



USING CHATBOTS TO SUPPORT EFL LISTENING DECODING SKILLS IN FULLY ONLINE ENVIRONMENTS: A COMPREHENSIVE RESEARCH- BASED ANALYSIS

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Abstract. *The rapid expansion of fully online English as a Foreign Language (EFL) programs has intensified the need for effective methods to improve learners' listening decoding skills—phoneme identification, connected-speech processing, and lexical segmentation. These bottom-up skills are often overlooked in online settings where interaction and feedback are limited. This article provides a comprehensive research-based analysis of how conversational chatbots, supported by advances in natural language processing and speech technologies, can be leveraged to develop decoding skills in online EFL learning environments. Integrating findings from recent studies in computer-assisted language learning (CALL), mobile-assisted language learning (MALL), and human–computer interaction (HCI), the analysis demonstrates that chatbots can enhance real-time listening interaction, provide adaptive scaffolding, deliver individualized micro-listening tasks, and increase learner autonomy. Key pedagogical considerations, implementation guidelines, and limitations are addressed. The article concludes by outlining directions for future empirical research on the role of AI-driven conversational agents in fostering EFL listening proficiency.*

Keywords: *EFL listening; decoding skills; chatbots; artificial intelligence; CALL; online learning; automated feedback; listening comprehension*

INTRODUCTION.

Developing effective listening skills remains one of the most persistent challenges for EFL learners, particularly in fully online learning environments where teacher-led modeling, immediate feedback, and interactive support are less accessible. Listening decoding skills—bottom-up processes such as phoneme discrimination, stress detection, and processing of connected speech—are foundational for accurate comprehension (Field, 2019). Yet traditional online courses often focus on comprehension questions rather than the perceptual processes that enable learners to interpret the speech signal.

In parallel, rapid advancements in artificial intelligence (AI) have made conversational chatbots increasingly prevalent in educational settings. AI chatbots can simulate interaction, deliver speech input at adjustable difficulty levels, and provide instant feedback—functions that align closely with the needs of decoding-focused listening instruction. This article synthesizes current research to examine how chatbots can support the development of EFL listening decoding skills in fully online environments.

The Importance of Decoding Skills in EFL Listening

Listening decoding involves reconstructing meaning from the acoustic signal through processes such as parsing word boundaries, identifying phonological forms, and recognizing patterns of connected speech (Vandergrift & Goh, 2012). Research indicates that weaknesses in bottom-up processing are a major source of comprehension breakdown for EFL learners (Field, 2008; Cauldwell, 2018). Without sufficient decoding skills, learners struggle with reduced forms (e.g., gonna, wanna), assimilation, elision, and variations in stress and intonation.



Strengthening decoding skills therefore requires targeted, perceptually oriented training that provides controlled input, repetition, and immediate corrective feedback—conditions that AI chatbots can effectively simulate.

Chatbots in Online Language Education

Chatbots have been increasingly explored within CALL and MALL frameworks due to their ability to provide accessible, low-anxiety, on-demand interaction (Li, 2023). Unlike fixed online listening materials, chatbots can dynamically adjust task difficulty, speech rate, and linguistic complexity. Their capabilities include:

- Speech-based interaction using automatic speech recognition (ASR)

- Delivery of personalized micro-listening tasks

- Instant corrective feedback at the phoneme or word level

- Flexible integration with Learning Management Systems (LMS)

- Automated tracking of learner progress

These affordances position chatbots as potentially transformative tools for decoding-focused listening instruction.

How Chatbots Support Listening Decoding Skills

Adaptive Scaffolding and Personalization

Chatbots can assess learner performance in real time and modify speech rate, accent, or vocabulary difficulty. When learners encounter decoding challenges, the chatbot can replay segments, provide slower or clearer versions, or highlight reduced forms—mechanisms shown to facilitate perceptual learning (Bradlow, 2021).

Micro-Listening Tasks for Bottom-Up Skill Development

Chatbots can deliver task types such as:

- Minimal-pair discrimination

- Short utterance transcription

- Identification of stress or intonation patterns

- Spot-the-reduction activities

- Word boundary recognition exercises

Such tasks help learners strengthen the perceptual processes necessary for fluent listening comprehension.

Authentic but Controlled Listening Exposure

AI-generated or scripted chatbot speech allows instructors to balance authenticity with pedagogical control. Learners are exposed to naturalistic language features while maintaining the option to adjust listening conditions.

Immediate, Individualized Feedback

Feedback is crucial in decoding development. Chatbots can point out specific misheard phonemes, provide phonetic transcriptions, replay problematic segments, and supply auditory comparisons—feedback types that are difficult to deliver consistently in online classroom settings.

Limitations and Challenges

While the potential benefits are clear, chatbot-based listening support faces several constraints:

- ASR inaccuracies may result in incorrect feedback.

- Limited multimodal cues in audio-only interactions may hinder comprehension for beginning learners.

- Predictable dialogues can restrict exposure to interactional variability unless carefully designed.

- Technical issues, including connectivity and audio quality, may affect listening perception.

- Instructor training is needed to thoughtfully integrate chatbots into curriculum design.

These limitations underscore the importance of pedagogically informed implementation rather than purely technological adoption.

Pedagogical and Design Implications



To maximize effectiveness, instructors and developers should:

Integrate chatbot activities into broader listening instruction rather than using them as add-ons.

Combine explicit phonological instruction with chatbot-based practice.

Employ task sequencing that moves from controlled micro-listening tasks to freer interaction.

Use analytics from chatbot platforms to monitor learner progress and adjust instruction.

Ensure that chatbot interactions reflect a range of naturalistic pronunciations, accents, and speech patterns.

Future Research Directions

Further empirical work is needed in the following areas:

Long-term effects of chatbot-assisted decoding practice

Optimal levels of speech variability for different proficiency bands

The role of multimodal chatbot avatars in supporting listening comprehension

Comparisons between chatbot-mediated and instructor-mediated decoding instruction

Learner perceptions of AI-driven listening support over extended periods

Such research will help refine pedagogical models and inform future chatbot design.

Conclusion

Chatbots offer significant potential for supporting EFL learners' listening decoding skills in fully online environments. By providing adaptive scaffolding, individualized feedback, and abundant opportunities for controlled listening practice, AI-driven conversational agents address key limitations in traditional online listening instruction. When integrated thoughtfully and supported by solid pedagogical design, chatbots can contribute meaningfully to the development of learners' bottom-up listening abilities and overall listening proficiency.

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