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## VR-supported English language learning: Applications, benefits, and challenges

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### ABSTRACT

This article focuses on theoretical foundations of virtual reality-supported language learning and theoretically proves that Virtual Reality (VR) has emerged as a promising technology for enhancing English language learning by providing immersive, interactive, and context-rich learning experiences. However, existing research remains fragmented across different language skills, educational contexts, and technological applications. This study aims to systematically synthesize empirical evidence on the use of VR in English language learning and examine its reported benefits, underlying learning mechanisms, implementation challenges, and future research directions. A systematic narrative review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Literature searches were performed in Scopus, Web of Science, ERIC, and Google Scholar, supplemented by manual searches of relevant references. A total of 160 records were identified, of which 10 empirical studies met the inclusion criteria and were included in the qualitative synthesis. The findings indicate that VR has been applied to support vocabulary acquisition, speaking, listening, writing, pronunciation, and intercultural communication. Across the reviewed studies, VR was associated with increased learner engagement, improved vocabulary retention, enhanced communicative competence, reduced language anxiety, and greater learning motivation. The review further suggests that these outcomes may be explained by the mechanisms of immersion, presence, embodiment, situated learning, and flow theories. Despite these benefits, challenges related to cost, technical infrastructure, accessibility, teacher preparedness, and ethical considerations continue to affect implementation. The review identifies several research gaps, including the need for longitudinal studies, larger participant samples, stronger representation of teacher perspectives, and more inclusive VR design. Thus, literature review suggests that VR represents a valuable complementary tool for English language education when integrated through sound pedagogical practices and adequate institutional support.

**Keywords:** virtual reality, English language learning, immersive learning, language acquisition, students

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## **INTRODUCTION**

English proficiency plays a crucial role in academic success, professional development, business communication, and participation in an increasingly globalized society (Kassymova et al., 2026). However, learners of English as a Second Language (ESL) and English as a Foreign Language (EFL) often face challenges such as limited exposure to authentic language environments, first-language interference, communication anxiety, and difficulties in developing communicative competence. Language learning anxiety has been identified as a significant factor that negatively affects learner motivation, academic participation, personal development, and professional performance (Horwitz et al., 1986). In response to these challenges, researchers and educators have increasingly explored digital technologies that can create more engaging and authentic learning experiences. One of the latest advancements in digital technologies is Virtual Reality (VR), which has gained significant attention in education. Virtual Reality can be understood as a computer-generated simulation that enables users to interact with immersive three-dimensional environments. In educational contexts, VR is commonly discussed in terms of its level of immersion, ranging from low-immersion environments accessed through desktop computers or mobile devices to high-immersion environments supported by head-mounted displays (Kaplan-Rakowski & Gruber, 2019). This distinction is important in English language learning because different levels of immersion may shape how learners experience interaction, presence, and contextual language practice.

By simulating realistic scenarios, VR can allow students to practice and apply their target language skills more engagingly and authentically (Feng & Ng, 2023). It has gained significant traction in education since how students work and engage in learning materials differs substantially from the traditional methods when students work with textbooks and other materials provided by instructors. Through VR, students can be immersed in authentic, contextual environments that enable them to practice their language skills more naturally and engagingly. Previous studies have reported positive outcomes associated with online learning, artificial intelligence-based schools, and VR-supported language learning, including improvements in vocabulary acquisition, speaking performance, listening comprehension, learner confidence, and educational motivation (Kassymova et al., 2019; Feng & Ng, 2023; Yan et al., 2023; Tai & Chen, 2021). Nevertheless, the existing literature remains fragmented. Many studies focus on specific language skills or individual VR applications, while previous review articles often provide descriptive summaries without systematically synthesizing findings or examining the theoretical mechanisms underlying VR-enhanced learning in higher education. Consequently, there remains a need for a comprehensive review that integrates empirical evidence with relevant learning theories and identifies both opportunities and limitations associated with VR-supported English language education. Unlike previous reviews that primarily summarize technological developments or report isolated learning outcomes, this review integrates empirical evidence through the theoretical lenses of immersion, presence, embodiment, and situated learning. In doing so, it provides a more comprehensive explanation of how and why VR may support English language learning.

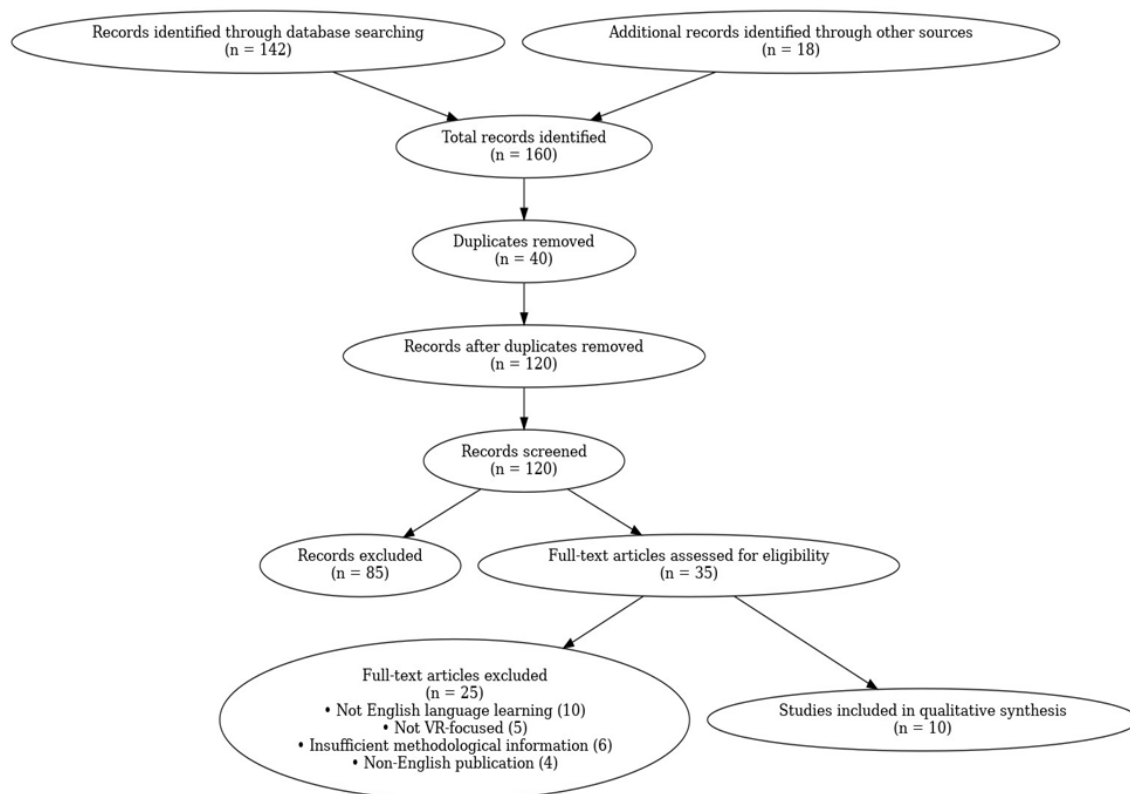
To address this gap, this study conducts a systematic narrative review of empirical research on VR in English language learning. Unlike previous reviews, this article synthesizes findings through the theoretical lenses of immersion, presence, embodiment, and situated learning while systematically examining evidence regarding learner engagement, retention, communication, motivation, and implementation challenges. Accordingly, the study addresses the following research questions: 1) RQ1: How has Virtual Reality (VR) been applied in English language learning, and what benefits related to learner engagement, retention, and authentic communication have been reported? 2) RQ2: Through what mechanisms, including immersion, presence, embodiment, and interactivity, does VR appear to support language acquisition and learner motivation? 3) RQ3: What challenges, limitations, and contextual factors influence the successful implementation of VR in English language teaching and learning? 4) RQ4: What research gaps and future directions emerge from the current body of evidence on VR-supported English language education?

By answering these questions, the study contributes to the growing field of technology-enhanced language learning by providing a systematic synthesis of empirical findings, clarifying the theoretical foundations of VR-supported learning, and identifying practical implications for educators, researchers, and policymakers.

## METHOD

This study employed a systematic narrative review design guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. A systematic narrative review was selected because the reviewed studies varied substantially in their research designs, participants, educational contexts, VR technologies, and reported outcomes, making statistical meta-analysis inappropriate. The purpose of the review was to identify, evaluate, and synthesize empirical evidence regarding the use of Virtual Reality in English language learning.

The literature search was conducted across four major academic databases: Scopus, Web of Science, ERIC, and Google Scholar. To maximize coverage, additional studies were identified through manual searches of reference lists and related publications. The search employed combinations of the following keywords: ("Virtual Reality" OR "VR" OR "Immersive Virtual Reality") AND ("English Language Learning" OR "English as a Foreign Language" OR "EFL" OR "English as a Second Language" OR "ESL") AND ("language acquisition" OR "speaking" OR "listening" OR "writing" OR "vocabulary" OR "motivation").



**Figure 1. PRISMA Flow Diagram**

Inclusion and exclusion criteria included several questions, such as whether the study material investigated the use of VR in the context of English language teaching, whether it reported empirical findings based on qualitative, quantitative, or mixed methods research, whether it was published in peer-reviewed journals or conference proceedings, whether it was written in English, and whether it examined language learning outcomes such as speaking, listening, vocabulary, writing, motivation, interest, memory, or anxiety. Studies were excluded if they were conceptual articles, editorials, commentaries, or opinion pieces that focused on educational technologies

other than VR, were not related to English language teaching, lacked sufficient methodological information, and were published in languages other than English.

The review followed four PRISMA stages: identification, screening, eligibility, and inclusion (see Figure 1). An initial search identified 160 records, comprising 142 studies retrieved from electronic databases and 18 records identified through manual searches. Following duplicate removal, 120 unique records remained and were screened based on titles and abstracts. This process resulted in the exclusion of 85 records that did not satisfy the inclusion criteria. Subsequently, 35 full-text articles were assessed for eligibility. Twenty-five studies were excluded because they lacked methodological rigor, did not focus on English language learning, or failed to meet the review criteria. As a result, 10 empirical studies were included in qualitative synthesis. The substantial reduction from 160 initial records to 10 included studies reflects the stringent inclusion criteria applied in this review. It also indicates that, despite growing scholarly interest in VR-assisted language learning, the number of empirical studies that directly examine its educational impact remains relatively limited.

Data from selected studies were extracted using a structured coding framework that included author(s) and year of publication, country and educational context, participant characteristics, virtual reality technology used, language skills considered, study design and methodology, as well as key findings and reported outcomes. The analysis was conducted through thematic synthesis. Findings were organized according to the review's theoretical framework, focusing on four key dimensions: immersion, presence, embodiment, and situated learning. Additional themes relating to learner motivation, engagement, retention, communication, implementation challenges, and future research needs were also identified and synthesized

## **FINDINGS AND DISCUSSION**

### **Findings**

This systematic and transparent approach ensured a comprehensive and replicable review of the current evidence regarding the role of Virtual Reality in English language learning. A total of 10 studies met the inclusion criteria. Table 1 summarizes the characteristics of the included studies, including educational context, VR application, language skills addressed, key findings.

### ***Applications of virtual reality in English language learning***

The reviewed studies demonstrate that VR has been applied across multiple dimensions of English language learning, including vocabulary acquisition, speaking, listening, writing, pronunciation, intercultural communication, and teacher preparation. Vocabulary learning represents one of the most extensively investigated areas. Legault et al. (2019) found that immersive VR environments significantly improved second-language vocabulary acquisition and retention by providing contextualized experiences that enhanced memory formation. Similar findings were reported by Tai et al. (2020), who observed improved vocabulary learning outcomes among adolescent EFL learners using VR-supported applications. These findings suggest that contextual cues available within virtual environments facilitate deeper processing of lexical information. Speaking skills have also received substantial attention; Yan et al. (2023) reported significant improvements in speaking fluency, vocabulary usage, and grammatical accuracy among EFL learners participating in VR-supported role-playing activities. Likewise, Xie et al. (2022) found that immersive VR instruction contributed to improved oral communication and reduced learner anxiety.

The authentic communicative opportunities available within VR environments appear to encourage greater language production and learner confidence. Listening comprehension represents another area where VR has demonstrated positive effects. Tai and Chen (2021) found that learners using mobile-rendered VR achieved significantly higher listening-comprehension scores and better retention than students using conventional video-based learning because the immersive nature of VR may enhance attention and reduce cognitive overload, thereby facilitating comprehension.

**Table 1. Characteristics of studies included in the review**

Author(s)	Country	Participants	VR Application	Language Skill(s)	Main Findings
Yang et al. (2018)	Japan	High school EFL students	VR serious game	Vocabulary, Speaking	Faster vocabulary acquisition, better retention, and improved conversational skills.
Chen et al. (2019)	China	University EFL students	Google Earth VR and storytelling activities	Writing	Improved writing proficiency and confidence in self-expression.
Feng & Ng (2023)	China	140+ EFL learners	Immersive VR (iVR)	Writing, Vocabulary	Improved vocabulary usage, lexical richness, and writing performance.
Yan et al. (2023)	China	16 university EFL learners	Desktop VR role-play environment	Speaking	Enhanced fluency, vocabulary use, grammar, and learner engagement.
Dooly et al. (2023)	Spain	Sixth-grade EFL learners	Immerse virtual environment	Speaking, Vocabulary	Higher language production, increased motivation, reduced anxiety, and better vocabulary retention.
Acar & Cavas (2020)	Turkey	7th-grade students	VR-enhanced learning environment	Reading, Writing	Improved academic achievement compared with traditional instruction.
Żammit (2023)	Malta	25 language teachers	Educational VR environments	General Language Learning	Positive perceptions of VR engagement, despite technical and cost-related barriers.
Tai & Chen (2021)	Taiwan	72 EFL learners	Mondly VR with mobile-rendered headset	Listening	Higher listening comprehension, retention, and learner engagement.
Dillen (2023)	Belgium	Pre-service language teachers	Ovation VR	Teaching Practice, Speaking Confidence	Reduced foreign language teaching anxiety and improved preparedness.
Xie et al. (2022)	China	Foreign language learners	VR-integrated immersion-based instruction	Speaking, Communication	Improved communication skills, reduced anxiety, and enhanced language outcomes.

Research on writing skills remains comparatively limited but promising. Feng and Ng (2023) demonstrated that learners exposed to immersive virtual environments produced richer vocabulary, greater lexical diversity, and improved writing performance. The authors suggest that immersion, presence, and embodiment collectively contribute to enhanced written expression by providing meaningful contextual experiences. Beyond individual language skills, researchers have also explored the use of VR for intercultural learning and communication. Shadieff et al. (2021) found that 360-degree immersive technologies supported intercultural communicative competence and knowledge sharing by exposing learners to authentic cultural contexts. Similarly, Nicolaidou et al. (2021) reported that immersive VR environments promoted learner engagement and meaningful interaction in foreign-language learning.

***Thematic findings on learning benefits***

Table 2 presents a thematic synthesis of the findings reported across the ten studies included in this review. The analysis reveals that learner motivation and engagement constitute the most frequently reported outcomes, appearing in six of the reviewed studies. Researchers consistently found that immersive virtual environments increased students' attention, participation, and willingness to engage in language-learning activities (Dooly et al., 2023; Tai & Chen, 2021; Yan et al., 2023; Żammit, 2023). These findings suggest that VR has considerable potential to enhance learners' affective engagement, which is often associated with improved learning outcomes. Taken together, these findings indicate that VR is most consistently associated with improvements in learner engagement, vocabulary acquisition, speaking performance, and communication confidence, while evidence regarding long-term language development remains limited.

**Table 2. Thematic synthesis of findings across included studies**

Theme	Number of Studies	Representative Studies	Key Findings
Vocabulary Acquisition	4	Yang et al. (2018); Feng & Ng (2023); Dooly et al. (2023); Xie et al. (2022)	VR enhances vocabulary acquisition and retention through immersive, context-rich learning environments.
Speaking Skills	4	Yan et al. (2023); Xie et al. (2022); Yang et al. (2018); Dooly et al. (2023)	VR promotes speaking fluency, pronunciation accuracy, confidence, and communicative competence.
Writing Skills	2	Chen et al. (2019); Feng & Ng (2023)	VR supports writing development by improving lexical richness, creativity, and overall writing quality.
Listening Comprehension	1	Tai & Chen (2021)	VR contributes to improved listening comprehension and information retention.
Learner Motivation and Engagement	6	Dooly et al. (2023); Tai & Chen (2021); Yan et al. (2023); Żammit (2023)	VR increases learner engagement, participation, motivation, and sustained attention during language learning activities.
Anxiety Reduction	3	Dillen (2023); Dooly et al. (2023); Xie et al. (2022)	VR provides supportive learning environments that help reduce language anxiety and increase confidence.
Implementation Challenges	2	Żammit (2023); Acar & Cavas (2020)	High costs, technical limitations, accessibility concerns, and insufficient teacher training remain significant barriers to implementation.

Vocabulary acquisition and speaking development were also prominent themes. Four studies reported positive effects on vocabulary learning, indicating that contextualized and immersive experiences facilitate vocabulary retention and recall (Yang et al., 2018; Feng & Ng, 2023; Dooly et al., 2023; Xie et al., 2022). Similarly, four studies identified improvements in speaking performance, including increased fluency, confidence, pronunciation, and communicative competence. These findings support the argument that VR provides authentic opportunities for language use that may be difficult to replicate in traditional classroom settings. The evidence for writing and listening skills was more limited but nevertheless promising. Two studies reported improvements in writing quality, lexical richness, and written expression through immersive VR experiences (Chen et al., 2019; Feng & Ng, 2023), while one study demonstrated significant gains in listening comprehension and retention among EFL learners using VR-supported instruction (Tai & Chen, 2021). Although fewer studies have examined these language

skills, the available evidence suggests that VR can support multiple dimensions of language development beyond vocabulary and speaking.

Another important finding concerns anxiety reduction. Three studies reported that VR environments helped learners feel more comfortable communicating in English by reducing fear of negative evaluation and creating psychologically safe spaces for practice (Dillen, 2023; Dooly et al., 2023; Xie et al., 2022). This finding is particularly relevant in foreign language learning contexts, where communication anxiety often hinders participation and performance.

A consistent finding across the literature is that VR enhances learner engagement and motivation. Chao et al. (2021) reported positive learner perceptions regarding motivation during VR-supported language learning activities. Dooly et al. (2023) similarly observed increased enthusiasm, participation, and willingness to communicate among language learners engaged in immersive VR experiences. These findings are consistent with broader reviews conducted by Dhimolea et al. (2022) and Hua and Wang (2023), which conclude that VR creates engaging learning experiences capable of sustaining learner interest. Traditional classroom settings usually involve a standard curriculum delivered by a teacher in person. In contrast, VR allows students to participate in the learning process actively, immersing themselves in the virtual environment and making choices that significantly shape the language-learning experience (Sun et al., 2020; Hua & Wang, 2023). This level of interactivity has been shown to increase student motivation and attention as learners become more invested in the learning process (Saidin et al., 2015). Furthermore, VR's ability to provide immediate feedback and consequences for student actions can reinforce language skills and promote more effective learning (Sun et al., 2020).

One of the most significant barriers to effective language learning is the anxiety and self-consciousness that many students experience when communicating in a new language. VR's ability to create a low-stakes, judgment-free environment can help mitigate these concerns, allowing learners to practice speaking without embarrassment or criticism (Chen et al., 2021; Zhang, 2020; Yan et al., 2023). Xie et al. emphasized virtual and augmented reality's positive impact on foreign language acquisition, as students reported reduced anxiety when using VR tools. This reduction was attributed to the audience's focus shifting towards the virtual landscape through Google viewers, allowing presenters to feel more relaxed and achieve greater fluency (Xie et al., 2022). Language anxiety has long been recognized as a major obstacle to foreign-language acquisition (Horwitz et al., 1986). Several studies suggest that VR may help alleviate this challenge by providing psychologically safe learning environments. Xie et al. (2022), Dillen (2023), and Dooly et al. (2023) found that learners felt more comfortable practicing language skills within virtual environments because they perceived lower levels of social pressure and fear of negative evaluation.

The increasing integration of immersive technologies in education has not only expanded the possibilities for hands-on and self-directed learning for learners in language learning, but has also found application in other disciplines. While Pratama et al. (2022) found that the combination of virtual reality and augmented reality in civil engineering education increases students' practical understanding and engagement through interactive and authentic learning environments, Pratama et al. (2021) demonstrated that augmented reality serves as an effective interactive learning tool by improving students' visualization of complex geographical concepts and increasing their motivation to learn, meaning that VR can be widely used by educators in almost all disciplines.

Although the reviewed studies generally reported positive outcomes, several implementation challenges were identified. Cost, technical difficulties, accessibility concerns, and teacher preparedness emerged as the most frequently reported barriers to successful integration (Acar & Cavas, 2020; Żammit, 2023). These findings indicate that the effectiveness of VR depends not only on technological capabilities but also on institutional support, teacher training, and equitable access to resources.

### ***Challenges and limitations***

Despite its potential, VR implementation faces several challenges. Cost remains one of the most significant barriers. High-quality VR systems require substantial financial investment, which may limit adoption in many educational institutions (Radianti et al., 2019; Zammit, 2023).

Technical limitations also present practical obstacles. Studies report challenges related to hardware compatibility, internet connectivity, software stability, and device usability (Webster & Dues, 2018; Muczyński et al., 2023). These issues can disrupt learning activities and reduce instructional effectiveness.

Firstly, VR hardware and software costs can significantly hinder widespread adoption, particularly in resource-constrained educational settings. There are some low-cost VR options available, such as smartphone-based VR headsets (Google Cardboard, VRG Headset). However, as research shows, they are not able to provide a high-quality VR experience, thus minimizing the learning effect. The higher-end systems that provide more immersive and engaging experiences can be prohibitively expensive for many educational institutions. However, in order to benefit from VR-supported instruction, preferably all students should be provided. Secondly, the successful integration of VR in the classroom requires a significant investment in teacher training and professional development. Educators must be equipped with the necessary skills to effectively design, implement, and facilitate VR-based learning activities and troubleshoot technical issues that may arise. Many researchers reported technical challenges related to hardware requirements. Technical issues with devices, software, internet access, and compatibility can also disrupt learning activities (Muczyński et al., 2023; Webster & Dues, 2018; Elmqaddem, 2019; Luis et al., 2016).

Integrating virtual reality technology into the classroom requires technical skills and pedagogical knowledge that many teachers may not naturally possess; teacher preparedness represents another critical concern. Southgate et al. (2018) and Vert and Andone (2019) emphasize that effective implementation requires educators to possess both technical skills and pedagogical knowledge. Without adequate professional development, teachers may struggle to integrate VR meaningfully into language-learning curricula. Accessibility concerns remain underexplored. Radianti et al. (2019) and Urazaliyeva et al. (2024) note that some learners may experience difficulties due to visual impairments, physical disabilities, or motion sickness. These limitations highlight the need for inclusive design principles in future VR development. Finally, ethical concerns related to privacy and data protection are receiving increasing attention. As VR systems collect extensive behavioral and biometric data, researchers emphasize the importance of responsible data management and user privacy protection (Garrido et al., 2023; Tricomi et al., 2023).

## **Discussion**

An important observation emerging from the reviewed studies is that VR does not improve learning outcomes automatically. Rather, positive outcomes depend on the alignment between technological affordances and pedagogical objectives. The reviewed studies indicate that learning benefits are most evident when VR activities are integrated into structured learning experiences involving meaningful communication, collaboration, and reflection. Consequently, instructional design remains a crucial determinant of successful VR-supported language learning. The findings of this systematic narrative review indicate that Virtual Reality (VR) has considerable potential to support English language learning by creating immersive, interactive, and authentic learning environments. Across the reviewed studies, positive outcomes were reported in vocabulary acquisition, speaking performance, listening comprehension, writing development, learner engagement, motivation, and anxiety reduction. However, the effectiveness of VR appears to be influenced not only by technological features but also by pedagogical design, learner characteristics, and contextual factors.

Digital transformation in education is required to equip students with the necessary digital skills and computational thinking to become the next generation of digital innovators. Accelerating pre-existing trends, where technology presence is prominent, teaching and learning activities are almost entirely dependent on digital platforms and tools. Therefore, such changes have highlighted the importance of digital competency as a necessary skill for survival and development in critical situations (Lantolf & Xi, 2023). Traditional language teaching methods, while fundamental, often fall short in addressing the diverse needs of learners in various contexts. This highlights the increasing necessity for innovative language teaching approaches that foster

engagement, adaptability, and proficiency. Moreover, innovative language teaching should incorporate real-world contexts that learners can relate to. A recurring pattern across the reviewed literature is the positive relationship between immersion and language learning outcomes; studies by Legault et al. (2019), Tai and Chen (2021), Feng and Ng (2023), and Yan et al. (2023) suggest that immersive virtual environments allow learners to interact with language in meaningful contexts that resemble real-life communication situations; these findings support situated learning theory (Lave & Wenger, 1991), which argues that learning is more effective when knowledge is acquired through participation in authentic activities. Rather than memorizing isolated vocabulary items, learners in VR environments engage in contextualized communication, which appears to facilitate deeper understanding and stronger retention of language knowledge.

The VR environments allowed students to practice conversational skills in realistic scenarios, leading to better internalization of grammar and vocabulary (Yang et al., 2018). Similar studies were conducted investigating the influence of VR-supported instruction on vocabulary acquisition, and to some extent, researchers could identify improvement in vocabulary acquisition (Fuhrman et al., 2021; Repetto et al., 2013). Fuhrman et al. (2021) studied and found that vocabulary learning in a virtual reality environment was enhanced when students physically manipulated virtual objects associated with target words; that is, this study demonstrates that interaction in virtual reality can create an authentic, multi-sensory learning environment that supports vocabulary acquisition. Another study conducted at a university in China explored the use of VR to improve learners' writing skills in English as a Foreign Language. The researchers found that VR-based writing activities involving role-playing and interactive storytelling resulted in measurable outcomes in the student's writing proficiency and overall confidence in self-expression (Chen et al., 2019).

Likewise, a study conducted by Chinese researchers examined the vocabulary usage and writing performance of learners who use iVR versus conventional classroom instruction. More than 140 Chinese-speaking English learners were divided into experimental and control groups and completed writing tasks. Thus, learners using iVR performed significantly better on target word usage, lexical density, distribution richness, and overall task completion. The positive learning transfer may relate to exploring the VE. Therefore, iVR's immersion and sense of presence and embodiment enable learners to benefit from VR-supported instruction, aiding their use of vocabulary in writing. The study demonstrates how technological factors, specifically learners' VR experience and embodiment, can improve writing performance (Feng & Ng, 2023). A team of researchers from the Chinese public university explored the impact of VR-enhanced instruction on EFL learners' speaking skills and their perception of the learning experience. Sixteen students participated in role-playing exercises using a desktop-based VR application. Quantitative analysis of the study showed that students' speaking skills improved significantly, with significant improvements in vocabulary, fluency, and grammar. Qualitative research has noted that authentic contexts in VR environments help EFL students improve their comprehension, retention, learner interest and motivation to learn, and improve their learning, facilitating learning in a location-based setting (Yan et al., 2023).

The review further highlights the importance of presence as a mechanism underlying VR-supported learning. Presence refers to the subjective feeling of being physically located within a virtual environment (Slater & Wilbur, 1997). Research conducted by Tai and Chen (2021) demonstrated that learners who experienced stronger feelings of presence achieved higher listening-comprehension scores and better retention than learners exposed to conventional video-based instruction. Similarly, Feng and Ng (2023) found that immersion, presence, and embodiment significantly contributed to improved writing performance among EFL learners. These findings suggest that the psychological experience of "being there" may enhance attention, cognitive engagement, and memory formation, thereby improving language-learning outcomes.

Another important finding concerns learner engagement and motivation. Consistent with previous reviews (Dhimolea et al., 2022; Hua & Wang, 2023), the studies included in this review indicate that VR environments can increase learners' interest, enjoyment, and willingness to participate. Chao et al. (2021) reported that learners perceived VR-assisted language learning as motivating and engaging during the COVID-19 period. Likewise, Dooly et al. (2023) observed

increased learner enthusiasm and active participation when students engaged in immersive VR language-learning activities. These findings are consistent with motivation theories suggesting that learners become more intrinsically motivated when learning activities provide autonomy, challenge, interaction, and meaningful experiences.

Drs. Sadler and Thrasher facilitated the VR sessions with groups of 6 students at a time, while Dr. Melinda Dooly and Mónica López Vera oversaw the classroom-based activities. This design allowed the researchers to compare the student's performance on classroom tasks versus their performance in the VR environment. The activities centered around language learning objectives, such as describing and discussing routines and hobbies. Students produced language at a higher CEFR level in VR, retained vocabulary learned in VR for use in the classroom, and were more motivated and less anxious when using VR technology. The VR environment allowed students to practice language skills like describing relative positions that are difficult to replicate in the classroom. Overall, the study demonstrates the potential of iVR to enhance language learning outcomes (Dooly et al., 2023). A group of researchers from Turkey investigated the impact of a VR-enhanced learning environment on 7th-grade students' academic achievement in English reading and writing. A quasi-experimental design was used, with 15 students in the experimental group and 11 in the control group. The results showed that VR-based learning positively affected the experimental group's English reading and writing academic achievement. The findings also suggest that iVR is more effective than traditional teaching methods, as it provides students with sensory information in three dimensions (Acar & Cavas, 2020). Researchers from Malta explored the potential of VR for teaching Maltese as a second language. A mixed-methods approach involved a focus group and an online survey with 25 Maltese teachers. The results indicate that younger respondents were more optimistic about the impact of VR on learning outcomes. VR was found to effectively engage students in immersive environments and enhance the learning context, but challenges related to cost, hardware, and technical issues were also identified.

The evidence also suggests that VR may contribute to reducing language anxiety, a factor that has long been recognized as a barrier to language acquisition (Horwitz et al., 1986). Studies by Xie et al. (2022), Dillen (2023), and Dooly et al. (2023) reported that learners felt more comfortable communicating in virtual environments than in traditional classroom settings. The anonymity and psychological safety provided by VR appear to reduce fear of negative evaluation and encourage greater willingness to communicate. This finding is particularly important because communication anxiety often limits learner participation in foreign-language classrooms. The review also reveals several gaps within the existing literature. First, most studies employ short-term interventions and relatively small sample sizes. Consequently, limited evidence exists regarding the long-term effects of VR on language proficiency and retention. Second, teacher perspectives remain underrepresented compared with learner-focused research. Third, relatively few studies have examined inclusive VR design for learners with diverse educational needs. Finally, emerging developments such as artificial-intelligence-powered virtual tutors, adaptive learning systems, and haptic technologies remain largely unexplored within English language learning contexts.

Overall, the evidence suggests that VR represents a promising educational tool capable of enhancing engagement, communication, and language development through immersion, presence, embodiment, and situated learning. However, its successful implementation depends on thoughtful pedagogical integration, adequate institutional support, teacher preparedness, accessibility considerations, and ethical technology use. Future research should move beyond short-term experimental studies toward longitudinal and mixed-methods investigations that examine sustainable and equitable approaches to VR-supported language learning.

## **CONCLUSION**

This systematic narrative review synthesized empirical evidence concerning the use of Virtual Reality (VR) in English language learning. The findings demonstrate that VR has been applied across a range of language-learning contexts, including vocabulary development,

speaking, listening, writing, and intercultural communication. The reviewed studies indicate positive effects on learner engagement, motivation, confidence, vocabulary retention, and communicative competence. The analysis further suggests that these benefits are influenced by several interconnected mechanisms, including immersion, presence, embodiment, interactivity, and situated learning.

At the same time, the review identified several challenges that may limit the widespread adoption of VR in language education. These include financial costs, technical constraints, accessibility concerns, teacher preparedness, potential health effects, and ethical issues related to privacy and data security. Consequently, successful implementation requires careful planning, adequate institutional support, and pedagogically informed instructional design.

VR should not be viewed as a replacement for teachers or conventional language instruction. Rather, it represents a complementary educational tool that can enrich learning experiences by providing immersive, authentic, and engaging opportunities for language use. This review should be interpreted considering several limitations. The synthesis was restricted to English-language publications and included only ten empirical studies, which may limit the generalizability of the findings. In addition, the diversity of research designs, educational contexts, and VR technologies prevented direct comparison across all studies. Future research should investigate long-term learning outcomes, examine teacher perspectives, employ larger and more diverse samples, and explore inclusive design strategies that accommodate learners with different needs and abilities.

## REFERENCES

- Acar, A., & Cavas, B. (2020). The effect of virtual reality enhanced learning environment on the 7th-grade students' reading and writing skills in English. *Malaysian Online Journal of Educational Sciences*, 8(4), 22-33.
- Chao, G. C., Jong, M. S., & Luk, E. T. (2021). Work-in-progress: Motivation in virtual reality Chinese language learning in the context of COVID-19. <https://doi.org/10.23919/ilrn52045.2021.9459245>
- Chen, C. H., Hung, H. T., & Yeh, H. C. (2021). Virtual reality in problem-based learning contexts: Effects on problem-solving performance, vocabulary acquisition, and motivation of English language learners. *Journal of Computer Assisted Learning*, 37(3), 851–860. <https://doi.org/10.1111/jcal.12537>
- Chen, C., Chang, S., Hwang, G., & Zou, D. (2021). Facilitating EFL learners' active behaviors in speaking: A progressive question prompt-based peer-tutoring approach with VR contexts. *Interactive Learning Environments*, 31(4), 2268–2287. <https://doi.org/10.1080/10494820.2021.1878232>
- Chen, Y., Smith, T. J., York, C. S., & Mayall, H. J. (2019). Google Earth virtual reality and expository writing for young English learners from a funds of knowledge perspective. *Computer Assisted Language Learning*, 33(1–2), 1–25. <https://doi.org/10.1080/09588221.2018.1544151>
- Dhimolea, T. K., Kaplan-Rakowski, R., & Lin, L. (2022). A systematic review of research on high-immersion virtual reality for language learning. *TechTrends*, 66(5), 810–824. <https://doi.org/10.1007/s11528-022-00717-w>
- Dillen, M. (2023). Overcoming pre-service foreign language teaching anxiety with the help of virtual reality software: A contribution of the Ovation VR project [*Master's thesis, Université catholique de Louvain*].
- Dooley, M., Thrasher, T., & Sadler, R. (2023). “Whoa! Incredible!”: Language learning experiences in virtual reality. *RELC Journal*, 54(2), 321–339. <https://doi.org/10.1177/00336882231167610>
- Elmqaddem, N. (2019, February 14). Augmented reality and virtual reality in education: Myth or reality? *International Journal of Emerging Technologies in Learning*, 14(03), 234–234. <https://doi.org/10.3991/ijet.v14i03.9289>

- Feng, B. J., & Ng, L. L. (2023). Facilitating writing performance of EFL learners via virtual reality: Immersion, presence, embodiment. *Frontiers in Psychology, 14*, Article 1134242. <https://doi.org/10.3389/fpsyg.2023.1134242>
- Fuhrman, O., Eckerling, A., Friedmann, N., Tarrasch, R., & Raz, G. (2021). The moving learner: Object manipulation in virtual reality improves vocabulary learning. *Journal of Computer Assisted Learning, 37*(3), 672–683. <https://doi.org/10.1111/jcal.12515>
- Garrido, G. M., Nair, V., & Song, D. (2023). SoK: Data privacy in virtual reality. *Proceedings on Privacy Enhancing Technologies, 2024*(1), 21–40. <https://doi.org/10.56553/popets-2024-0003>
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal, 70*(2), 125–132. <https://doi.org/10.1111/j.1540-4781.1986.tb05256.x>
- Hua, C., & Wang, J. (2023). Virtual reality-assisted language learning: A follow-up review (2018–2022). *Frontiers in Psychology, 14*, Article 1153642. <https://doi.org/10.3389/fpsyg.2023.1153642>
- Kaplan-Rakowski, R., & Gruber, A. (2019). Low-immersion versus high-immersion virtual reality: Definitions, classification, and examples with a foreign language focus. In *Innovation in Language Learning International Conference Proceedings*. Pixel.
- Kassymova, G. K., Duisenbayeva, S. S., Adilbayeva, U. B., Triyono, M. B., & Sangilbayev, O. S. (2019). Cognitive competence based on the e-learning. *International Journal of Advanced Science and Technology, 28*, 167–177.
- Kassymova, G.K., Safitri, D., Abduldaye, Y. et al. (2026). Scoping review of english medium instruction (emi) and content and language integrated learning (CLIL) in central asia: empirical insights and regional policy implications. *SN Soc Sci 6*, 191. <https://doi.org/10.1007/s43545-026-01473-x>
- Lantolf, J.P. and Xi, J. (2023), Digital language learning: A sociocultural theory perspective. *TESOL J, 57*, 702-715. <https://doi.org/10.1002/tesq.3218>
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Legault, J., Zhao, J., Chi, Y., Weitao, C., Klippel, A., & Li, P. (2019). Immersive virtual reality as an effective tool for second language vocabulary learning. *Languages, 4*(1), 13. <https://doi.org/10.3390/languages4010013>
- Luis, C. E. M., Martín-Gutiérrez, J., Díaz, B. A., & González-Marrero, A. (2016, December 20). Virtual technologies trends in education. *Eurasia Journal of Mathematics, Science and Technology Education, 13*(2). <https://doi.org/10.12973/eurasia.2017.00626a>
- Nicolaidou, I., Pissas, P., & Boglou, D. (2021). Comparing immersive virtual reality to mobile applications in foreign language learning in higher education. *Interactive Learning Environments, 31*(4), 2001–2015. <https://doi.org/10.1080/10494820.2020.1870504>
- Pratama, G.N.I.P., Triyono, M. B., Hasanah, N., B. Kenzhaliyev, O., N. Kosherbayeva, A., K. Kassymova, G., & Azman, M. N. A. (2022). Development of construction engineering teaching course by using vr-ar: A case study of polytechnic in Indonesia. *International Journal of Interactive Mobile Technologies (iJIM), 16*(14), pp. 93–106. <https://doi.org/10.3991/ijim.v16i14.30539>
- Pratama, H., Azman, M. N. A., Kenzhaliyev, O. B., Wijaya, H., & Kassymova, G. K. (2021). Application of augmented reality technology as an interactive learning medium in geography subjects. *News of the National Academy of Sciences of the Republic of Kazakhstan, Series of Geology and Technical Sciences, 448*(4), 21–29. <https://doi.org/10.32014/2021.2518-170X.77>
- Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2019). A systematic review of immersive virtual reality applications for higher education. *Computers & Education, 147*, 103778. <https://doi.org/10.1016/j.compedu.2019.103778>
- Repetto, C., Colombo, B., Cipresso, P., & Riva, G. (2013). The effects of rTMS over the primary motor cortex: the link between action and language. *Neuropsychologia, 51*(1), 8-13. <https://doi.org/10.1016/j.neuropsychologia.2012.11.001>

- Saidin, N. F., Halim, N. D. A., & Yahaya, N. (2015). A review of research on augmented reality in education: Advantages and applications. *International Education Studies, 8*(13). <https://doi.org/10.5539/ies.v8n13p1>
- Shadiev, R., Yu, J., & Sintawati, W. (2021). Exploring the impact of learning activities supported by 360-degree video technology on language learning. *Frontiers in Psychology, 12*. <https://doi.org/10.3389/fpsyg.2021.766924>
- Slater, M., & Wilbur, S. (1997). A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators and Virtual Environments, 6*(6), 603–616. <https://doi.org/10.1162/pres.1997.6.6.603>
- Southgate, E., Smith, S. P., Cividino, C., et al. (2018). Embedding immersive virtual reality in classrooms. *International Journal of Child-Computer Interaction, 19*, 19–29. <https://doi.org/10.1016/j.ijcci.2018.10.002>
- Sun, C., Yao, Y., Wang, R., & Ye, X. (2020). A study on the influence of scene reality of VR environment on English learners' learning engagement and learning effectiveness. <https://doi.org/10.1109/csei50228.2020.9142520>
- Tai, T., Chen, H. H., & Todd, G. (2020). The impact of a virtual reality app on adolescent EFL learners' vocabulary learning. *Computer Assisted Language Learning, 35*, pp. 892-917. <https://doi.org/10.1080/09588221.2020.1752735>
- Tai, T.-Y., & Chen, H. H.-J. (2021). The impact of immersive virtual reality on EFL learners' listening comprehension. *Journal of Educational Computing Research, 59*(7), 1272-1293. <https://doi.org/10.1177/0735633121994291>
- Tricomi, P. P., Nenna, F., Pajola, L., Conti, M., & Gamberini, L. (2023). You can't hide behind your headset: User profiling in augmented and virtual reality. *IEEE Access, 11*, 9859–9875. <https://doi.org/10.1109/ACCESS.2023.3240071>
- Urazaliyeva, U., Bekalayeva, A., & Kassymova, G. (2024). Learning through virtual reality: Results of a pilot study in English language learning. *Bulletin of the Eurasian Humanitarian Institute, 3*, 235-247. <https://doi.org/10.55808/1999-4214.2024-3.22>
- Vert, S., & Andone, D. (2019). Virtual reality authoring tools for educators. *ITM Web of Conferences, 29*, 03008. <https://doi.org/10.1051/itmconf/20192903008>
- Webster, R., & Dues, J. (2018, May 10). *System usability scale (SUS): Oculus Rift® DK2 and Samsung Gear VR®*. <https://doi.org/10.18260/1-2--28899>
- Xie, Y., Liu, Y., Zhang, F., & Ping, Z. (2022). Virtual reality-integrated immersion-based teaching to English language learning outcome. *Frontiers in Psychology, 12*. <https://doi.org/10.3389/fpsyg.2021.767363>
- Yan, W., Lowell, V., & Yang, L. (2023). Exploring the impact of virtual reality on developing EFL learners' speaking skills in situated learning [Preprint]. *Research Square*. <https://doi.org/10.21203/rs.3.rs-3711927/v1>
- Yang, F. O., Chen, H., & Liao, C. (2018). Exploring the effects of multimedia design in a life English VR serious game. In *2018 7th International Congress on Advanced Applied Informatics (IIAI-AAI)* (pp. 946–947). IEEE. <https://doi.org/10.1109/IIAI-AAI.2018.00194>
- Žammit, J. (2023). Exploring the effectiveness of virtual reality in teaching Maltese. *Computers & Education: X Reality, 3*, 100035. <https://doi.org/10.1016/j.cexr.2023.100035>
- Zhang, M. (2020). Virtual situated learning of spoken English based on computer simulation technology. *International Journal of Emerging Technologies in Learning, 15*(4), 206–218. <https://doi.org/10.3991/ijet.v15i04.12939>