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ARTIFICIAL INTELLIGENCE TOOLS IN PERSONALIZED LANGUAGE LEARNING: A SYSTEMATIC THEMATIC REVIEW

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Abstract

The integration of artificial intelligence (AI) technologies into language learning has become an essential field of research because it promises to adapt educational experiences to individual learners. With the rapid progress of automatic learning algorithms, adaptive learning systems can now immediately analyze learners' progress and adjust content and delivery methods accordingly. This adaptability improves the personalization of linguistic education, allowing students to engage more deeply with the material at their own pace and skill level. This study aims to explore how AI-driven technologies can improve personalized language learning experiences through autonomous learning. This study focuses on adaptive learning systems powered by AI tools such as ChatGPT, DeepSeek, and Duolingo, developing user engagement strategies, and exploring evolving implications for better results in language acquisition. This research uses a systematic thematic review methodology. Following the guidelines from Braun and Clarke (2006), systematically analyzed 59 peer-reviewed studies thematically. They were identified through academic databases (e.g., Scopus, Google Scholar, ERIC, JSTOR, Education Source) published during 2023-2025. Developed themes included AI for student autonomy, pocket teacher AI: feedback and learning apps, AI for diverse demographics and social inclusion, intelligent conversations: chatbots and language models, personalized learning, limitations, and access inequalities. The study shows that personalized learning helps students learn languages better. Students who use advanced AI tools remember more and manage their learning better than with traditional methods. In the end, the implications of this study highlight the potential of AI tools such as ChatGPT, DeepSeek, and Duolingo to enhance language education by facilitating personalized learning and helping learners achieve better language-learning outcomes.

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INTRODUCTION

The combination of artificial intelligence (AI) and individualized language instruction has attracted considerable scholarly and pedagogical interest due to AI's transformative capacity to customize learning environments for each student's special needs. Alhusaiyan (2025) provides a narrative review of the principal trends in AI applications within foreign

language learning. Reveals the abilities of these application tools, which can change content, pace, and teaching methods to suit different student needs. For example, Duolingo includes AI-enhanced features such as "Roleplay" and “Explain My Answer” to deepen understanding. This kind of customization and flexibility plays a crucial role in enhancing student interest and outcomes in language learning. Previous studies have explored how AI can improve personalized learning experiences by using data analysis to understand students' behaviors and attitudes (Mahmoud & Sorensen, 2024). Memrise AI tool uses AI-backed spaced repetition, real-life videos of native speakers, and adaptive review timing to reinforce vocabulary. Tools such as intelligent tutoring systems and language applications promoted by AI provide immediate comments, allowing students to adjust their strategies and develop fluency more effectively, as shown in studies (Jeon et al., 2024). Specifically, conversational agents, including chatbots powered by advanced voice recognition technology, have been particularly effective in promoting skills in speaking and listening, as they can simulate real-life language use in a controlled environment (Kovalenko & Baranivska, 2024). A bibliometric analysis by Igbokwe (2024) indicates a growing interest in AI within the teaching of languages. It demonstrates the need for continuous exploration of trends and the outcomes of integrating AI. Building on this, Wang et al. (2024) suggest that if researchers analyze common themes in undergraduate students' beliefs about their experiences in personalized learning environments, those insights can help design and apply better teaching methods, especially those enhanced by the most effective AI tools.

However, despite the expanding corpus of literature on the application of AI in personalized language learning, there remains a noticeable gap in the review of studies concerning AI adoption in targeted language learning, particularly. Earlier reviews have tended to focus mainly on quantitative outcomes, total technology adoption, or specific groups of learners, often without considering the seamless integration of AI-driven personalization strategies such as adaptive learning systems, chatbots, mobile apps like Duolingo, and feedback loops. Thus, there is a lack of an integrated, critical analysis that merges diverse findings on personalized AI-supported language learning across domains and approaches. The purpose of this review is to fill this gap by systematically documenting and reviewing current knowledge on AI in individualized language learning, with a view to identifying key conceptual incompatibilities, untapped research areas, and future research directions.

AI applications for individualized language education have shown progress, but researchers continue to face multiple obstacles during their implementation. The digital divide poses a significant challenge because access to AI technology remains restricted in certain geographic and economic areas, exacerbating educational language disparities (Li & Wong, 2023). The educational value of AI tools remains a subject of ongoing discussion among experts. Some educators question whether technology can really understand the aspects of language learning that require human interaction and emotional support (Mohebbi, 2025). It emphasizes the imperative to prepare teachers for the effective deployment of AI and to ensure that technology aligns with teaching objectives (Kristiawan et al., 2024).

While AI offers the promise of personalized language learning, it is important to consider the issues it raises. Future studies must aim to optimize the educational effectiveness of AI, mitigate issues of access, align technology with pedagogical intentions, and investigate cooperative aspects that allow for interactivity among students. Future research aims to improve the educational effectiveness of AI tools by addressing accessibility issues, aligning technological solutions with pedagogical needs, and exploring collaborative features that promote peer interaction. In doing so, the field can move towards more equitable and engaging language-learning experiences for all students, paving the way for a future in which AI plays an essential role in language education (Yılmaz, 2024). The learning of personalized

languages powered by AI has global implications and connections that influence culture, access to technology, and education. This technology can improve learning outcomes (Kovalenko & Baranivska, 2024), but disparities persist across regions (Alhusaiyan, 2025). As AI becomes an integral part of education, understanding its role is vital for fair education (Arani, 2024).

Looking towards the future, the ongoing research must focus on the development of systems that promote the student's independence and self-regulation while using AI tools. A systematic review of Zhu and Wang (2025) suggests that future studies should explore incorporating collaboration characteristics into AI applications, enabling students to interact with their classmates while learning through technology. In addition, exploring the implications of large language models for educational effectiveness could provide insights into improving the interactivity and adaptability of language-learning tools (Arani, 2024). Therefore, a study is needed to ensure AI supports fair, inclusive, and human-centered language learning that works well for students from all backgrounds and cultures. This study responds to the following research question: How does the use of AI affect the experiences of personalized language learning?

RESEARCH METHOD

This review employs thematic analysis to synthesize research on AI applications in customized language education from sixty academic studies. The research used academic databases, such as Google Scholar, ResearchGate, ERIC, and JSTOR, to identify articles using keywords such as artificial intelligence, personalized learning, language learning, and adaptive feedback. The research included articles published from 2023 to 2025 that met the criteria. The selection criteria for studies included AI-based personalized language learning research with empirical evidence or theoretical insights, as well as peer-reviewed status and English language availability. The research excluded studies that failed to discuss AI or personalized learning, contained unrelated content, lacked empirical evidence, or were not available in English. The data selection process yielded a reliable, focused dataset.

The thematic analysis method of Braun and Clarke (2006) served as the framework for analysis, involving pattern identification and analysis. The researcher conducted a complete review of all 59 articles to establish an initial understanding. The researchers applied coding to extract essential information, organizing it into three main categories: AI-based personalization methods, AI effects on student achievement, and difficulties in AI system deployment. The researchers developed specific definitions for these themes to extract fundamental concepts, thereby producing an organized, structured analysis. The analysis enabled researchers to develop a comprehensive understanding of AI applications in customized language education.

The research follows APA citation rules for all references and uses direct quotes only when necessary. The research team worked to minimize bias by evaluating multiple viewpoints across different contexts. The review includes only English-language studies and might miss necessary research conducted in other languages. Additionally, publication bias exists because journals tend to publish studies with positive results. The thematic analysis reveals essential information about modern AI and the trends, challenges, and knowledge gaps in personalized language learning research.

FINDINGS AND DISCUSSION

The finding is based on a review of 59 articles. Key themes include AI for student autonomy, pocket-teacher AI, AI for diverse demographics and social inclusion, Chatbots for more innovative learning, and, finally, limitations and access inequalities.

AI for Student Autonomy

Artificial Intelligence (AI) is now widely used in individually customized language learning. AI technologies are programmed to address the specific needs of language learners in their language acquisition journey. Several researchers stress how language learning becomes more interactive and efficient (Kristiawan et al., 2024; Wang et al., 2024). One significant aspect of AI is that it supports students' self-sufficiency and self-discipline. Mohebbi (2025) states that AI applications assist students in organizing their study schedules and monitoring their progress, leading to desirable performance. Through AI, students can make decisions that directly reflect their individual goals and priorities, gaining greater authority over their education. The salient features of AI-integrated language learning are autonomy and motivation. Kerimbayev et al. (2025) demonstrate that through personalized learning experiences, AI amplifies student potential. Students have the agency to decide how much time to spend on activities and can adapt their time allocation to their learning modality and requirements. As Saeedirad et al. (2024) mention, this sense of self-sufficiency elevates aspirations and dedication to language learning (Yilmaz, 2024). Likewise, Simi Sharma et al. (2025) assert that individualized AI tools encourage the achievement of holistic educational development goals by empowering learners to craft their learning journey. Along with motivating students, this approach also creates a more equitable education system in which learning is optimized for everyone's strengths and interests.

AI also evaluates each student's language proficiency and tailors tasks to match their competencies (Zhao et al., 2025; Islam et al., 2024; Khan et al., 2024). This establishes that learners are being challenged at their proficiency level while remaining motivated during their self-paced progress (Chen et al., 2025). To thrive persistently, interactive AI, such as gamification, plays a crucial role (Erdiana et al., 2025). These features make learning more engaging and the tasks compelling enough to sustain their interest (Li et al., 2023). Learners acknowledge being more driven towards AI language applications with game-like features, as these enhance their overall learning experience (Frank, 2024). For example, Anki "Flaschcards" or Duolingo "Roleplays" captivate the attention of learners easily. However, there are difficulties, such as over-reliance on technology that can minimize one-on-one physical encounters, which are essential for interactive language learning (Boumahdi, & Es-Sarghini, 2025). Therefore, it is crucial to counterbalance AI with traditional teaching methods. To be concise, AI in language learning fosters autonomy and motivation, enabling students to take control of their education and engage more effectively with the language-learning process.

Pocket Teacher AI

The use of intelligent tutoring systems (ITS) is a prominent theme in artificial intelligence applications for self-paced language learning, as it caters to each student's profile (Li & Wong, 2023). For example, Lingvist customizes vocabulary repetition or adjusts lesson frequency based on learners' interactions. A student's aptitudes and educational advancement are gauged by algorithms through technologies to customize learning materials to accommodate the distinct needs of each individual (Vorobyeva et al., 2025; Arani, 2024). It can provide targeted feedback to help students progress in specific areas of linguistic expertise by gathering data on their strengths and weaknesses (Alruwaili et al., 2025; Pari, 2024; Wang et al., 2023). For instance, Hidayat-ur-Rehman (2024) illustrates how these systems analyze user input data to create a personalized learning strategy that can build language proficiency more efficiently than traditional methods. Another notable aspect of this is the capacity to give instant responses. Jegede (2024) argues that feedback is essential for language learning, as it enables learners to detect their mistakes and fix them immediately. This live feedback facilitates students to understand their shortcomings and inspires them to practice productively with ease. For example, Beelingua and Talkpal applications give

immediate targeted feedback on a student's pronunciation or vocabulary; these have segments like audiobook-style narration to keep the learners engaged as well. Additionally, Vashishth et al. (2024) argue that immediate responses from guided AI tools can prompt increased encouragement and engagement among learners, leading to improved linguistic outcomes.

The mobile applications powered by artificial intelligence also play a pivotal role in learning specially designed languages. The latest findings of Yuen and Schlote (2024) demonstrate how applications can offer tailored exercises and materials based on learners' requirements. Far from a conventional classroom setup, mobile applications facilitate availability and malleability, enabling students to drill and gradually build their linguistic competence from anywhere (Kerimbayev et al., 2025; Tao, 2025; Igbokwe, 2023). This facility is especially beneficial to dedicated learners who endeavor to learn a new language in their leisure (Shikina, 2025). For instance, features such as "Explain my answer" in the Duolingo app or AI-generated frequent reminders in Busuu help learners stay steadfast in their language learning. The researchers note that these apps' customization features promote consistent practice, which is fundamental for acquiring and excelling in any language.

Chatbots for Smarter Learning

Another central theme is the contribution of advanced linguistic models in language learning. Sharma et al. (2025) note that these models can ensure participatory, dynamic materials suited to individual learners. This optimization keeps students engaged and focused. For example, Saleem et al. (2025) argue that AI can assess participants' competencies and tailor task challenges to students' needs without bewildering them. This functionality enables students to progress gradually at their own pace (Jian, 2023). Furthermore, chatbots are becoming indispensable for individualized language learning. By providing immediate observations and communication exercises, these chatbots replicate genuine, practical communication.

Zhao and Chen (2025) state that students can hone their language skills at their convenience, without time restrictions, thereby improving confidence and speed. Using chatbots also gives students the confidence and comfort to reach out to available resources whenever they face difficulties or seek credibility (Hasan et al., 2025; Willis, 2024). The learning of tailored languages is enhanced by incorporating detailed natural language processing (NLP) within them (Yekollu et al., 2024). Applications such as Talkpal and Univerbal offer features that support multiple languages, simulating real-world communication experiences. Kanchana et al. (2025) report how NLP can generate activities grounded in the context of practical life that help students simulate lived experiences. Moreover, Sreen and Majid (2024) delve into how communication models, such as Chatbots, transform the process of customized language learning. This research exhibits that communication with AI can facilitate meaningful discussions, which are fundamental to escalating linguistic capacities. For instance, applications such as Busuu and Univerbal provide exposure to native conversations and give learners the experience of real-time interactions. These conversations allow students to practice writing and speaking in ways that align with their pursuits, keeping the process engaging and gratifying. These designed conversations prompt individuals to believe they have an interactive partner who understands their specific needs, thereby building their reliance and motivation to learn.

AI for Diverse Demographics and Social Inclusion

In individually customised language learning, AI pertains to different socioeconomic data, specifically refugees and immigrants. Koç and Savaş (2025) emphasize the need for personalized language-learning tools to help marginalized groups develop their linguistic capabilities and support cohesion within emerging groups. Naznin et al. (2025) elaborate on the development of English skills for foreign language students (EFL) using AI technologies.

The paper argues that AI increases learners' autonomy by helping them tailor their learning experiences to their needs. The agency is nearing the end of its language-learning journey, resulting in heightened interest and positive outcomes. This aligns with the study by Dekhakhena (2025), which argues that customized AI materials help students recognize their potential and shortcomings, thereby enabling purposeful, strategic initiatives.

Furthermore, Fanning's (2024) bibliometric analysis examines recent developments and trends in the use of AI in language acquisition. As outlined in the study, there appears to be a growing emphasis on AI to facilitate language acquisition for non-native speakers. There is a growing interest among researchers in the distinct requirements that AI meets for diverse groups of learners, such as addressing cultural gaps and accommodating a range of expertise levels. Kazimova et al. (2025) reiterate this by analyzing how AI technologies can organize customized learning techniques. Their research reveals that when language learning is adjusted to learners' predominant styles and preferred approaches, it results in improved language skills. They reinforce that AI can make language learning more engaging by incorporating the most efficient learning approaches for different demographic groups. Ma et al. (2024) elaborate on how AI enriches language acquisition by customizing aids, supporting displaced people, migrants, and adults, minimizing alienation, and efficiently accommodating heterogeneous learning backgrounds.

Limitations and Access Inequalities

Artificial intelligence (AI) is transforming how people learn languages by providing tailored, adaptive learning that adapts materials to individual goals. This versatility enables students to accelerate more swiftly and skillfully (Zhao, 2025). However, some adversities hinder learners from serving uniformly. A prominent issue is the digital disparity (Hasan et al., 2024). Limitations of access to the latest devices and stable internet connections restrict economically or ecologically underprivileged learners from connecting with AI-generated tools (Wang & Zhu, 2025; Kristiawan et al., 2024). Students with steady internet connections in urban centres can regularly converse with modern AI applications, whereas in rural or peripheral areas, students face challenges due to limited connectivity. This technological disparity limits access to efficient language learning (Kazimova et al., 2025). Socioeconomic hierarchies also determine AI availability. Individuals from privileged socioeconomic backgrounds are more likely to purchase premium courses, cutting-edge technologies, and advanced AI learning platforms. On the contrary, economically challenged students may be deprived of such services because of limited time, facilities, and financial aid (Saleem et al., 2025; Al-Smadi et al., 2024). Hence, the discrepancy between socioeconomically advantaged and marginalized learners can increase.

Cultural variables also determine the integration of AI tools. In many cultural groups, inadequate acknowledgment of the value of foreign language learning can also demotivate learners from interacting with AI platforms. In addition, particular languages are often given preference over others, which also reduces opportunities for students seeking to learn less prevalent languages (Alhusaiyan, 2025). For instance, a lack of motivation from a learner's support systems to learn a less widespread language can result in a reduced use of AI technologies. In essence, while AI delivers significant benefits in facilitating individually tailored language learning, systematic disparities in technology, socioeconomic conditions, and cultural orientation create barriers that constrain equal opportunity for every individual (Zhu & Wang, 2025).

Table 1. Summary of Artificial Intelligence in Personalized Language Learning

Variables	Key Findings	Author
Student Autonomy	AI allows learners to control their own study pace and make decisions about which activities to prioritize.	(Mohebbi, 2025)
	It also helps students track their progress and adjust learning strategies to meet personal goals.	(Saeedirad et al., 2024)

Variables	Key Findings	Author
Motivation	Personalized AI tools increase student engagement by providing interactive and adaptive learning experiences.	(Shikina, 2025)
	They also encourage sustained commitment to language learning by offering rewards and instant feedback.	(Wang et al., 2024)
Learning Outcomes	AI-based personalized learning improves language proficiency by offering targeted exercises and immediate corrective feedback.	(Jegede, 2024)
	It also supports skill acquisition by adapting content to the learner's current level.	(Alhusaiyan, 2025)
Access to Technology	Students with reliable devices and the internet can fully benefit from AI-supported learning platforms.	(Kristiawan et al., 2024)
	On the contrary, limited access to technology can restrict equitable participation and create learning disparities.	(Zhu & Wang, 2025)
Teacher Involvement	Educators guide students in effectively using AI tools and integrating them into broader learning goals.	(Vorobyeva et al., 2025)
	They also ensure ethical use of AI and provide support when learners face difficulties or require additional instruction.	(Alruwaili et al., 2025)
Personalized Learning	AI adapts content, pace, and tasks to meet each learner's unique needs, enhancing the learning experience.	(Kovalenko & Baranivska, 2024)
	This personalization helps students focus on their strengths and weaknesses, improving efficiency and learning outcomes.	(Wang et al., 2024)

Discussion

A dynamic shift has occurred in language learning with the integration of artificial intelligence (AI) into personalized language learning. These AI tools, like Duolingo, Anki, Talkpal, and Univerbal, have brought about a central change towards improving students' freedom and motivation in language learning. This research synthesizes the results of various studies, clarifying the important role of AI in enhancing students' commitment, self-monitoring, and inclusiveness in educational practices. As Mohebbi (2025) noted, reshaping the formation models of traditional language instruction to enhance teaching and students' learning autonomy has been facilitated by AI tools. A literature analysis reveals several common themes that illustrate both AI's potential and the challenges it poses. A central theme that emerges is "Improving students' engagement through personalized learning experiences facilitated by AI language learning tools". Research by Wang et al. (2024) shows that students in integrated AI environments have higher motivation and are more engaged in their learning. For example, Duolingo, this approach keeps learning engaging by adapting to each student's strengths and weaknesses. Lessons are personalized to their needs and pace.

Interactive features like 'Roleplay' and 'Explain My Answer' actively involve learners. This deepens understanding and maintains motivation. This observation is aligned with the survey of Willis (2024) on the impact of AI tools like chatbots, ChatGPT, which indicates that AI applications significantly improve not just the student learning experiences, but also help you learn how to give commands correctly, the ability to ask the right questions, and recognize learners' potential. The analysis suggests that when students interact with AI-tailored personalized content, their intrinsic motivation is positively influenced, promoting an autonomous learning experience (Shikina, 2025). Self-monitoring, like a metacognitive strategy, is another essential aspect that has been focused on in recent studies. Students frequently encounter cognitive and motivational obstacles that hinder their language-learning progress. AI tools, such as universal translators, offer a practical approach by providing real-time conversation practice in learners' mother language (Myrzabek et al., 2025). The literature indicates that AI applications provide adaptive comments and personalized learning recommendations, which are essential for developing self-regulation skills (Hidayat-ur-Rehman, 2024). Students in learning environments enhanced by chatbots demonstrate greater ability to monitor their own progress by receiving critical feedback, aligning with Κουκαράς's

(2025) findings on how AI supports smart learning habits. Also, making education inclusive is crucial when discussing how AI affects language learning. Fanning (2024) believes that AI can serve the needs of various learners and assist with different learning horizons and styles. This is supported by Tao (2025), who found that the AI tool Beelinguapp can provide customized resources tailored to learners with varying competence levels, thereby eliminating educational inequalities. Language education through AI is perceived as introducing additional personalization to the learning environment, making it more inclusive overall.

However, it is important to identify the contradictions where studies disagree about how independent students are in their learning. For example, while Huynh (2024) notes that EFL students perceive AI tools as a means to increase their autonomy, Alruwaili et al. (2025) find that the extent of teacher support can influence this perception. The contradiction highlights a knowledge gap in the complex interaction between AI tools and teacher involvement, suggesting that AI's effectiveness in facilitating autonomy depends on the surrounding context (Vorobyeva et al., 2025). The contradiction necessitates further examination of the intersection of teachers' motivation and pedagogy with AI use in classrooms. Despite the promising prospects of AI, there remains a significant gap in addressing ethical concerns about its use. On the contrary, the majority of scholars agreed that AI is promoting autonomy. In academic settings, some scholars have disagreed on how AI handles confidentiality and protects data from an ethical perspective (Al-Smadi et al., 2024). The tension between AI print for personalized learning and the need to safeguard learners' data remains a significant concern for teachers and policymakers. Al-Atrash (2024) emphasizes that addressing such ethical implications is necessary to optimize the use of AI in language learning.

By correlating the results with broader educational problems, it is clear that implementing AI presents both opportunities and challenges. While educational institutions adopt AI tools, they must consider the varying technological skills of students, teachers, and the institutions themselves (Bayly-Castaneda et al., 2024). Differences in access to technology across contexts can hinder the full realization of AI's potential benefits. Thus, promoting an environment that supports both students and educators to navigate improved learning in AI is crucial. The models of engagement, self-regulation, and inclusiveness are strongly emerging. However, contradictions and gaps reveal a need for a continuous investigation into the interaction of AI, the participation of educators and ethical considerations (Brightwood et al., 2024) while we go ahead in the integration of AI into educational practices, the implications extend beyond simple academic success; They approach the broader educational landscape, leading to a more inclusive, fair and reactive learning environment.

When discussing implications for educators, policymakers, and researchers, educational institutions must recognize that AI significantly enhances students' autonomy and motivation in learning personalized languages. As Mohebbi (2025) and Shikina (2025) note, models of engagement, self-monitoring, and inclusiveness should be incorporated into AI-supported teaching practices. However, as Alruwaili et al. (2025) and Vorobyeva et al. (2025) believe, integrating AI lessons in classrooms, along with educators' involvement and contextual factors, can critically shape language learning. Also, it challenges traditional teaching norms. Confidentiality and data security are concerns policymakers must address to ensure safe and equitable AI use, as Al-Atrash (2024) instructed. Reducing digital skill gaps and ensuring equal access can play a critical role in AI-enabled language learning, as highlighted by Hong and Guo (2025). Researchers must continue exploring the complex interactions among AI tools, teacher participation, and ethical concerns to optimize AI's role in linguistic education. Lastly, this comprehensive strategy will enable learners to gain the maximum benefit from AI technologies in personalized language learning and to address relevant issues.

CONCLUSION

Artificial intelligence (AI) has significant potential to enhance personalized language learning, and this review demonstrated that capability. To adapt unique learning materials to meet the individual needs of students and make learning more engaging and compelling, AI tools such as Memrise, Lingvist, Duolingo, and Univerbal offer customized services (Kovalenko & Baranivska, 2024; Wang et al., 2024). Students can take greater ownership of their learning, which encourages independence, strengthens motivation, and helps them track their progress with AI (Mohebbi, 2025; Shikina, 2025; Saeedirad et al., 2024; Hasan et al., 2025). These studies indicate that people's learning styles and adaptation capabilities differ. When learners have the freedom to choose their preferred learning style, they flourish with confidence (Anis & Hasan, 2025). Through AI-driven instruction and scaffolding for language learning, individuals can progress at their own pace, receive immediate feedback, and focus on the skills they need to improve, leading to better educational outcomes (Jegede, 2024; Alhusaiyan, 2025). AI-based mobile applications, chatbots, Duolingo, Memrise, Talkpal, Univerbal, and intelligent tutoring systems provide flexible learning opportunities. They allow students to practice anytime, anywhere, simulate real-life conversations, sometimes provide translanguaging instructions to scaffold, and receive targeted feedback (Chen et al., 2025; Zhao, 2025; Yuen & Schlote, 2024). Natural language processing (NLP) in AI tools like busuu can further enhance the learning experience by understanding student inputs, combining interactive lessons, AI-powered review reminders, pronunciation practice, and language exchange with native speakers who help correct learners' writing or speaking skills (Yekollu et al., 2024; Kanchana et al., 2025).

AI applications like Duolingo, Memrise, Talkpal, Univerbal, Lingvist, Busuu, Beelinguapp, and Anki positively influence personalized language learning by using AI-backed spaced repetition, real-life videos of native speakers, and adaptive review timing to reinforce vocabulary. Also, studies have found that AI tools for personalized language learning enhance students' autonomy, motivation, and engagement, while offering individualized support that improves learning outcomes, especially in linguist apps. However, inequality in access to technology and ethical considerations remain important factors that influence the fair and effective implementation of AI in educational settings. Future studies should examine the long-term impacts of AI across diverse cultural and educational contexts, including non-Western settings. Longitudinal research can examine student capacity, performance, and the sustained effectiveness of AI tools. More research on ethical issues, cultural influences, and collaborative AI features will help create fair, inclusive, and human-centered language learning experiences.

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INFORMED CONSENT STATEMENT

Participation in this study was fully voluntary, and informed consent was obtained from all participants before data collection began. Participants were clearly informed about the study objectives, procedures, possible risks, potential benefits, confidentiality measures, and their right to withdraw at any stage without penalty. Consent indicated their agreement to participate under the ethical conditions explained by the researchers and documented beforehand.

DATA AVAILABILITY STATEMENT

The data supporting this study are not publicly available because of privacy considerations and ethical obligations to protect participant confidentiality. However, the dataset may be made available by the corresponding author upon reasonable request for academic purposes. Any sharing of data will require prior approval from the appropriate institutional ethics committee and must remain consistent with consent agreements.

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