CHAPTER 6
IMPLICATIONS, RECCOMENDATIONS & LIMITATIONS

6.1 Summary of the main findings

This doctoral research investigated the level of acceptance in terms of readiness and willingness towards the integration of AR technology in English for Tourism and Hospitality courses, with a focus on its effects on students' speaking skills, engagement, and professional preparedness. Conducted at the University of Economics Ho Chi Minh City (UEH), the study employed a mixed-methods approach, utilizing pre- and post-surveys, speaking assessments, focus group interviews to provide a comprehensive evaluation of AR's role in language learning. A total of 40 purposively and conveniently selected students participated in AR-enhanced learning activities designed to foster communicative competence in English. The findings clearly demonstrate that AR technology significantly enhanced students' speaking proficiency, particularly in pronunciation accuracy, fluency, vocabulary usage, and self-confidence in real-world communication scenarios. The immersive and multimodal affordances of AR created a highly engaging and interactive learning environment, fostering increased motivation and willingness to communicate. Furthermore, students exhibited notable gains in digital literacy and adaptability, overcoming initial technological challenges through scaffolded guidance and peer collaboration. Beyond linguistic improvements, the study underscored the practical benefits of AR in preparing students for professional communication within the tourism and hospitality industry. Participants perceived AR-assisted learning as a valuable tool for simulating workplace interactions, enhancing situational awareness, and improving customer service dialogue. By enabling experiential learning, AR bridges the gap between theoretical knowledge and applied practice, providing students with authentic, contextualized exposure to industry-specific language use. While this study confirms the efficacy of AR in promoting language learning, it also highlights critical challenges, including technological accessibility issues, the learning curve associated with AR adaptation, and disparities in students' digital competencies. Nevertheless, the findings strongly suggest that AR represents a promising pedagogical innovation capable of transforming English language instruction, particularly in domain-specific education such as English for Tourism and Hospitality.

6.2 Implications

The findings of this study have significant theoretical, pedagogical, and institutional implications, reinforcing the transformative role of AR in English language education.

6.2.1 Theoretical implications

This research contributes to the expanding discourse on CALL, MALL, and TELL. It extends the application of sociocultural learning theories by demonstrating how AR fosters immersive, interactive, and situated learning experiences, aligning with Vygotsky's concept of the ZPD. Furthermore, the study reinforces constructivist learning paradigms, illustrating how AR-supported activities promote learner autonomy, collaboration, and engagement in meaning-making processes.

6.2.2 Pedagogical implications

From a pedagogical perspective, this study underscores AR's potential as a transformative tool for developing communicative competence in EFL classrooms. The findings highlight the importance of incorporating multimodal learning experiences that cater to diverse learning styles, providing students with opportunities to engage in dynamic, real-time language use. Additionally, AR functions as a bridge between traditional classroom instruction and authentic language practice, enabling learners to apply theoretical knowledge in simulated real-world contexts. Moreover, the study calls for innovative assessment strategies that align with AR-enhanced learning environments. Traditional pen-and-paper speaking assessments may not fully capture the communicative gains facilitated by AR experiences. Instead, performance-based assessments, peer evaluations, and digital portfolios can provide a more comprehensive evaluation of students' speaking development and technological adaptability.

6.2.3 Institutional and policy implications

From an institutional standpoint, the study advocates for policy reforms that recognize the pedagogical value of AR in language education. Institutions should develop strategic frameworks for AR integration, ensuring that technological initiatives align with broader educational objectives and accreditation standards. Additionally, policymakers should consider funding initiatives that support AR-driven research, development, and implementation, thereby fostering sustainable and equitable access to digital learning tools.

6.3 Recommendations for further studies

Based on the research findings, several pedagogical and institutional recommendations are proposed to optimize AR integration in English language learning, particularly in speaking-focused curricula. First, educational institutions should prioritize the development of technological infrastructure to support AR-enhanced learning environments. This includes the provision of stable internet connectivity, ready access to AR-compatible devices, and the integration of up-to-date, education-specific AR applications. To ensure accessibility and reduce technological barriers, institutions are encouraged to adopt user-friendly AR platforms that can be seamlessly embedded into existing curricula. This infrastructural foundation is essential for promoting inclusive and scalable AR implementation. Second, systematic professional development initiatives are necessary to prepare educators for AR-based instructional design and delivery. Such initiatives should go beyond basic technical training to encompass digital pedagogy, with an emphasis on how AR can support communicative language teaching (CLT) principles. Teachers should be equipped with strategies to facilitate learner-centered engagement, manage classroom dynamics in AR-mediated environments, and troubleshoot technical challenges. Ongoing support and collaborative learning communities may further enhance teachers' confidence and competence in using AR. Third, curriculum designers should embed AR-driven pedagogical models that promote experiential and task-based learning. AR activities should be aligned with real-world communication needs in the context of ESP, such as tourism and hospitality. This includes incorporating immersive simulations, role-playing with virtual clients, location-based storytelling, and AR-augmented rehearsals that foster authentic language use. Such activities not only improve speaking proficiency but also increase learner motivation by providing meaningful and interactive experiences. Finally, future research is warranted to further validate and expand the pedagogical potential of AR in language education. Longitudinal studies are particularly recommended to examine the sustained effects of AR on learners' speaking performance, engagement, and autonomy over time. These studies can offer insights into long-term language retention and the evolving role of AR in fostering independent learning behaviors. Moreover, comparative research across different institutional contexts, cultural backgrounds, and proficiency levels can illuminate the broader applicability and adaptability of AR-supported instruction. Investigating the integration of AR with emerging technologies such as artificial intelligence (AI) and wearable AR devices may also yield promising directions for innovation in language learning.

6.4 Limitations

While this study makes significant contributions to the field of AR-assisted language learning, several limitations must be acknowledged. First, the study was conducted within a single university context, potentially limiting the generalizability of the findings to broader educational settings. Although valuable insights were gained, future research should examine AR's applicability across diverse institutional landscapes and learner populations. Second, the sample size, while sufficient for qualitative and mixed-methods research, was relatively small. Expanding the participant pool in future studies could provide a more comprehensive understanding of AR's impact across different proficiency levels and demographic groups. Third, the study was limited to a one-semester intervention, restricting its ability to assess long-term language learning outcomes. Longitudinal research is needed to examine the sustained effects of AR on speaking proficiency, engagement, and professional preparedness over extended periods. Fourth, technological constraints, such as device compatibility issues, inconsistent internet access, and students' varying levels of digital literacy, posed challenges that may have influenced learning outcomes. Addressing these challenges through institutional support, targeted training programs, and investment in accessible AR tools is crucial for maximizing the effectiveness of AR-enhanced pedagogy. Despite these limitations, this study represents a significant contribution to technology-enhanced language education. By providing empirical evidence of AR's pedagogical potential, the research underscores the need for continued exploration and innovation in integrating emerging technologies into English language instruction.

6.5 Final Remarks with The Future of Augmented Reality, Artificial Intelligence, and Cutting-edge Technology in Language Learning

As the landscape of augmented reality (AR) and mixed reality (MR) technology continues to evolve, major technology firms are pushing the boundaries of immersive digital experiences. Two of the most anticipated advancements in this domain are Apple Vision Pro and Meta Orion Glasses, both of which represent the next generation of spatial computing and AR integration. Apple Vision Pro, unveiled in 2023, is a high-end mixed reality headset that merges AR and VR through a sophisticated spatial computing interface. Featuring eye-tracking technology, a high-resolution micro-OLED display, and a seamless gesture-based control system, Vision Pro aims to revolutionize the way users interact with digital content. By overlaying virtual elements onto the real world, it enables immersive experiences in entertainment, productivity, and communication. Apple's emphasis on seamless hardware-software integration ensures

that Vision Pro functions as an intuitive and responsive extension of the user's environment. On the other hand, Meta Orion Glasses represent Meta’s next evolution in wearable AR technology, designed to bring lightweight and everyday usability to augmented reality. Unlike bulkier headsets, Orion Glasses prioritize a compact and stylish design, integrating AR overlays directly into the user's field of view without obstructing real-world interactions. Meta envisions these glasses as a step toward mainstream AR adoption, allowing users to access contextual information, interact with holographic displays, and enhance their daily experiences with AI-powered smart assistance. While both devices aim to redefine AR engagement, Apple Vision Pro is positioned as a premium, high-performance mixed-reality headset tailored for immersive digital experiences, whereas Meta Orion Glasses focus on accessibility, portability, and integration into everyday life. Their development signals a growing competition in the AR industry, with both companies vying to shape the future of interactive technology.

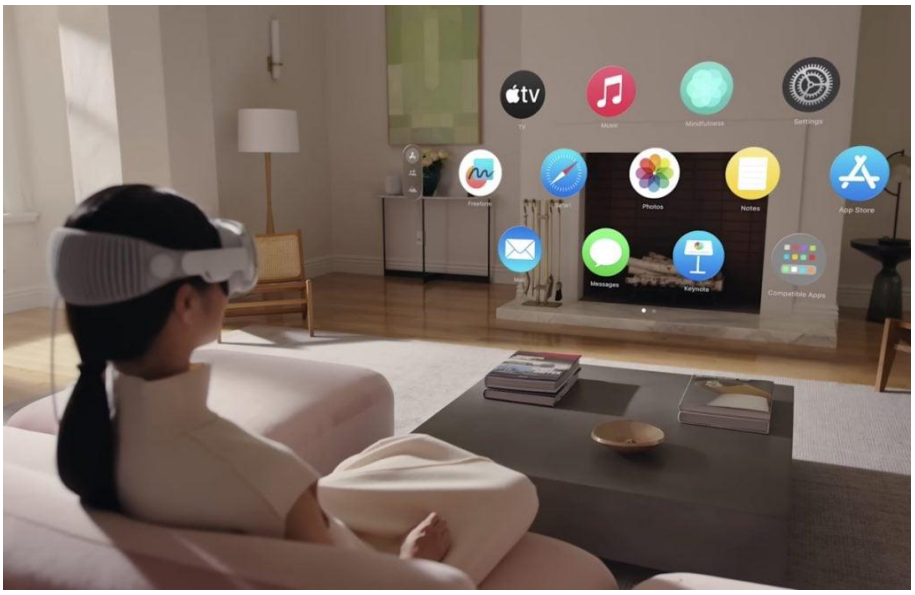

Figure 6.1 Immersive Augmented Reality Interface for Language Learning using Apple Vision Pro

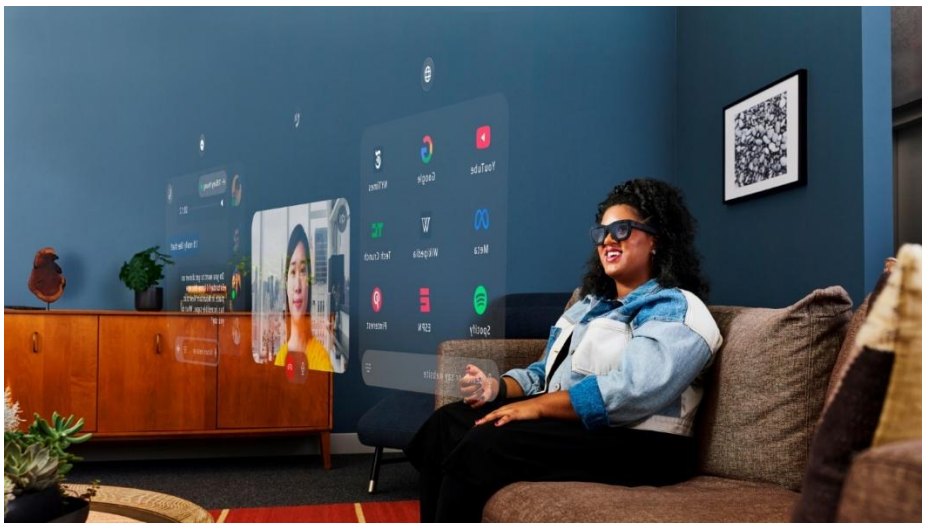

Figure 6.2 Interactive Augmented Reality Learning with Meta Orion Glasses for English Language Education

Advanced AR hardware, such as Apple's Vision Pro and Meta's Orion AR glasses, represents a significant step towards integrating AI-driven real-time feedback with AR-enhanced learning environments. These technological advancements have the potential to bridge the gap between traditional classroom instruction and real-world communication, fostering more effective language acquisition. However, while the combination of AR and AI presents promising opportunities, challenges related to accessibility, cognitive load, and ethical considerations must also be addressed to ensure equitable and meaningful implementation. The synergy between AR and AI is particularly impactful in second language acquisition, as it enables personalized and immersive learning environments that adapt to students' individual needs. AI-driven natural language processing (NLP) can analyze learners' speech patterns, grammar usage, and pronunciation errors in real-time, providing immediate corrective feedback. When integrated with AR, these features can create interactive learning scenarios where students practice conversations in simulated environments, increasing both engagement and retention (Kumar et al., 2023). This aligns with previous research suggesting that AR-enhanced learning leads to deeper cognitive engagement and more effective retention of language structures (Radu, 2014). Furthermore, studies indicate that AR fosters experiential learning, allowing learners to contextualize their language use in meaningful ways. For example, Solak and Cakir (2016) found that AR-enhanced simulations improved speaking fluency by providing real-world interactional cues, helping learners develop conversational skills with greater authenticity. Similarly, Zhao and Zhu (2022) emphasized that immersive AR applications reduce speaking anxiety,

as learners feel more comfortable practicing in simulated rather than high-pressure real-world scenarios.

The rapid evolution of AR hardware plays a crucial role in expanding the possibilities of language learning applications. Apple's Vision Pro and Meta's Orion AR glasses exemplify the next generation of AR technology, incorporating high-resolution displays, enhanced spatial computing, and AI-powered interactivity (Business Insider, 2024). These devices have the potential to redefine how learners engage with language practice by seamlessly overlaying digital elements onto their physical environment. Meta's Orion AR glasses, for instance, offer a mixed-reality interface designed to facilitate real-time collaboration, which can significantly enhance peer-based language learning (Deusens, 2024). This aligns with Vygotsky's (1978) sociocultural theory, which emphasizes the importance of interaction and scaffolding in language development. Apple's Vision Pro, meanwhile, integrates advanced gesture recognition and AI-assisted feedback, allowing users to practice speech in fully immersive environments, potentially leading to greater improvements in pronunciation and fluency. Despite these advancements, several technical and pedagogical challenges remain. Device accessibility and affordability continue to be barriers, as high-end AR hardware remains costly, limiting widespread adoption in educational institutions (Diegmann et al., 2015). Additionally, issues related to cognitive load must be addressed; as Mayer's (2020) Cognitive Theory of Multimedia Learning suggests, overloading learners with excessive multimodal stimuli can hinder rather than enhance learning outcomes.

While the integration of AR and AI in education is advancing rapidly, ethical considerations related to data privacy, user autonomy, and algorithmic bias must also be taken into account. With AI-driven AR applications increasingly collecting speech and behavioral data, concerns over data security and potential misuse of learner information are growing (Huang et al., 2023). Future research should focus on developing transparent data governance policies that ensure student autonomy and consent in digital learning spaces. Additionally, future developments should explore how AR and AI can be optimized for diverse linguistic and cultural contexts. Current AI models are often trained on standardized English dialects, potentially disadvantaging learners from varied linguistic backgrounds (Jin et al., 2022). To create inclusive and effective learning environments, AI-assisted AR applications should integrate multilingual and culturally adaptive speech recognition models. The future of AR-integrated AI in language learning presents transformative opportunities for immersive and adaptive education. Devices such as Apple's Vision Pro and Meta's Orion AR glasses exemplify the potential of advanced spatial computing and real-time AI

feedback to enhance speaking skills, engagement, and retention. However, challenges related to cognitive overload, accessibility, and ethical considerations must be carefully addressed to ensure equitable and effective implementation. As technology continues to evolve, ongoing research should focus on scalable, inclusive, and pedagogically sound approaches that maximize the benefits of AR and AI in second language acquisition.