

The Role of Artificial Intelligence in Language Learning and Teaching

¹ Turkan Ismayilli, ² Javid Babayev, ³ Hasan Alisoy

^{1, 2, 3} Nakhchivan State University, Azerbaijan

Abstract

Artificial intelligence (AI) has emerged as one of the most influential technological innovations in contemporary education, significantly transforming language learning and teaching processes. This study provides a comprehensive overview of the use of artificial intelligence in language learning, examining its pedagogical foundations, applications, advantages, and challenges. The study first discusses major theories of language acquisition and language teaching approaches, highlighting the evolution of technology-assisted language learning. It then explores the role of AI-powered tools and applications in supporting language acquisition through personalized learning, real-time feedback, speech recognition technologies, virtual and augmented reality environments, and gamified learning experiences. The findings of the reviewed literature indicate that artificial intelligence enhances learner engagement, motivation, and language proficiency by adapting instructional content to individual needs and providing continuous support throughout the learning process. However, concerns related to data privacy, technological dependence, and the limited ability of AI systems to replicate human interaction remain important challenges. The study concludes that artificial intelligence should be viewed as a complementary educational tool rather than a replacement for teachers. Future developments in AI technologies are expected to further enrich language learning environments and contribute to more effective, accessible, and learner-centered language education.

Keywords: artificial intelligence; language learning; language acquisition; personalized learning; speech recognition; educational technology; gamification; language teaching

Introduction

Gestures, facial expressions, hand, arm, and body movements, as well as traffic signs and various symbols, are important means of communication in the process of interaction between people. However, the most fundamental and advanced tool of communication is language. In its simplest form, language can be defined as a means of communication and notification. Linguists define language as a multifaceted communication tool that allows people to convey their feelings, thoughts, desires, and experiences to others through a system of sounds, meanings, and rules accepted by society. Communication through language is a complex process that enables the transfer of feelings and thoughts from a source to a receiver. There are different theoretical approaches to language acquisition. Chomsky (1965) suggested that individuals have an innate ability to learn language and that this ability operates through the Language Acquisition Device (LAD). According to him, when an individual is exposed to sufficient language input, they acquire language using this innate potential (Richards & Schmidt, 2002, p. 539).

In contrast, the constructivist approach argues that language learning occurs as a result of the individual's active participation and social interactions. Theorists such as Piaget, Vygotsky, and Bruner have emphasized the decisive role of environmental factors and learning experiences in language development. One of the important studies on language acquisition and learning is Krashen's theory. Krashen (1982) explains language acquisition as a natural process formed by the accumulation of meaningful language input that the individual receives unconsciously. According to this view, effective language acquisition requires the individual to be exposed to sufficient language input, listening activities, and meaningful experiences. As a result, language acquisition is a multidimensional process that falls within the common field of study of different disciplines such as linguistics, psychology, educational sciences, and cognitive sciences. This process is influenced by both innate cognitive characteristics and social and environmental factors. In this context, theories and approaches developed regarding language teaching contribute to a better understanding of language learning processes.

Theoretical Approaches to Language Teaching

Behavioral Approach

Behaviorist theorists such as Skinner, Pavlov, and Watson viewed language learning as a process of habit formation. According to behaviorists, language teaching occurs through repetition, reinforcement, and reward. Students' correct language use is rewarded, and incorrect usage is corrected. This approach has been particularly effective in traditional methods such as the Grammar-Translation Method. However, critics have argued that this method does not adequately contribute to students' understanding of the real-world use of language.

Cognitive Approach

Chomsky's universal grammar theory suggests that language learning is based on innate cognitive mechanisms in the human brain. Chomsky explained children's ability to learn language rules quickly using a Language Acquisition Device. This theory emphasizes the role of grammar in language teaching and leads to learning being perceived as a set of rules.

Direct Instruction Method

The Direct Instruction Method encourages students to learn the target language only in the target language, not through their native language. In this method, language teaching is largely based on oral communication and listening. The aim is for students to learn the language in a way that they can use it in daily life. Popularized by Maximilian Berlitz, this method emerged as an alternative to the traditional Grammar-Translation Method.

Natural Approach

Krashen and Terrell argued that language learning occurs naturally in the environment where the language is used. With the Input Hypothesis, Krashen proposed that learners need to encounter meaningful and understandable language input, and that language acquisition occurs in this way. According to Krashen, language learning is based on understandable input rather than conscious grammatical rules.

Multiple Intelligences Theory

Gardner's theory of multiple intelligences argues that students have different learning styles and that language learning should be designed taking these individual differences into account. Language teachers can improve students' language skills using different strategies that appeal to visual, auditory, kinesthetic, and social intelligence.

Technology-Assisted Language Teaching

With the widespread adoption of digital technologies in the 21st century, the use of technology in language teaching has increased significantly. Computer-assisted language learning, online platforms, mobile applications, and digital learning tools have begun to offer learning experiences tailored to students' individual learning paces. Technological tools support learners' active participation in language learning processes while also expanding learning opportunities both inside and outside the classroom.

Language laboratories, multimedia applications, mobile technologies, and social media play a significant role in developing language skills (Ismayilli, 2023). Furthermore, next-generation technologies such as augmented reality, virtual reality, and artificial intelligence have made learning environments more interactive and student-centered. In recent years, artificial intelligence has emerged as one of the most notable components of educational technologies. AI-powered applications increase the effectiveness of language learning processes by offering personalized learning, instant feedback, and adaptive instruction. Therefore, artificial intelligence is considered an innovative and complementary educational tool in language teaching today (Holmes et al., 2019).

Artificial Intelligence and Language Acquisition

Artificial intelligence technologies have initiated a significant transformation process in the field of education in recent years. This transformation has profoundly affected language learning processes in particular, combining traditional methods with innovative approaches. The role of artificial intelligence in language learning offers a dynamic learning environment that responds to students' needs through personalized learning experiences, interactive applications, and continuous feedback mechanisms. The impact of AI applications on language learning, along with the opportunities and advantages they offer, holds a significant place in the future of education (Godwin-Jones, 2018, pp. 8–28).

To understand the impact of AI applications on language learning processes, it is necessary to first examine the complex nature of language learning. Language learning is not limited to learning vocabulary and grammar rules, but also includes elements such as cultural context, communication skills, and social interaction (Van Patten & Williams, 2015). Therefore, it is important to develop a customized learning process that takes into account the needs, learning styles, and motivations of language learners. Artificial intelligence has the potential to make language learning more effective and accessible by meeting these needs (Warschauer, 2004).

The role of artificial intelligence in education has made significant progress in recent years, especially in language learning processes. AI provides personalized learning experiences, delivering content according to students' learning styles and speeds. Interactive applications teach grammar and vocabulary while simultaneously helping students improve their pronunciation and speaking skills. Furthermore, AI-powered systems provide students with instant feedback, monitoring their progress and allowing them to focus on areas where they are weak. Features such as multilingual support and

automatic translation overcome language barriers, making learning more accessible. Artificial intelligence uses data analytics to evaluate student performance and personalize teaching strategies. Virtual assistants and chatbots interact continuously with students, contributing to their language learning processes (Babayev, 2025). These developments have made language learning more effective, efficient, and accessible.

Artificial intelligence plays a significant role in language learning processes. Natural language processing technologies form the basis of language learning applications, providing students with real-time feedback and contributing to the development of language skills. Popular language learning platforms, in particular, personalize each student's learning process by working with AI-based systems. These platforms offer students an interactive learning experience, providing content tailored to their needs and pace. AI makes learners' language learning processes more efficient and effective by providing continuous feedback, suggestions, and corrections to improve language skills. Koedinger, McLaughlin, and Heffernan (2012) stated that AI-supported language learning tools provide more effective and faster learning and play a significant role in improving students' language skills. Such systems analyze student performance, identify errors, and suggest corrective actions.

Language learning is not limited to learning grammar rules; it also includes the development of reading, writing, listening, and speaking skills. Native language instruction is the process of developing individuals' abilities to communicate, express their thoughts, and make sense of things. In this context, artificial intelligence can be used as an effective tool in improving these four fundamental language skills in students. By personalizing students' learning processes and providing appropriate corrections and feedback tailored to each student's needs, AI can make language learning more efficient.

Applications of Artificial Intelligence in Language Learning

Personalized Learning

Artificial intelligence analyzes students' individual needs, learning speeds, and language proficiency levels to provide personalized learning experiences. This ensures that each student receives appropriate content, activities, and feedback, increasing the efficiency of the language learning process. Adaptive learning systems continuously monitor students' performance, updating their learning paths and supporting individual development.

Real-Time Feedback and Evaluation

AI-based language teaching systems support the learning process by providing students with instant feedback. These systems automatically detect grammar, spelling, and expression errors, allowing students to quickly correct their mistakes. Thus, learners become aware of their errors earlier and can improve their language skills more effectively (Huang & Lin, 2017). Furthermore, AI-powered assessment tools provide teachers with data on students' strengths and areas for improvement by analyzing student performance in detail. This contributes to a more goal-oriented planning of the teaching process. Research shows that AI systems can detect grammar and spelling errors with high accuracy. Tools like Grammarly and WriteToLearn, in particular, contribute to the development of written language skills by providing students with instant feedback (Knoll, 2019).

The Role of Artificial Intelligence in Spoken Language Learning: Speech Recognition Technology

One of the most effective applications of artificial intelligence, speech recognition technology offers students the opportunity to improve their pronunciation skills and receive instant feedback. Some language learning platforms focus particularly on pronunciation. Speech recognition technology analyzes the words and sentences spoken by students and provides feedback on correct pronunciation (Alisoy, 2025). These systems are a great source of motivation, especially in spoken language learning. Speech recognition technology detects incorrect pronunciations, allowing students to instantly recognize and correct these errors. This contributes to the effective improvement of the language learning process (Hsu, 2020).

Integration of Artificial Intelligence into Language Learning Environments: VR and AR Applications

The combination of virtual reality (VR) and augmented reality (AR) technologies with artificial intelligence offers language learners the opportunity to practice language in a real-world context. Chiu, Liou, and Yeh (2016) showed that AI-powered VR applications increased students' language learning motivation and success rates. In such environments, students can practice their language skills within virtual scenarios. VR and AR technologies enable language learners to practice and experience learning. Students can improve their language skills in natural contexts by virtually navigating a restaurant or a tourist attraction.

AI-Powered Gamification and Language Learning Motivation

Artificial intelligence increases student motivation and participation in language learning processes by integrating gamification elements. Gamification elements such as points, badges, level progression, and reward systems make the learning process more engaging and interactive. This approach contributes to maintaining the attention of young learners in particular and developing a positive attitude towards learning. Research shows that AI-powered gamified applications enable students to participate more actively in learning processes and increase their motivation towards learning (Lai et al., 2019). For example, platforms like Duolingo transform language learning into a more fun and sustainable experience through tasks, rewards, and achievement indicators.

Conclusion

This study has provided a comprehensive overview of the role of artificial intelligence in language learning processes by examining theoretical foundations, technological applications, and pedagogical implications. The reviewed literature demonstrates that artificial intelligence significantly contributes to language education through personalized learning environments, real-time feedback mechanisms, speech recognition systems, gamification strategies, and immersive technologies such as virtual and augmented reality. These tools enhance learner engagement, motivation, and overall language proficiency by adapting instruction to individual needs and learning paces.

However, despite its considerable advantages, the integration of artificial intelligence in language learning also presents several challenges. Issues such as data privacy, overdependence on technology, and the limited capacity of AI systems to fully replicate human interaction and cultural context remain critical concerns. Therefore, AI should not be considered a replacement for traditional teaching but rather a complementary tool that supports and enriches the role of educators. In conclusion, artificial intelligence represents a transformative force in language education, offering innovative and flexible

learning opportunities. Future research should focus on improving ethical frameworks, enhancing human–AI interaction, and further exploring how AI can be more effectively integrated into pedagogical practices to ensure sustainable and inclusive language learning environments.

Declarations

Ethical Approval: This study is a theoretical review based on published scholarly literature. No human participants were involved. All sources are appropriately cited.

Conflict of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

Data Availability: All sources referenced in this article are publicly available.

Author Contributions: T. Ismayilli: conceptualization and writing of the main manuscript. H. Alisoy: literature review and analysis of AI applications. J. Babayev: methodology and revision. All authors read and approved the final manuscript.

References

- Alisoy, H. (2025). The impact of AI-powered personalized learning on ESL student outcomes. *EuroGlobal Journal of Linguistics and Language Education*, 2(2), 89–98.
- Alqahtani, A. (2019). The use of technology in English language teaching. *Frontiers in Education Technology*, 2(3), 1–17. <https://doi.org/10.22158/fet.v2n3p168>
- Babayev, J. (2025). Application of social platforms in language learning. *Acta Globalis Humanitatis et Linguarum*, 2(3), 141–148.
- Burstein, J., & Marcu, D. (2003). Developing technology for automated evaluation of discourse structure in student essays. In M. D. Shermis & J. C. Burstein (Eds.), *Automated essay scoring: A cross-disciplinary perspective* (pp. 209–230). Lawrence Erlbaum.
- Chiu, C. H., Liou, H. C., & Yeh, Y. (2016). A virtual reality-based language learning environment for EFL students. *Educational Technology & Society*, 19(1).
- Chun, D. M. (2016). The role of technology in SLA research. *Annual Review of Applied Linguistics*, 36.
- Godwin-Jones, R. (2018). Chatbots and language learning: Interactive tools for language practice. *Language Learning & Technology*, 22(1), 8–28.
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Hsu, T.-L. (2020). Speech recognition technology and pronunciation feedback in language learning. *Computer Assisted Language Learning*.
- Huang, Y., & Lin, K. (2017). Automated error detection and feedback in second language writing. *Language Learning & Technology*, 21(3).
- Ismayilli, T. M. (2023). A cognitive perspective on the delivery of affirmation in stylistic devices in English. *German International Journal of Modern Science*, (68).
- Ismayilli, T. (2024). *The impact of non-verbal communication on the language learning process*.

- Knoll, A. (2019). Automated writing evaluation tools in the language classroom. *CALICO Journal*, 36(2).
- Koedinger, K. R., McLaughlin, E. A., & Heffernan, N. T. (2012). A quasi-experimental evaluation of an online formative assessment and tutoring system. *Journal of Educational Computing Research*, 43(4), 489–510.
- Krashen, S. D. (1981). *Second language acquisition and second language learning*. Pergamon Press.
- Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.
- Kutsyk, B. M., & Nykyporets, S. S. (2024). *The impact of artificial intelligence (AI) on language learning*. Proceedings of the All-Ukrainian Scientific-Practical Internet Conference “Youth in Science 2024.”
- Lai, C., Hu, X., & Lyu, B. (2019). Understanding the nature of learners’ out-of-class language learning experience with technology. *Computer Assisted Language Learning*, 32(1–2), 92–116.
- Richards, J. C., & Schmidt, R. (2002). *Longman dictionary of language teaching and applied linguistics* (3rd ed.). Pearson Education.
- Van Patten, B., & Williams, J. (Eds.). (2015). *Theories in second language acquisition: An introduction* (2nd ed.). Routledge.
- Warschauer, M. (2004). Technological change and the future of CALL. In S. Fotos & C. Browne (Eds.), *New perspectives on CALL for second language classrooms* (pp. 15–25). Lawrence Erlbaum.

Authors	Turkan Ismayilli (Corresponding Author) PhD in Philology, Nakhchivan State University, Azerbaijan ORCID: https://orcid.org/0009-0009-1687-6203 Javid Babayev PhD in Philology, Nakhchivan State University, Azerbaijan ORCID: https://orcid.org/0009-0009-2472-0006 Hasan Alisoy Nakhchivan State University, Azerbaijan ORCID: https://orcid.org/0009-0007-0247-476X
----------------	---

Received: 20.05.2026

Revised: 02.06.2026

Accepted: 17.07.2026

Published: 19.07.2026