CHAPTER 5
DISCUSSION & CONCLUSION

This chapter offers a comprehensive and critical analysis of the findings from the integration of AR technology into an ETH course. It situates the results within broader theoretical frameworks, empirical literature, and pedagogical discourse, particularly focusing on Second Language Acquisition (SLA) and English for Specific Purposes (ESP) instruction. Guided by three research questions, the study investigated: (1) students' readiness, willingness, and acceptance of AR technology; (2) the effects of AR on their speaking performance; and (3) their perceptions of AR-supported language learning. The results, presented in Chapter 4, confirmed the transformative potential of AR to enhance students' engagement, motivation, and oral communicative competence. At the same time, they exposed important limitations, such as cognitive overload, technological accessibility, and interface usability, that warrant further pedagogical consideration. To interpret these findings, the discussion draws upon relevant theoretical perspectives, notably the Technology Acceptance Model (TAM) (Davis, 1989) and Cognitive Load Theory (Sweller, 1994), as well as constructivist and sociocultural paradigms that emphasize learner-centered and context-rich instruction. These frameworks illuminate the nuanced ways in which AR fosters or constrains language development through immersive, experiential learning environments. The chapter also builds on comparisons with prior empirical studies and pilot phase results, highlighting both consistencies and divergences in learners' trajectories of AR adoption, adaptation, and performance outcomes. The structure of this chapter aligns with the research questions that guided the study. The first section explores how students' readiness and willingness evolved over time, examining their initial apprehension and eventual acceptance of AR as a learning tool. The second section evaluates the specific dimensions of speaking performance - fluency, pronunciation, lexical resource, and grammatical accuracy - discussing the role of real-time interaction, feedback mechanisms, and instructional scaffolding in skill development. The final section digs into students' perceptions of AR, emphasizing their enthusiasm for immersive learning, while also acknowledging the challenges related to accessibility, cognitive load, and the sustainable integration of emerging technologies such as AI-enhanced AR systems.

By synthesizing these multidimensional insights, this chapter aims to provide a forward-looking discussion on the pedagogical and technological implications of immersive learning in language education. It positions AR not merely as a supplementary tool, but as a potentially transformative medium for ESP instruction - one that bridges classroom learning with professional realities in tourism and hospitality. The findings offer critical considerations for curriculum designers, educators, and policymakers as they seek to employ the affordances of AR while mitigating its challenges to ensure inclusive, engaging, and effective learning environments.

5.1 Students' Readiness, Willingness, and Acceptance of AR Technology in Language Learning

5.1.1 The evolution of readiness: overcoming initial skepticism through immersion

The first objective of this study was to examine Vietnamese EFL students' readiness and willingness to adopt AR technology for improving their speaking skills. The findings reveal a trajectory of transformation in students' attitudes-from initial skepticism and apprehension to growing enthusiasm and engagement. While students expressed excitement about the potential of AR-enhanced learning, many initially struggled with technological unfamiliarity and cognitive overload, highlighting the importance of guided support and scaffolding in the adoption process. These results align with the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which posits that perceived ease of use, perceived usefulness, and technological self-efficacy are critical determinants of students' willingness to engage with new digital tools. A notable trend that emerged in focus group discussions was the initial hesitation students experienced when introduced to AR-based activities. Several participants reported feeling overwhelmed by the interface, which is consistent with findings from Chaidir and As'ari (2024), who observed that students require an adjustment period when engaging with AR-enhanced instruction. Similarly, research by Ibáñez and Delgado-Kloos (2018) highlights that technological unfamiliarity often acts as a barrier to student engagement in digital learning environments. However, as exposure to the technology increased, students became more comfortable and confident in navigating AR tools. This progression underscores the significance of structured onboarding, including hands-on demonstrations and technical assistance, to facilitate a smoother transition into AR-based learning. The shift in perception observed in this study also aligns with the Technology Acceptance Model (TAM) (Davis, 1989), which suggests that perceived usefulness and ease of use influence a learner's adoption of technology. Initially, students' reluctance stemmed from concerns about usability and effectiveness; however, as they recognized the interactive and immersive advantages of AR, their willingness to engage with the tool increased. This transformation reflects the principles of Self-Determination Theory (Deci & Ryan, 2000), which suggests that technology fostering autonomy and engagement enhances intrinsic motivation. The interactive and gamified nature of AR provided a sense of agency, making students more eager to participate and practice speaking in an immersive environment.

Despite this overall increase in acceptance, some students remained skeptical about the long-term sustainability of AR in their learning routines, particularly outside the classroom. Concerns about access to AR-compatible devices, software stability, and personal motivation to use AR independently were frequently mentioned. This raises critical equity concerns regarding technological accessibility, reinforcing the findings of Burston (2022), who emphasized that socioeconomic barriers and infrastructure constraints significantly impact the feasibility of scaling educational innovations. Without institutional support, such as AR-compatible device lending programs or mobile-based AR alternatives, students may struggle to integrate AR into their independent learning practices.

In sum, the findings highlight a dynamic process in students' readiness and willingness to adopt AR technology. While initial apprehension due to technological unfamiliarity and cognitive overload was evident, structured exposure and practical engagement led to increased acceptance and motivation. However, the sustainability of AR adoption beyond the classroom remains contingent upon accessibility and institutional support. These insights contribute to ongoing discussions on technology adoption in language education, underscoring the need for holistic implementation strategies that address both pedagogical and infrastructural challenges.

5.1.2 Engagement as a driving factor for willingness to adopt AR technology

The study's quantitative findings revealed that students demonstrated a high level of acceptance of AR-based learning, with most participants rating the experience as enjoyable and beneficial. These findings are consistent with Parmaxi & Demetriou (2020), who found that gamification and immersive learning experiences increase student motivation in digital education. The qualitative data further reinforces this perspective, with students describing AR as *"more dynamic than traditional lessons" (Student 5)* and *"a learning experience that felt closer to real life" (Student 1).* The interactive elements of AR, such as 3D environments and digital role-playing played a crucial role in sustaining students' willingness to engage. However, the study also identifies key challenges that impact AR adoption, particularly technical accessibility and digital literacy disparities. While some students found AR intuitive and easy to navigate, others struggled with interface complexities, device limitations, or connectivity issues. This echoes Diegmann et al. (2015), who noted that technical barriers remain one of the primary obstacles in AR adoption in education. Engagement emerged as a key factor influencing students' willingness to embrace AR-based learning. The interactive and immersive nature of AR fostered enthusiasm and motivation, making learning experiences more meaningful and enjoyable. However, technical limitations remain a concern, emphasizing the need for improved accessibility and digital support systems to ensure equitable and sustainable integration of AR into educational settings.

5.1.3 Bridging the gap: recommendations for enhancing AR readiness

To address these challenges, this study suggests a phased implementation of AR technology in language education, starting with low-immersion AR activities before progressing to fully immersive experiences with AR simulations. Providing pre-training workshops on AR navigation, incorporating guided practice sessions, and ensuring technical support during early adoption phases can mitigate initial anxiety and foster long-term engagement. Additionally, institutional efforts should focus on ensuring AR accessibility for diverse student populations. Exploring cost-effective AR alternatives, such as mobile-based AR applications, web-AR integrations may provide more equitable access to immersive learning experiences. The findings suggest that while students' willingness to use AR evolves positively over time, pedagogical scaffolding, digital literacy training, and adaptive implementation strategies are essential for maximizing engagement and minimizing accessibility barriers.

5.2 The Effects of AR technology on Students' Speaking Performance

The second research question explored how AR integration influenced students' speaking abilities, with a particular focus on fluency, pronunciation, lexical resource, and grammatical range and accuracy. The study found that AR-based instruction had a significant positive impact on students' fluency and pronunciation, while vocabulary acquisition also improved, though to a lesser extent. However, grammatical accuracy showed minimal gains, suggesting that while AR enhances communicative competence, it may be less effective in reinforcing explicit grammatical instruction. These findings align with constructivist perspectives on language learning (Vygotsky, 1978; Lave & Wenger, 1991), which emphasize the importance of situated, experiential learning in skill development.

5.2.1 Fluency development: real-time immersion in communicative contexts

One of the most notable improvements observed in the post-test results was in fluency and coherence. Students exhibited faster speech production, reduced hesitation markers, and greater ease in maintaining conversational flow, indicating that AR-supported learning environments provided more naturalistic speaking opportunities. These findings are consistent with Deng and Trainin (2020), who found that AR-enhanced role-play activities encouraged spontaneous speech production by reducing learners' reliance on pre-scripted responses. Students in the focus group interviews frequently emphasized that the immersive nature of AR made speaking practice feel more like real-world interactions, which in turn helped them build confidence. This finding supports Lave and Wenger's (1991) Situated Learning Theory, which suggests that language acquisition is most effective when embedded within authentic communicative settings.

However, some students initially struggled with real-time speech production in AR environments, particularly in highly interactive simulations that required quick responses. This suggests that cognitive adaptation occurs over time, reinforcing the importance of gradual exposure and scaffolding in AR-mediated speaking tasks.

5.2.2 Pronunciation gains: peer feedback and teacher correction

A significant improvement observed in this study was students' pronunciation accuracy, particularly in terms of intonation and articulation of target lexical items. Many participants attributed their progress to structured peer feedback and teacher correction, which played a pivotal role in refining their pronunciation skills. The interactive nature of AR-based learning provided students with numerous opportunities to practice spoken English in an immersive environment while receiving immediate feedback from both their peers and instructors. These findings align with research by Saito and Lyster (2012), who emphasize that explicit corrective feedback, whether from teachers or peers, significantly enhances phonological awareness and pronunciation development in second language learners. Similarly, Derwing and Munro (2015) suggest that frequent exposure to pronunciation models, coupled with corrective feedback, leads to greater phonetic accuracy over time. Peer feedback emerged as a particularly valuable tool for pronunciation improvement, as students actively engaged in collaborative correction and reinforcement. This supports the findings of Trofimovich and Isaacs (2017), who argue that peer interaction fosters a communicative and supportive learning environment, reinforcing pronunciation gains through social engagement. Additionally, peer feedback allows learners to develop heightened phonological awareness by listening to their classmates' speech and comparing it to their own, which is consistent with the principles of interactionist learning theories in second language acquisition (Long, 1996). Beyond peer support, teacher correction was identified as essential in addressing more complex phonetic difficulties. Several students highlighted that instructor-led guidance provided more precise and reliable pronunciation correction, particularly for sounds that were challenging to self-monitor. These observations align with Rogerson-Revell (2011), who underscores the necessity of teacher intervention in pronunciation training, as instructors can provide accurate modeling and targeted correction that might not always be available through peer interactions. Furthermore, explicit phonetic instruction from teachers helps learners internalize correct articulatory patterns, as demonstrated in previous research on form-focused pronunciation instruction (Couper, 2006). Despite these benefits, some students expressed challenges in distinguishing subtle phonetic differences without external validation. While peer feedback offered an interactive and collaborative means of correction, some participants felt that they still required teacher confirmation to ensure accuracy. This aligns with the findings of Foote et al. (2016), who argue that while peer feedback is beneficial, it should be complemented with expert intervention to prevent the reinforcement of incorrect pronunciation patterns. To further optimize pronunciation training in AR-integrated learning, structured pronunciation-focused activities should be incorporated into future implementations. Providing more guided phonetic exercises, incorporating phonetic transcription references, and increasing instructor-led modeling could help students refine their speech production with greater confidence. Additionally, structured peer correction activities, such as pronunciation workshops and collaborative speech analysis tasks, may encourage deeper engagement and self-awareness in pronunciation practice. As Saito (2013) highlights, explicit and repeated exposure to correct phonetic patterns, combined with targeted corrective feedback, is crucial for sustained pronunciation development. The study's findings indicate that pronunciation gains in AR-based learning were significantly influenced by peer feedback and teacher correction, reinforcing the effectiveness of interactive, socially mediated learning in second language acquisition. While peer interactions facilitated pronunciation awareness and self-correction, the role of teacher-led feedback remained indispensable in ensuring accuracy and phonetic refinement. These results suggest that future AR-based pronunciation training should incorporate a balanced approach that integrates both collaborative and instructor-guided correction to maximize learning outcomes.

5.2.3 Lexical resource development: context-driven vocabulary acquisition

The results also indicate notable improvements in students' lexical resource, particularly in their ability to retrieve and use contextually appropriate vocabulary. Many students reported that AR’s visual and interactive components facilitated stronger word recall, as they could associate new vocabulary with immersive 3D environments rather than abstract definitions in textbooks. This finding supports Schmitt’s (2008) Lexical Learning Theory, which suggests that multimodal reinforcement strengthens vocabulary retention and recall. Similar results were reported by Ibrahim et al. (2017), who found that AR-driven language tasks led to higher retention rates compared to traditional rote memorization techniques. However, some students noted that while AR improved vocabulary retrieval in specific scenarios, it did not necessarily enhance long-term retention without repeated reinforcement. This suggests that AR should be integrated with spaced repetition techniques, where students encounter key vocabulary across multiple contexts over time to reinforce learning.

5.2.4 Grammatical accuracy: a limitation of AR-based language learning?

Unlike fluency, pronunciation, and vocabulary acquisition, grammatical range and accuracy showed relatively minor improvements in the post-test assessments. This suggests that AR-based learning environments may be more effective for fostering communicative competence than for teaching explicit grammatical structures. Some students expressed difficulty applying complex grammatical rules in real-time AR-tasked interactions, explaining that the focus on spontaneous communication made it challenging to structure sentences accurately. These findings align with Ellis’s (2009) Input Hypothesis, which suggests that fluency-focused tasks often prioritize meaning over form, leading to improvements in communicative confidence but limited gains in explicit grammatical accuracy. While immersion-based language learning enhances spontaneous production, explicit grammar instruction and corrective feedback are still necessary for structural accuracy. To address this limitation, future AR-based curricula should integrate AI-driven grammar correction tools that provide real-time grammatical suggestions without disrupting fluency. Additionally, blended learning approaches, where students alternate between immersive speaking practice and focused grammar instruction, may yield more balanced linguistic outcomes.

5.3 Students' Perceptions of AR Technologies

The final research question investigated students' perceptions of AR technologies, particularly in their application to language learning through the Halo AR application. The findings indicate that students generally viewed AR technology as a valuable and engaging tool for enhancing their speaking skills. They reported increased motivation, improved language retention, and a greater willingness to participate in speaking activities due to the interactive and immersive nature of AR-based learning. However, they also identified challenges related to technical accessibility and the cognitive demands associated with using AR in speaking practice. These insights align with existing literature on AR-assisted language learning and provide a foundation for further exploration of its pedagogical implications.

5.3.1 Enhanced engagement and motivation in speaking practice

Students overwhelmingly expressed enthusiasm for using AR in their speaking practice, emphasizing its ability to create interactive and realistic learning environments. This response aligns with previous research by Karacan and Akoglu (2021), who found that AR technology significantly increases student engagement and motivation in EFL settings by providing immersive and contextually rich learning experiences. Similarly, Radu (2012) demonstrated that students who used AR-based learning tools exhibited greater progress in language acquisition than those who relied solely on traditional methods. The integration of AR into speaking activities was particularly effective in reducing speaking anxiety. Many students reported feeling more comfortable practicing their pronunciation and sentence structures when interacting with AR-generated scenarios. This observation is supported by studies such as Solak and Cakir (2016), which highlight the benefits of AR in reducing foreign language anxiety by creating a low-stress, immersive environment for learners. The ability to engage in simulated real-world dialogues allowed students to develop greater confidence in their speaking abilities, reinforcing the communicative approach to language learning (Krashen, 1982).

5.3.2 Perceived challenges: technical barriers and cognitive load

Despite the overall positive reception of AR, students also identified several challenges that affected their learning experience. One major concern was the technical requirements of AR applications, particularly the need for high-performance devices and stable internet connections. Some students reported difficulties in accessing the full range of AR features due to device compatibility issues. These findings are consistent with Diegmann et al. (2015), who found that technological barriers, including hardware limitations and connectivity issues, remain significant obstacles to the widespread adoption of AR in educational settings. Additionally, students highlighted the cognitive load associated with processing multiple layers of information simultaneously while speaking. The combination of visual stimuli, interactive elements, and verbal communication sometimes led to cognitive overload, making it difficult for learners to focus on pronunciation and fluency. This aligns with Mayer's (2020) Cognitive Theory of Multimedia Learning, which warns against excessive cognitive demands in digital learning environments. To mitigate these challenges, instructional designers must carefully balance AR's multimodal features with appropriate scaffolding strategies that allow students to process information more effectively.

5.3.3 Future directions and pedagogical implications

The findings of this study suggest that while AR technology offers substantial benefits for language learning, its implementation should be accompanied by strategic pedagogical planning to maximize its effectiveness. Instructors should consider incorporating structured AR tasks that gradually increase in complexity, ensuring that students can adjust to the technology without experiencing cognitive overload. Additionally, providing alternative access to AR resources, such as in computer labs or through institutional device loan programs, could help address accessibility concerns. Future research should explore how AR can be further optimized to support speaking practice, particularly in developing spontaneous conversation skills and pronunciation accuracy. As previous studies (Tai et al., 2020) have suggested, integrating AR with peer collaboration and teacher feedback mechanisms can create a more interactive and personalized learning experience. Expanding the range of AR-based language learning scenarios, including culturally authentic dialogues and workplace-specific conversations, may also enhance students' preparedness for real-world communication. Overall, students' perceptions of AR technologies, particularly the Halo AR application, were largely positive, with notable benefits in engagement, motivation, and language confidence. However, challenges related to technical limitations and cognitive load highlight the need for thoughtful instructional design and support mechanisms to enhance the effectiveness of AR in speaking practice. By addressing these concerns, AR has the potential to evolve from a novel digital tool into an integral component of communicative language teaching, bridging the gap between classroom instruction and authentic language use.

5.4 A Comparison with the Pilot Study: Bridging the Gap between Initial Skepticism and Long-Term AR Adoption in Language Learning

One of the most striking findings of this research is the progressive shift in students' perceptions of AR technology, moving from initial uncertainty and apprehension in the pilot study to increasing engagement and acceptance in the main study. This transformation is crucial because it highlights the evolving nature of digital literacy in educational contexts, particularly in the field of English for Specific Purposes (ESP), where authentic communicative practice is essential for professional readiness.

5.4.1 From skepticism to engagement: a longitudinal perspective

In the pilot study, student responses indicated significant hesitation toward AR-based learning, particularly due to technological unfamiliarity, sensory overload, and skepticism regarding its pedagogical value. Several students expressed doubts about AR's ability to enhance spoken language proficiency, perceiving it as a novelty rather than an effective learning tool. This initial resistance aligns with findings from Ibáñez & Delgado-Kloos (2018), who argue that students' technological readiness is a key determinant of digital tool adoption in education. Early challenges in AR learning often stem from lack of exposure to immersive environments, requiring structured scaffolding and guided interactions to facilitate adaptation. However, this study reveals that repeated engagement with AR simulations, coupled with instructional support, significantly increased students' comfort and enthusiasm over time. By the main study, students' willingness to use AR had risen considerably, with many acknowledging its ability to simulate real-world scenarios for authentic speaking practice. The quantitative survey data reflected a statistically significant increase in students' perceived usefulness of AR as they became more familiar with its interactive components. This transformation is best explained by the Technology Acceptance Model (TAM) (Davis, 1989), which posits that users' willingness to adopt new technology depends on their perception of its usefulness and ease of use. Initially, students were hesitant due to usability concerns, but once they experienced the tangible benefits of AR, their motivation and engagement increased. This reflects broader research findings by Parmaxi & Demetriou (2020), who demonstrated that AR's interactive features create a sense of agency and engagement that traditional language learning methods often lack. However, the study also raises an important pedagogical implication: while AR stimulates engagement, its successful implementation depends on structured scaffolding and digital literacy support. The students who struggled the most in the pilot study were those with limited prior exposure to AR or digital learning environments. This suggests that AR adoption should be phased, beginning with low-immersion interactions before progressing to high-immersion of AR-enhanced simulations.

5.4.2 Fluency and pronunciation gains: the role of peer and teacher feedback

A major area of improvement observed in both the pilot and main study was in spoken fluency and pronunciation accuracy. The post-test speaking assessments revealed notable gains in fluency, coherence, and articulation, suggesting that AR-based interaction contributed to greater speaking confidence and naturalization of speech patterns. This supports research by Deng & Trainin (2020), who found that AR's ability to provide contextualized, immersive conversations enhances spontaneous language production and real-world communication skills. The findings from the main study demonstrate significant improvements in students' pronunciation, particularly in the areas of intonation and articulation of target lexical items. This aligns with the results of the pilot study, where pronunciation gains were also observed. However, key differences emerged in the mechanisms that contributed to these improvements. While the pilot study participants highlighted the immersive nature of AR and its ability to provide exposure to native-like pronunciation models, they also expressed concerns regarding the adequacy and timeliness of feedback. The main study addressed these concerns by integrating structured peer feedback and teacher correction, which appeared to facilitate more sustained and targeted pronunciation improvements. In the pilot study, participants noted that the feedback was often delayed or not sufficiently tailored to their individual pronunciation errors, limiting its effectiveness in real-time correction. In contrast, the main study supported them with peer and teacher correction, allowing students to receive immediate and context-specific guidance. This aligns with previous research suggesting that socially mediated feedback, particularly from peers and instructors, plays a crucial role in pronunciation development (Saito & Lyster, 2012; Derwing & Munro, 2015). Furthermore, the pilot study highlighted challenges in students' ability to self-monitor pronunciation due to a lack of explicit corrective cues. Some participants expressed uncertainty about whether they were correctly pronouncing words when relying solely on AR simulations. The main study addressed this limitation by incorporating guided pronunciation activities, where instructors provided explicit modeling and corrective feedback. As a result, students reported greater confidence in their pronunciation abilities. Another significant contrast between the two studies relates to the impact of multimodal features on pronunciation practice. The pilot study found that AR-enhanced multimedia elements, such as video dialogues and native speaker recordings, supported pronunciation development by offering authentic exposure to target sounds. However, this exposure alone was insufficient for some learners, as it lacked an interactive feedback component. The main study built upon this finding by supplementing AR-based input with structured peer correction sessions. As a result, students engaged more actively in pronunciation monitoring and demonstrated more noticeable improvements in phonetic accuracy. Despite the overall success of the main study in addressing limitations from the pilot phase, some challenges remain. A few students still reported difficulties in distinguishing certain phonemes, particularly those influenced by their native language sound system. This suggests that while peer feedback is beneficial, it should be complemented with expert intervention to ensure accuracy, a point supported by previous research on pronunciation instruction (Foote et al., 2016). In short, the comparative analysis between the pilot and main study findings highlights the effectiveness of structured feedback mechanisms in pronunciation training. While both studies demonstrated pronunciation gains through AR-based learning, the main study's integration of peer and teacher feedback provided a more reliable and interactive corrective process. These findings underscore the importance of balancing technology-enhanced learning with human-mediated feedback to optimize pronunciation improvement in language education. Future implementations should consider incorporating structured pronunciation workshops and expert-guided sessions to further support learners in refining their speech production.

5.4.3 Balancing cognitive load in high-immersion AR-supported learning

Despite the many advantages of AR-based learning, one of the most pressing concerns raised by both the pilot and main study participants was cognitive overload, particularly in high-immersion scenarios that required rapid visual, auditory, and linguistic processing. Some students described feeling mentally fatigued after extended AR use. This aligns with Sweller's (1994) Cognitive Load Theory, which suggests that when learners are required to process too much information simultaneously, their ability to retain and produce language effectively may be hindered. The main study findings revealed that students who had repeated exposure to AR-based learning developed better cognitive adaptation strategies over time, leading to a decrease in perceived cognitive overload. However, some participants still struggled with the fast-paced nature of AI-driven interactions, highlighting the need for adjustable difficulty settings in AR-assisted speaking tasks. A potential pedagogical solution would be to incorporate structured scaffolding within AR learning environments, allowing students to adjust immersion levels based on their proficiency and cognitive capacity. A leveled AR integration model, where students begin with controlled, guided interactions before progressing to more complex, real-time dialogues, could mitigate overload while maintaining engagement.

5.5 Conclusion

The discussion in this chapter has provided a comprehensive analysis of the study's findings concerning the integration of AR technology in ETH courses. Through a comparison with prior studies and the results from the pilot study, it has become evident that AR-based instruction significantly enhances students' engagement, speaking proficiency, and pronunciation accuracy. The findings underscore the importance of readiness and willingness as crucial determinants of successful AR adoption. While initial skepticism was observed, structured exposure and guided onboarding led to increased acceptance, supporting theoretical models such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). However, accessibility and technological infrastructure remain key barriers that must be addressed to ensure equitable implementation of AR in language education. Furthermore, student engagement emerged as a primary factor influencing AR adoption. The immersive and interactive features of AR fostered motivation and participation, making language learning more dynamic and contextually relevant. This aligns with previous research demonstrating that digital gamification and experiential learning enhance intrinsic motivation (Parmaxi & Demetriou, 2020). However, technical challenges, such as software stability and device compatibility, affected user experience, reaffirming the need for improved digital literacy training and technical support. The study also revealed notable pronunciation gains, particularly in students' articulation and intonation. Unlike the pilot study, where the reliance on AI-driven feedback led to inconsistencies, the main study's use of peer feedback and teacher correction facilitated more targeted and reliable pronunciation improvement. Participants expressed greater confidence in their spoken English when corrections were provided through structured peer interactions and instructor-led guidance, corroborating the effectiveness of socially mediated feedback in pronunciation development (Saito & Lyster, 2012; Derwing & Munro, 2015). The findings suggest that a balanced approach-integrating technology-enhanced learning with human-mediated correction-is optimal for refining speaking skills in AR-assisted language education. In short, the discussion has illustrated that AR technology offers immense potential for enhancing speaking skills in ETH courses. However, its effectiveness depends on student readiness, sustained engagement, and structured feedback mechanisms. While

AR fosters experiential learning and real-world language immersion, its full potential can only be realized through strategic implementation that combines digital innovation with pedagogical best practices. Future research should explore scalable solutions for technological accessibility and examine how AR can be integrated with other emerging educational technologies to further optimize English language learning outcomes.

In conclusion, this doctoral study has provided compelling evidence that AR technology serves as a powerful pedagogical tool in enhancing the speaking skills of Vietnamese EFL learners within the English for Tourism and Hospitality context. Through a rigorously implemented mixed-methods design, the research demonstrated how AR fosters immersive, interactive, and professionally relevant learning experiences that not only improve linguistic competence but also cultivate learners' engagement, confidence, and digital adaptability. The findings contribute meaningfully to theoretical frameworks within CALL, MALL, and TELL by affirming the value of constructivist and sociocultural approaches in technology-mediated environments. Furthermore, the study offers timely pedagogical and institutional insights that advocate for more strategic and inclusive integration of AR into language curricula. While recognizing the contextual and methodological limitations, this research lays a foundational platform for future inquiry, particularly in the form of longitudinal studies, cross-institutional comparisons, and investigations into AR's synergy with emerging technologies such as artificial intelligence and wearable devices. Ultimately, the study underscores the transformative potential of AR in bridging the gap between academic language instruction and real-world communicative demands, marking a pivotal step toward more experiential, student-centered, and future-ready language education.