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Editorial

Speaking without fear: How AI is transforming language learning for the anxious and introverted

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1. Introduction

Language learning offers both opportunities and challenges. For some learners, particularly those who are introverted or prefer less social interaction, the experience is often accompanied by anxiety. Foreign language anxiety, a well-documented phenomenon, includes fear of speaking, making mistakes, or being judged in unfamiliar linguistic environments [1–3]. This emotional barrier can undermine self-confidence and limit classroom participation, slowing overall language development [4]. While anxiety is not exclusive to introverts, it tends to manifest more strongly in learners who are less comfortable with social exposure [5]. The consequences extend beyond academics, affecting self-esteem, motivation, and willingness to engage in real-world communication [6]. Without effective interventions, learners may enter a cycle of avoidance and stagnation, reinforcing the psychological toll [5]. In response to these enduring psychological barriers, educators and researchers are increasingly turning to technological innovations to reimagine language learning environments. Among these, Artificial Intelligence (AI) has emerged not merely as a digital supplement but as a transformative force capable of redefining how learners interact with language [7]. Rather than replacing teachers, AI tools offer learners an alternative pathway, one that is private, adaptive, and free from the social risks that often hinder progress [8]. By enabling personalised, real-time practice through features like speech recognition, adaptive feedback, and conversational agents, AI creates judgment-free spaces where anxious or introverted students can build competence and confidence at their own pace [9,10]. These developments mark a significant step toward more inclusive and psychologically attuned language education.

Language learning anxiety is a multifaceted phenomenon that affects learners' performance, confidence, and willingness to communicate [11]. It is commonly associated with three interrelated components such as communication apprehension, fear of negative evaluation, and test anxiety [1]. These psychological factors can lead learners to avoid interaction, disengage from speaking tasks, or over-focus on correctness at the expense of fluency [12]. To advance a more comprehensive understanding of language learning anxiety, it is essential to move beyond traditional classifications and examine the phenomenon through the lens of contemporary theoretical models. For instance, **Control-Value Theory** [13] explains language anxiety as a product of learners' perceived control over tasks and the value they assign to success. When students perceive low control but high stakes, anxiety increases. Similarly, **Dynamic Systems Theory** in SLA highlights the fluctuating nature of affective states, suggesting that anxiety is not fixed but shaped by complex interactions

between the learner, environment, and task [14]. Integrating these models deepens our understanding of why anxiety is particularly disruptive in speaking-focused language learning. It also opens new pathways for interventions that are responsive, personalised, and adaptable over time, precisely where AI tools may have an advantage.

In recent years, AI has emerged as a transformative tool in language education, particularly for supporting learners who experience anxiety or lack confidence in oral communication. Among the most promising innovations are AI-powered applications like ELSA Speak, Replika, and Woebot, each offering unique affordances for personalised, low-pressure learning environments that can buffer users from the psychological challenges often present in traditional classroom settings. **ELSA Speak**, an acronym for English Language Speech Assistant, exemplifies how AI can aid language learning by providing real-time pronunciation feedback through Automatic Speech Recognition (ASR). Anggraini [15] demonstrated a progressive improvement in students' pronunciation scores over three teaching cycles, with averages rising from 70 to 80 points. Similarly, Kholis [16] found that students using ELSA Speak reported increased confidence and greater accuracy in pronunciation. The app's immediate, nonjudgmental feedback allowed learners to rehearse pronunciation without peer scrutiny, helping to mitigate performance anxiety. These studies show that ELSA Speak not only supports linguistic competence but also enhances learner motivation by offering a structured yet flexible learning path [17].

2. Empirical studies

Beyond linguistic enhancement, AI is increasingly intersecting with emotional and psychological dimensions of learning. **Social chatbots** like Replika are designed to provide companionship and mental health support. A study by Laestadius et al. [18], based on user posts from the Replika Reddit community, revealed that users often develop emotionally dependent relationships with the chatbot. This emotional bonding, while occasionally beneficial in reducing feelings of loneliness, also introduced potential harms. Users projected human-like needs onto the chatbot and felt compelled to maintain emotional reciprocity, suggesting a blurring of boundaries between human–AI and human–human interaction. These findings highlight the dual-edged nature of emotionally responsive AI tools in that they can offer comfort but also raise ethical concerns related to emotional manipulation and dependency. A parallel examination of **Woebot**, a chatbot grounded in cognitive-behavioural therapy principles, offers further insight into the emotional affordances and limitations of AI. Yeh et al. [19] conducted an 18-week study involving master's students and found no significant decrease in anxiety or depression among users, despite initial positive feedback. Usability challenges, such as technical glitches and language limitations, contributed to a decline in user satisfaction. These findings suggest that while AI has potential as a psychological aid, its long-term effectiveness depends on user experience, cultural adaptability, and technological reliability.

Moreover, Naik et al. [20] proposed an AI system that integrates facial expression analysis and sentiment detection to predict mental health states. By combining multimodal inputs, the chatbot simulated human-like emotional engagement and

offered mood-specific coping strategies. This model underscores the growing capacity of AI to detect and respond to affective cues, a promising development for emotionally attuned language learning tools. Taken together, these empirical studies suggest that AI applications can provide psychologically safe, adaptive environments that are especially valuable for anxious or introverted learners. However, they also highlight the importance of thoughtful integration, ethical oversight, and continued research into the cognitive and emotional impacts of these tools. As AI evolves, its true educational value will depend not only on technical sophistication but on its alignment with learner needs, pedagogical frameworks, and ethical design principles.

The next phase of AI in language education is set to move beyond automation toward systems that are more adaptive and emotionally responsive. Advances in neuroadaptive interfaces and affective computing suggest AI may soon detect learner stress, disengagement, or hesitation, and adjust feedback accordingly [21]. While promising, these technologies remain in early stages, and current models of emotional intelligence in AI are still rudimentary, capable of recognising surface cues like speech hesitation or facial expression, but limited in interpreting cultural context, learner intent, or nuanced emotional states [22]. As such, optimism around empathetic AI must be tempered with realism. A pressing barrier is the professional development gap since many educators lack the training needed to integrate AI meaningfully and ethically into instruction [23]. Without support in areas like data interpretation, ethical use, and prompt design, AI risks being misused, as a gimmick or in ways that amplify bias and surveillance [24]. Ultimately, the success of AI in language learning will hinge not only on technological sophistication but on human readiness to deploy it with clarity, care, and pedagogical purpose.

To ensure sustainable and inclusive growth of AI in language education, future efforts must prioritise interdisciplinary collaboration among educators, technologists, linguists, and ethicists [25]. Policies and curriculum frameworks should be co-developed to align technological affordances with learning goals, while maintaining learner autonomy and privacy. Additionally, investment in open-access AI tools and equitable digital infrastructure will be vital to prevent a growing divide between learners with and without access to cutting-edge technologies [26]. In this way, the future of AI will not be defined solely by innovation, but by the intentional design of educational ecosystems that balance innovation with inclusion, trust, and human-centred learning.

3. Conclusion

Foreign language learning, while intellectually enriching, is often accompanied by anxiety, particularly for introverted learners or those lacking communicative confidence. Traditional classroom dynamics can intensify this pressure, inhibiting risk-taking and oral fluency development. AI-mediated environments offer judgment-free, adaptive, and private spaces for iterative practice, effectively lowering affective barriers. These tools humanise learning by responding to emotional and behavioural cues that educators cannot always monitor in real time [27]. However, the pedagogical value of AI depends on thoughtful integration. Implementation should be scaffolded within communicative language teaching frameworks and personalised learning

pathways [28]. Teachers remain central, not as technologists, but as facilitators who interpret AI feedback, provide socio-emotional support, and balance automation with pedagogical insight. Equipping educators with the skills to navigate AI's capabilities and limitations through targeted professional development is critical to its meaningful adoption.

As AI evolves to include features like affect recognition, biometric responsiveness, and learner modelling, ethical and equity concerns grow more urgent [29]. Transparent data governance, consent protocols, and safeguards against algorithmic bias are essential, especially in contexts involving vulnerable or under-resourced learners. Simultaneously, the digital divide remains a barrier as AI-based tools often depend on reliable infrastructure, devices, and digital literacy, which are not universally accessible. Future innovations must therefore be designed with accessibility, affordability, and cultural inclusivity in mind. Research, too, must move beyond short-term evaluations to examine long-term outcomes, retention, learner autonomy, and cross-linguistic applicability. Comparative studies are needed to determine when and for whom AI enhances language learning most effectively. Ultimately, AI should not replace educators but extend their reach, providing a more personalised, emotionally responsive, and equitable learning environment. For anxious learners, this marks not just a technological shift, but a reimagined, human-centred pathway to linguistic confidence and empowerment.

Highlights:

- AI tools can reduce language learning anxiety by creating psychologically safe environments.
- Introverted learners benefit significantly from self-paced, private AI interactions.
- Pedagogical and ethical training for teachers is crucial to integrate AI responsibly.
- Future innovations should aim for emotionally intelligent and adaptive AI systems.
- AI should be viewed not as a replacement for teachers, but as a complement that enhances their pedagogical reach and responsiveness.

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