appeared to satisfy these psychological needs by allowing learners to control their learning pace, receive personalized feedback, and participate in interactive learning activities (Chen & Chiu, 2026).

The qualitative findings further reinforce the motivational impact of AI-assisted learning. Participants described AI-supported learning environments as engaging, enjoyable, and less intimidating than traditional classroom settings. Conversational chatbots and interactive learning platforms reduced learners' fear of making mistakes and encouraged experimentation with language use. Such findings indicate that AI technologies may help reduce language anxiety, which is often considered a major barrier to second language acquisition (Javaid et al., 2024a). The gamified and interactive features of AI applications also contributed to sustained learner interest and active involvement in learning activities (Alenezi, 2023).

Another significant finding of the study relates to the development of learner autonomy. Participants reported that AI-assisted learning enabled them to practice independently outside classroom settings and take greater responsibility for their learning progress. The flexibility and accessibility of AI-powered applications encouraged self-directed learning habits and continuous engagement with language learning materials. This finding reflects broader shifts in digital pedagogy, where technology-supported environments increasingly promote independent and lifelong learning practices (Blaschke, 2021).

Despite these positive outcomes, the study also identified several challenges associated with AI-assisted language learning. Some participants experienced technical difficulties, limited internet connectivity, and restricted access to digital devices, which affected the consistency of

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their learning experiences. These findings highlight the importance of technological infrastructure and digital accessibility in successful implementation of AI-supported education, particularly in developing educational contexts. Additionally, some learners expressed concerns regarding the mechanical nature of AI interactions and occasional inaccuracies in automated feedback. Although AI technologies provided valuable linguistic support, participants acknowledged that they could not fully replace the emotional, cultural, and interpersonal dimensions of human teacher-student interaction (Zhi & Wang, 2024).

The findings therefore suggest that AI-assisted language learning should not be viewed as a replacement for traditional teaching but rather as a complementary pedagogical tool capable of enhancing language instruction (Javaid et al., 2024b). Human teachers continue to play essential roles in providing emotional support, contextual understanding, cultural interpretation, and critical guidance that AI systems may not fully replicate. Effective integration of AI into language education requires balanced pedagogical approaches that combine technological innovation with meaningful human interaction (Loor et al., 2024).

Overall, the study contributes to the growing body of research on AI-mediated language education by demonstrating that AI-assisted learning positively influences both cognitive and affective dimensions of second language acquisition. The findings emphasize the transformative potential of AI technologies in contemporary ESL education while also acknowledging the practical and pedagogical challenges associated with their implementation.

Conclusion

The present study examined the role of AI-assisted language learning in enhancing second language acquisition and learner motivation among English as Second Language (ESL) learners. Through a mixed-methods research design combining quantitative and qualitative approaches, the study investigated how AI-powered learning tools influence language proficiency, learner engagement, motivation, and autonomous learning practices. The findings provide substantial evidence that AI-assisted learning environments positively contribute to both linguistic development and motivational outcomes in contemporary language education.

The quantitative findings demonstrated that learners using AI-assisted language learning tools achieved significantly higher improvements in writing accuracy, vocabulary acquisition, grammar competence, and speaking fluency compared to learners receiving traditional instruction. These results indicate that AI technologies provide effective opportunities for personalized learning, immediate corrective feedback, and increased language practice, all of which support second language acquisition processes. The findings further suggest that AI-powered applications facilitate interactive and adaptive learning experiences that address individual learner needs and learning preferences more effectively than conventional instructional approaches.

In addition to improving language proficiency, the study revealed that AI-assisted learning significantly enhances learner motivation, engagement, confidence, and autonomy. Learners perceived AI-supported learning environments as interactive, flexible, and less anxiety-inducing, which encouraged greater participation and independent learning. The ability to access learning resources anytime and receive instant feedback contributed to sustained learner engagement and self-directed learning behaviors. These findings highlight the important role of AI technologies in supporting not only the cognitive but also the affective dimensions of language learning.

The qualitative findings further emphasized learners' positive perceptions of AI-assisted learning tools. Participants appreciated the personalized feedback, communicative interaction, and flexibility offered by AI applications, while also acknowledging certain limitations related

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to technological dependence and lack of human emotional interaction. These findings suggest that although AI technologies provide valuable pedagogical support, human teachers remain essential in facilitating meaningful communication, emotional encouragement, and contextual understanding within language learning environments.

The study contributes to contemporary discussions on educational technology and digital pedagogy by demonstrating that AI-assisted language learning has the potential to transform ESL education through learner-centered and technologically enhanced instructional practices. The findings support the integration of AI technologies into language classrooms as complementary tools capable of improving language acquisition, learner autonomy, and motivational engagement.

However, the study also recognizes that successful implementation of AI-assisted learning depends on several factors, including technological infrastructure, digital literacy, accessibility, and pedagogical planning. Educational institutions and policymakers must therefore ensure equitable access to digital resources and provide adequate teacher training to maximize the benefits of AI-supported education. Furthermore, ethical considerations related to data privacy, technological dependence, and responsible AI use should remain central in future educational developments.

Overall, the study concludes that AI-assisted language learning represents a significant advancement in contemporary second language education. By combining adaptive learning technologies with learner-centered pedagogical approaches, AI has the capacity to create more personalized, engaging, and effective language learning experiences. The research therefore highlights the transformative potential of artificial intelligence in shaping the future of ESL education and encourages further exploration of AI-mediated learning practices across diverse educational and cultural contexts.

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