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A Literature Review on Virtual Reality Study in EFL Context

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ABSTRACT

This literature review investigates how Virtual Reality (VR) is implemented and how it impacts learning in the context of English as a Foreign Language (EFL). With the advancement of immersive technologies, Virtual Reality (VR) has become a promising tool to foster language learning by providing engaging, authentic and interactive environments. This review scrutinizes research studied in 2025, 2024, 2023 and 2022 that explores the utilizing of VR in boosting different language skills, including listening, speaking and writing. The findings indicate that immersive technologies such as VR, AR, and AI significantly enhance EFL learners' language proficiency, critical thinking, motivation, and transferable 21st-century skills. Yet, the review also points out several challenges, such as limited resources, large class sizes, insufficient institutional support, teachers' low TPACK, short VR exposure time, lack of scaffolding, low realism and interactivity in VR content, occurrences of cybersickness, and the limited scope of studies. Future research should adopt rigorous experimental designs, explore underrepresented language skills, examine affective and contextual factors, and prioritize teacher professional development to ensure effective, inclusive, and sustainable integration of immersive VR in EFL instruction.

Keywords: Virtual Reality; EFL; Literature Review

INTRODUCTION

The rapid proliferation of immersive technologies has brought about a paradigm shift in modern language education, making Virtual Reality (VR) a transformative tool in teaching and learning English as a Foreign Language (EFL) (Zhang, 2024). VR has the advantage of simulating a real environment and having a variety of contexts, thus creating an excellent learning experience for learners. This technology provides them with a space to do various activities with language input in a meaningful and immersive way. This development aligns with the broader goal of English language teaching towards a constructivist, student-centered pedagogical approach, where students are required to participate actively (Tazeen & Kader, 2024). Context-based learning is a critical component in effective language learning.

Despite its many benefits, incorporating Virtual Reality (VR) into EFL (English as a Foreign Language) learning raises various complexities. Problems often occur include the lack of teacher readiness, the still low institutional infrastructure, and the lack of long-term data (Al Musawi et al., 2025). These multiple problems still substantially inhibit the scalability and sustainability of VR-based interventions.

Then, the absence of a good teaching framework that can be matched with the uniqueness of VR features emphasizes that there needs to be a theoretical basis in its application and a more systematic approach (Dogan & Sahin, 2024).

This study presents a critical literature review by synthesizing research findings published in 2025, 2024, 2023 and 2022 on the pedagogical implementation of Virtual Reality (VR) in English as a Foreign Language (EFL) instruction. It aims to map current trends, evaluate empirical outcomes, and identify key research gaps. The review highlights pedagogical implementation of Virtual Reality (VR), current trends in the use of VR in EFL learning, empirical findings from previous research, research gaps, practical and epistemological directions for VR and recommendations for further research. Additionally, the upcoming study could adopt rigorous experimental designs, explore underrepresented language skills, examine affective and contextual factors, and prioritize teacher professional development to ensure effective, inclusive, and sustainable integration of immersive VR in EFL instruction.

LITERATURE REVIEW

The integration of Virtual Reality (VR) into English as a Foreign Language (EFL) instruction has garnered significant scholarly attention in recent years. VR, as part of immersive technology, offers learners interactive, engaging, and contextually rich environments that facilitate language acquisition. Scholars such as Muthmainnah et al. (2025) and Zhang & Miao (2025) have emphasized the role of immersive VR in fostering 21st-century skills, including critical thinking, collaboration, and creativity, alongside traditional language proficiencies. These tools support constructivist and student-centered learning paradigms, allowing learners to interact with language in meaningful contexts that mirror real-life communication.

Several studies have demonstrated VR's efficacy in enhancing various EFL skills. For instance, Peixoto et al. (2023) compared immersive VR listening with traditional methods and found that VR led to greater student motivation and satisfaction, though learning outcomes remained similar. Meanwhile, Mubarok et al. (2024) investigated a VR-based collaborative argument mapping approach, which significantly improved learners' speaking fluency, critical reasoning, and cultural awareness. Likewise, Wang et al. (2022) demonstrated how integrating Spherical Video-based VR with Automated Writing Evaluation (AWE) substantially improved students' writing performance, engagement, and self-efficacy.

Despite the positive outcomes, the integration of VR in EFL settings faces several challenges. Hung et al. (2024) reported that VR's impact on speaking proficiency was minimal when exposure time was limited and when instructional scaffolding was lacking. Similarly, Muthmainnah et al. (2025) pointed out institutional constraints such as large class sizes, insufficient technological infrastructure, and

limited teacher competence in Technological Pedagogical Content Knowledge (TPACK) as barriers to successful VR implementation. These limitations suggest the need for more systematic instructional design and teacher training to maximize VR's pedagogical benefits.

Another recurring theme in the literature is the influence of learners' technological literacy on the success of VR integration. Zhang and Miao (2025) found that students with higher literacy in AI, AR, and VR technologies demonstrated greater engagement and deeper cognitive learning. However, many studies have not fully isolated the specific impact of VR alone on higher-order thinking skills like problem-solving and analytical reasoning. This gap highlights the necessity of further investigation into how immersive technologies uniquely shape cognitive development in language education.

Furthermore, the affective domain of learning particularly foreign language anxiety has received attention in VR research. Kaplan-Rakowski and Gruber (2023) discovered that repeated practice in VR public-speaking scenarios significantly reduced learners' anxiety compared to traditional methods. Learners benefited from depersonalized avatars and reduced social pressure, suggesting that VR can offer psychologically safe spaces conducive to language practice. Nonetheless, the potential for cybersickness and discomfort in low-interactivity environments remains a concern, emphasizing the need for careful design of immersive experiences. while VR presents promising opportunities for transforming EFL education through immersive, student-centered learning experiences, its effective integration requires overcoming both technical and pedagogical challenges. The literature calls for more rigorous, controlled, and longitudinal studies that examine not only linguistic outcomes but also cognitive, emotional, and contextual factors. Moreover, enhancing teacher readiness, refining instructional frameworks, and exploring diverse learner populations will be critical to ensuring that VR becomes a sustainable and equitable tool in global language education.

METHOD

Design and Sample

This study employed a qualitative approach using the literature review method, following the framework described by Nasir et al. (2024). The purpose of this approach was to explore and explain how Virtual Reality (VR) has been implemented in the context of English as a Foreign Language (EFL) learning. The sample consisted of research articles selected based on their relevance to the topic. These sources were retrieved from credible academic databases, including Google Scholar, Copernicus, and Scopus. Specific keywords such as "Virtual Reality in EFL," "Immersive learning English as a Foreign Language," and "VR-based English language instruction" were used to identify pertinent literature. Articles were included based on their publication year (2022–2025), academic quality, and thematic relevance to VR in language education.

Instrument and Procedures

The procedure of this literature review consisted of several systematic stages. First, relevant sources were identified and selected based on the criteria mentioned above. Next, data were collected by thoroughly reading the selected literature and extracting key information related to several main themes. These themes included: (1) Pedagogical implementation of VR in EFL, focusing on how VR is applied and the teaching strategies involved; (2) Current trends in VR use from 2022 to 2025; (3) Empirical findings that evaluated the effectiveness of VR in improving learners' language skills; (4) Identified research gaps, such as limited studies on long-term effects and instructional design; (5) Practical and epistemological implications of VR in EFL contexts; and (6) Recommendations for future research, such as the development of instructional frameworks and experimental classroom studies to assess VR's impact.

Data Analysis

After data collection, the information was classified and interpreted systematically. The researcher organized the findings into thematic categories, analyzing the frequency and focus of various issues addressed in the reviewed studies. Special attention was given to recurring patterns in VR implementation, the pedagogical strategies adopted, and emerging trends in the literature. This stage also involved identifying under-researched areas and theoretical directions suggested by prior studies. Finally, the analysis culminated in a comprehensive synthesis of the findings, followed by a meticulous revision and refinement process to ensure clarity, accuracy, and completeness of the manuscript. This review aimed to provide an in-depth and holistic understanding of the implementation of VR in EFL instruction, guiding both future research and practical classroom integration.

RESULT AND DISCUSSION

The implementation of Virtual Reality Study in EFL Context has shown its effectiveness in boosting different language skills, including listening, speaking and writing. Based on previous studies, important findings and related discussions are presented below.

Table 1. Research Results

Article Title (Author)	Research Focus
A new innovative metaverse ecosystem: VR-based human interaction enhances EFL learners' transferable skills (Muthmainnah et al., 2025)	The focus of this study is to examine the effectiveness of Immersive Virtual Reality (IVR) in enhancing Indonesian EFL university students' language proficiency and transferable 21st-century skills through a mixed-methods pre-experimental design.
Enhancing EFL Learners' Engagement and Motivation Through Immersive	This study focuses on examining how EFL students' literacy in

Technologies: The Role of Artificial Intelligence, Augmented Reality, Virtual Reality, and Mobile Applications (Zhang & Miao, 2025)	emerging technologies such as AI, AR/VR, and mobile applications influences their engagement, motivation, and cognitive development in technology-enhanced learning environments.
A virtual reality-based collaborative argument mapping approach in the EFL classroom (Mubarok et al., 2024)	This study focuses on evaluating the effectiveness of a virtual reality-based collaborative argument mapping (VR-CAM) approach in enhancing EFL students' oral presentation, computational thinking, creative thinking, and cultural learning interest during emergency distance learning.
Virtual reality is not always a cure-all: evidences from a quasi-experiment of EFL business speaking courses (Hung et al., 2024)	This study focuses on examining the effects of integrating virtual reality (VR) into English speaking classes on EFL students' oral proficiency, speaking anxiety, emotions, and perceptions compared to traditional PowerPoint-based instruction.
The impact of high-immersion virtual reality on foreign language anxiety (Kaplan-Rakowski & Gruber, 2023)	This study focuses on examining the effects of integrating virtual reality (VR) into English speaking classes on EFL students' oral proficiency, speaking anxiety, emotions, and perceptions compared to traditional PowerPoint-based instruction.
Teaching EFL With Immersive Virtual Reality Technologies: A Comparison With the Conventional Listening Method (Peixoto et al., 2023)	This study focuses on investigating the impact of passive and interactive immersive Virtual Reality (iVR) compared to traditional audio listening in enhancing motivation, user satisfaction, and knowledge retention in B1-level EFL learners.
The use of augmented reality in a gamified CLIL lesson and students' achievements and attitudes: a quasi-experimental study (Çelik & Yangın Ersanlı, 2022)	This study focuses on examining the impact of augmented reality (AR) in a CLIL lesson on EFL learners' language achievement and attitudes, revealing improved performance and positive student perceptions toward AR integration.
An Integrated Automatic Writing Evaluation and SVVR Approach to	This study focuses on investigating the effects of integrating Spherical

Improve Students' EFL Writing Performance (Wang et al., 2022)	Video-based Virtual Reality (SVVR) and Automatic Writing Evaluation (AWE) on EFL students' writing performance, motivation, self-efficacy, and writing anxiety.

The article titled "A New Innovative Metaverse Ecosystem: VR-Based Human Interaction Enhances EFL Learners' Transferable Skills" by Muthmainnah et al. (2025) investigated the effectiveness of Immersive Virtual Reality (IVR) in enhancing Indonesian EFL university students' language proficiency and transferable 21st-century skills through a mixed-methods pre-experimental design. In the research, findings show that students are highly motivated and engaged in VR-based learning environments, which transform traditional classroom tasks into interactive, game-like experiences. The study reveals that designing VR content and participating in simulations significantly improve learners' grammar, speaking, and narrative abilities, while also fostering soft skills needed for future career readiness. However, challenges such as inadequate resources, large class sizes, lack of institutional support, and lecturers' limited TPACK hinder full implementation. Despite the absence of a control group, the research aligns with previous studies affirming the benefits of VR in language learning and transferable skill development. The study calls for curriculum reform, systematic training, and stronger collaboration between education stakeholders to realize the full potential of VR in preparing students for real-world demands.

The study entitled "Enhancing EFL Learners' Engagement and Motivation Through Immersive Technologies: The Role of Artificial Intelligence, Augmented Reality, Virtual Reality, and Mobile Applications" by Zhang and Miao (2025) scrutinized how EFL students' literacy in emerging technologies such as AI, AR/VR, and mobile applications influences their engagement, motivation, and cognitive development in technology-enhanced learning environments. This study confirms that EFL students' literacy in technologies such as AI, AR/VR, and mobile applications has a significant positive relationship with their engagement, motivation, and the development of critical and cognitive thinking skills in technology-enhanced learning environments. The findings indicate that the higher the students' technological literacy, the more likely they are to engage actively and stay motivated in the learning process, aligning with theories such as the Technology Acceptance Model (TAM), Self-Determination Theory (SDT), and Constructivist Learning Theory. AI and AR/VR technologies are seen as capable of creating personalized, interactive, and immersive learning experiences that not only fulfill students' intrinsic needs such as autonomy and competence but also support higher-order thinking development in line with Bloom's Taxonomy. Thus, literacy in advanced technologies not only increases students' learning motivation but also serves as a key predictor of success in foreign language education in the digital age. This study offers a new contribution by filling a gap in the literature, focusing specifically on the impact of AI and AR/VR literacy—not just general digital literacy—on EFL students' learning outcomes.

Research conducted by Mubarok et al. (2024) discuses "A Virtual Reality-Based Collaborative Argument Mapping Approach in The EFL Classroom". This empirical inquiry scrutinized the pedagogical efficacy of a Virtual Reality-based Collaborative Argument Mapping (VR-CAM) paradigm in augmenting learners' oratorical proficiency, computational cognition, and ideational fluency within an exigent remote learning milieu. The findings elucidated that individuals engaged in VR-CAM exhibited statistically superior articulation, syntactic precision, discursiveness, and interlocutory aptitude vis-à-vis their counterparts in the conventional modality. Although the augmentation of intercultural curiosity remained marginal, a longitudinal increment was discernible in the experimental cohort. Furthermore, the integrative mechanism of VR and dialectical mapping demonstrably fortified metacognitive and divergent thought processes. Learners were afforded the latitude to architect immersive environments, fostering spontaneity and cognitive liberation. Notwithstanding its heuristic merit, the study's extrapolative validity is curtailed by its mono-institutional scope and unidirectional presence schema. Prospective inquiries are thus enjoined to deploy bidirectional interactivity and escalate immersion to substantiate and potentially amplify these preliminary outcomes.

Research conducted by Hung et al. (2024) discussed "Virtual Reality Is Not Always A Cure-All: Evidences From A Quasi-Experiment of EFL Business Speaking Courses". This investigation uncovered that despite the implementation of Virtual Reality (VR) tools in English-speaking instruction, statistical analyses revealed no substantial disparity in speaking performance or anxiety levels between the experimental and control cohorts—findings that deviate from extant literature. A plausible rationale lies in participants' limited engagement time with VR tools and the absence of guided scaffolding during usage, potentially impeding acclimatization and efficacy. While VR did not significantly elevate learners' emotional responses, qualitative insights suggested its latent capacity to mitigate anxiety through immersive, autonomous environments. Learners appreciated features such as flexible access, simulation for rehearsals, and psychological safety, although concerns emerged over insufficient realism, motion-induced discomfort, and lack of interactive responsiveness. These nuances underscore the necessity of refining VR integration through enhanced realism, prolonged exposure, responsive interactivity, and perhaps peer feedback mechanisms to better cultivate learners' oratory competence and emotional regulation in future pedagogical designs.

Research conducted by Kaplan-Rawoksi and Gruber (2023) explored "The Impact of High-Immersion Virtual Reality on Foreign Language Anxiety". The present inquiry elucidates that engaging in repeated public speaking practice within immersive Virtual Reality (VR) environments significantly attenuates Foreign Language Anxiety (FLA) when juxtaposed with conventional videoconferencing platforms like Zoom. Diverging from antecedent studies that predominantly relied on qualitative insights or singular interventions, this research furnishes robust empirical evidence through a rigorous experimental design and statistical

verification. Participants practicing in VR across eight sessions, in contrast to those using Zoom, reported diminished anxiety, a phenomenon plausibly attributable to the depersonalized nature of avatars, the mitigated social gaze pressure, and the controlled exposure to virtual audiences. Additionally, the study underscores VR's potential to simulate psychologically safe, autonomous rehearsal spaces, which not only nurture speaker confidence but also accommodate iterative skill refinement. Despite technical constraints such as limited interactivity and the occasional onset of cybersickness, the study's implications advocate for VR's integration into pedagogical frameworks aimed at fostering public speaking proficiency under low-stress conditions. Future investigations are encouraged to expand upon these findings through diversified participant pools, multimodal biometric analyses, and cross-platform comparative designs to better delineate the nuanced interplay between immersive technologies and affective variables in language learning.

Research conducted by Peixoto et al. (2023) investigated" Teaching EFL with Immersive Virtual Reality Technologies: A Comparison with the Conventional Listening Method". The study by Peixoto et al. (2023) critically examines the integration of immersive Virtual Reality (iVR) in English as a Foreign Language (EFL) instruction, revealing that while no significant differences were found between traditional audio-based learning and iVR in terms of immediate learning outcomes, iVR significantly enhanced learner motivation, satisfaction, and engagement. Notably, interactive iVR yielded higher knowledge test scores than passive iVR, suggesting that active participation fosters deeper cognitive processing. Although the novelty of iVR may have introduced distractions, it did not negatively affect learning, and users overwhelmingly preferred iVR over traditional methods. Furthermore, positive correlations between presence, involvement, and test performance highlight iVR's potential to create immersive, motivating environments conducive to language acquisition. Despite minimal instances of cybersickness, which slightly influenced preferences, the findings support iVR's role as a complementary pedagogical tool, emphasizing its promise in enhancing affective and experiential dimensions of language learning.

Research conducted by Çelik and Yangın Ersanlı (2022) investigated " The Use of Augmented Reality in A Gamified CLIL Lesson and Students' Achievements and Attitudes: A Quasi-Experimental Study". This study underscores the transformative potential of Augmented Reality (AR) in Content and Language Integrated Learning (CLIL) contexts, demonstrating that AR not only significantly enhances students' linguistic achievement but also fosters heightened engagement, curiosity, and learner satisfaction. The findings reveal that AR-supported instruction leads to improved content retention and promotes greater student involvement, with learners expressing strong preferences for its integration into future language learning experiences. The immersive and interactive qualities of AR enable deeper cognitive and affective engagement, aligning with contemporary learners' expectations and digital fluency, particularly among Generation Z. Despite minor technical limitations, the overwhelmingly positive responses suggest that AR holds considerable pedagogical promise. The study advocates for the incorporation of AR

into instructional materials and encourages educators to adopt accessible, user-friendly AR tools to enrich EFL classrooms. Ultimately, the research affirms AR's value not as a replacement for traditional methods, but as a powerful complementary tool capable of redefining language learning through meaningful, student-centered experiences.

Previous research conducted by Wang et al. (2022) discussed "An Integrated Automatic Writing Evaluation and SVVR Approach to Improve Students' EFL Writing Performance". The findings of the study provide strong empirical evidence that the SVVR–AWE approach significantly enhances EFL learners' writing performance, particularly in content organization, originality, and elaboration, while also improving learning motivation, writing self-efficacy, and reducing writing anxiety. Quantitative analyses using ANCOVA revealed medium effect sizes across these dimensions, indicating meaningful gains over the conventional AWE method. Complementing these results, qualitative insights from interviews highlighted learners' positive experiences with the immersive and interactive nature of SVVR, which not only deepened their engagement and content retention but also fostered independent learning. Participants consistently noted that the combination of SVVR and AWE enriched their writing process, facilitated personalized feedback, and optimized the instructional flow, ultimately making writing tasks more enjoyable and productive. These findings suggest that the integration of immersive virtual reality with automated feedback systems holds transformative potential for EFL writing instruction by supporting cognitive, affective, and pedagogical dimensions of learning.

Although numerous studies have shown the positive impact of immersive technologies such as Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and mobile applications on EFL learners' engagement, motivation, and cognitive skills, research on their pedagogical implementation still lacks depth in several critical areas. For instance, Muthmainnah et al. (2025) demonstrated that VR could enhance grammar, speaking, and narrative skills while also developing soft skills such as collaboration and creativity. However, the study highlights significant obstacles, particularly in the form of large class sizes, lack of institutional support, and teachers' limited TPACK (Technological Pedagogical Content Knowledge). Despite these findings, there is limited empirical research that explicitly examines the role of teacher readiness—especially TPACK—in determining the success of VR-based instruction in EFL settings.

In addition, much of the existing research relies on pre-experimental or quasi-experimental designs, as seen in the work of Muthmainnah et al. (2025), Mubarok et al. (2024), and Çelik and Yangın Ersanlı (2022). These studies, although insightful, often lack control groups or longitudinal follow-ups, which limits the generalizability and reliability of their conclusions. Consequently, there is a need for more rigorous research designs, such as randomized controlled trials, that can offer stronger evidence on the effectiveness of immersive technologies in

improving language outcomes. Moreover, many studies are conducted within a single institution or over a short duration, further restricting their external validity.

Another gap lies in the lack of focused attention on how immersive VR specifically cultivates higher-order thinking skills such as critical thinking, reasoning, and problem-solving. While Zhang and Miao (2025) explored the relationship between technological literacy and cognitive development, their findings were general to AI, AR/VR, and mobile applications, without isolating the unique cognitive benefits of immersive VR-based learning. Similarly, Mubarok et al. (2024) (2024) touched on computational thinking and argumentation skills, but the study did not offer a detailed account of how these skills are developed or measured over time in immersive environments.

Furthermore, although the influence of students' technological literacy has been acknowledged in the literature (Zhang & Miao, 2025), few studies have investigated how learners' proficiency in navigating immersive environments like VR or AR directly affects their language performance—particularly in productive skills such as speaking and writing. The integration of automated feedback tools like Automated Writing Evaluation (AWE) within immersive platforms, as explored by Wang et al. (2022), offers a promising direction. Still, more research is needed to understand how students with different levels of digital literacy benefit from such integration, especially in contexts with unequal access to technology.

Another key issue lies in the level of interactivity within immersive technologies. Hung et al. (2024) found that limited exposure time and lack of guided scaffolding hindered the effectiveness of VR in EFL speaking courses. Similarly, Peixoto et al. (2023) showed that interactive VR environments outperformed passive ones in promoting learner engagement and performance. However, many existing studies do not differentiate between types of immersive experiences, leading to inconsistent outcomes. This gap suggests the importance of exploring how the depth of immersion and learner agency within virtual environments influence language acquisition and learner motivation.

Lastly, while existing studies tend to isolate cognitive, affective, or social aspects of immersive learning, there is limited research that holistically examines how immersive technologies influence all three domains simultaneously. For example, Kaplan-Rawoksi and Gruber (2023) focused on reducing Foreign Language Anxiety (FLA) through VR, whereas Çelik and Yangın Ersanlı (2022) emphasized engagement and motivation in AR-supported CLIL lessons. A more integrated approach is needed to capture the full spectrum of learner outcomes in immersive learning—ranging from language development and emotional well-being to social collaboration and critical thinking. Addressing this multidimensional gap can offer a more comprehensive understanding of how immersive technologies can be effectively utilized in EFL education.

From a practical perspective, immersive Virtual Reality (VR) has demonstrated considerable potential to transform traditional EFL classrooms into interactive, student-centered environments. As evidenced by Muthmainnah et al. (2025), VR simulations facilitate grammar acquisition, speaking fluency, and soft skill development through game-like and experiential tasks. However, for VR to be effectively implemented, several practical considerations must be addressed. These include ensuring institutional support, providing technological infrastructure, offering systematic teacher training (especially in TPACK), and designing meaningful, goal-oriented VR content. Furthermore, studies like Hung et al. (2024) and Peixoto et al. (2023) highlight that the success of VR integration also hinges on learner exposure time, interactivity, and scaffolding, suggesting the need for well-structured lesson plans and instructional frameworks that guide VR use rather than relying on novelty alone.

Epistemologically, VR challenges traditional notions of language learning by introducing embodied, situated learning experiences that align with socio-constructivist and experiential learning theories. Learning in VR is not merely about content absorption but about active participation, negotiation of meaning, and the co-construction of knowledge in immersive contexts. This shift redefines language not just as a cognitive system to be mastered but as a tool for interaction, problem-solving, and identity formation in diverse digital environments. As supported by Mubarok et al. (2024) and Zhang and Miao (2025), VR and related immersive technologies foster cognitive and metacognitive development, critical thinking, and creativity hallmarks of 21st-century skills. These affordances prompt researchers and educators to reconsider the epistemological foundations of language pedagogy and embrace learning paradigms that are dynamic, embodied, and socially mediated.

Looking ahead, practical implementation must be accompanied by a clear epistemological vision. Future VR-enhanced language education should prioritize learner agency, real-world relevance, and iterative feedback, integrating technological, pedagogical, and content knowledge in a balanced way. This means moving beyond using VR as a mere tool for drill practice to embracing it as an environment for simulation-based learning, where language skills are developed organically through tasks that mirror authentic communication scenarios. Additionally, longitudinal and cross-institutional research should further investigate how VR shapes learners' cognitive, affective, and behavioral outcomes to build a more robust theoretical and practical foundation for immersive language instruction.

Despite growing evidence supporting the benefits of immersive VR in enhancing EFL learners' language proficiency, motivation, and soft skills, further research is needed to overcome the limitations noted in current studies. For instance, Muthmainnah et al. (2025) and Hung et al. (2024) highlighted the absence of control groups, short exposure time, and lack of scaffolding as critical limitations. Future studies should adopt more rigorous experimental or longitudinal designs with larger

and more diverse participant samples to assess long-term effectiveness and ensure broader generalizability of findings. Second, future research should explore the differential effects of VR across language skills (e.g., listening, reading, writing, speaking) and learner proficiency levels. While much of the existing research emphasizes speaking and grammar skills, writing and reading—particularly in academic contexts—remain underexplored in immersive environments. The integration of immersive VR with writing feedback tools (e.g., AWE, as in Wang et al., 2022) could open new pathways for improving writing organization, creativity, and fluency. Comparative studies between passive and interactive VR, as noted in Peixoto et al. (2023), could also inform the most effective design features.

Third, more research is needed to investigate the role of pedagogical models that best support VR integration in EFL instruction. Scaffolding strategies, teacher facilitation, and the role of peer collaboration in VR environments are still not fully understood. Studies could examine how instructional approaches such as task-based learning, problem-based learning, or content and language integrated learning (CLIL) function within immersive settings. Additionally, further inquiry into how VR affects students' self-regulated learning and critical thinking skills—building on Zhang and Miao's (2025) work—would provide valuable insights. Fourth, the affective dimension of VR-assisted language learning deserves more attention. Although Kaplan-Rawkski and Gruber (2023) emphasized VR's role in reducing foreign language anxiety, other emotional factors such as learner boredom, frustration, or overreliance on digital environments should also be examined. Researchers should consider incorporating biometric data, emotional analytics, or multimodal assessments to more accurately capture learners' emotional responses in immersive learning scenarios.

Fifth, more cross-cultural and institutional studies are recommended to investigate the contextual influences on VR implementation. Most current research focuses on single institutional settings, limiting the understanding of how educational policy, culture, infrastructure, and socioeconomic factors affect VR adoption. Comparative studies between different regions or countries could shed light on global versus local challenges and help build more adaptable and inclusive VR pedagogies. Lastly, further research should examine teachers' professional development and digital competencies, especially in relation to TPACK. While students' experiences and outcomes are often the focus, instructors' ability to design, facilitate, and assess VR-based learning environments is equally critical. Future studies could explore the effectiveness of specific training programs, peer mentoring models, or collaborative design practices to enhance teachers' confidence and competence in using immersive technologies.

CONCLUSION

The growing body of research on immersive technologies, particularly Virtual Reality (VR), in English as a Foreign Language (EFL) education has highlighted the potential of VR to transform traditional learning environments into interactive,

learner-centered spaces that foster language proficiency, motivation, and transferable 21st-century skills. Studies consistently demonstrate that VR-supported instruction can significantly enhance learners' engagement, reduce anxiety, and promote critical thinking, especially when integrated with collaborative tasks and personalized feedback mechanisms. However, limitations such as short exposure time, inadequate scaffolding, institutional barriers, and the lack of comprehensive teacher training continue to hinder the full-scale implementation of VR in language classrooms. Moreover, mixed findings across studies suggest that the impact of VR is highly context-dependent, influenced by factors such as technological literacy, instructional design, learner readiness, and cultural settings. As such, while VR holds great promise for revolutionizing EFL instruction, its successful adoption requires a holistic approach that includes pedagogical innovation, professional development, infrastructure support, and sustained empirical inquiry. Future research should therefore adopt more rigorous, longitudinal, and contextually diverse methodologies to refine theoretical frameworks and optimize VR integration in EFL pedagogy.

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