

The logo for RADemics, featuring the text "RADemics" in white on a blue arrow-shaped background pointing to the right. The arrow is part of a larger blue horizontal bar that is attached to a dark blue vertical bar on the left side of the page.

RADemics

Speech Recognition, Sentiment Analysis, and Conversational AI in English Language Pedagogy

A decorative graphic consisting of several thin, curved lines in shades of blue and grey, originating from the bottom left and extending upwards and to the right, resembling stylized grass or reeds.

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Abstract

The integration of Artificial Intelligence (AI) in English language pedagogy has transformed traditional teaching and learning paradigms, offering innovative tools for enhancing learner engagement, improving outcomes, and personalizing instruction. This chapter explores the roles of key AI technologies speech recognition, sentiment analysis, and conversational AI within modern language education, with a focus on their impact on both pedagogical practices and student experiences. Through the lens of learner-centered pedagogy, the chapter examines how AI facilitates individualized learning pathways, promotes collaborative and peer-learning environments, and enhances the feedback and assessment process. The challenges of integrating AI into language education, including issues of equity, bias, and data privacy, are critically evaluated to provide a comprehensive understanding of the ethical implications of AI in education. Additionally, the evolving roles of educators in an AI-driven learning environment are explored, emphasizing the need for balanced interaction between AI systems and human educators. This chapter aims to contribute to the ongoing discourse on the future of AI in education by highlighting its transformative potential while also addressing the complexities that accompany its integration.

Keywords: Artificial Intelligence, Language Pedagogy, Speech Recognition, Sentiment Analysis, Conversational AI, Learner-Centered Pedagogy.

Introduction

The integration of Artificial Intelligence (AI) into English language pedagogy marks a transformative shift in how language learning is approached and delivered [1]. Traditional teaching methods, which often rely on fixed curricula and standardized assessments, are being augmented by AI technologies that offer personalized, adaptive learning experiences [2]. AI tools such as speech recognition, sentiment analysis, and conversational AI are enhancing language instruction by providing real-time, individualized feedback, fostering learner autonomy, and creating dynamic, interactive environments [3]. These AI-powered solutions are capable of addressing the diverse needs of language learners, tailoring instruction to meet their unique proficiency levels, learning styles, and pace. As a result [4], AI has the potential to make

language learning more accessible, engaging, and effective, while empowering students to take greater control over their educational journey [5].

Among the various AI technologies, speech recognition plays a central role in English language education, particularly in improving pronunciation, fluency, and spoken language skills [6]. Through advanced algorithms, speech recognition systems evaluate learners' pronunciation, offering immediate corrective feedback that is typically unavailable in traditional classroom settings [7]. These systems not only correct mispronunciations but also track improvements over time, allowing learners to see their progress in real-time [8]. Furthermore, speech recognition tools can be integrated with other AI-driven applications to enhance the learning process [9]. For instance, learners can engage in interactive dialogues with AI-powered systems that simulate real-world conversational scenarios. By providing continuous opportunities for spoken language practice, speech recognition technology bridges the gap between theoretical knowledge and practical application, thus enhancing both fluency and confidence in using the language [10].

Sentiment analysis, another important AI tool, adds an emotional and affective dimension to language learning by gauging learners' emotional responses to learning materials and tasks [11]. Through the analysis of text or voice inputs, sentiment analysis algorithms can detect learners' emotional states, including frustration, confusion, or motivation, offering valuable insights into their engagement with the material [12]. This technology allows for more personalized interventions, enabling instructors or AI systems to adjust the learning experience based on real-time emotional feedback [13]. For example, if a learner is exhibiting signs of frustration, the system could suggest a break, offer encouragement, or present the material in a different format to alleviate stress [14]. The use of sentiment analysis provides an additional layer of support for language learners, helping to maintain motivation and engagement throughout the learning process. By addressing the emotional and psychological aspects of language learning, sentiment analysis enhances the overall learner experience and contributes to improved outcomes [15].