The Use of Virtual Reality as a Tool of Linguistic Landscape in Teaching French Language in the USA: The Case of Georgia State University.

The Use of Virtual Reality as a Tool of Linguistic Landscape in Teaching French Language in the USA: The Case of Georgia State University.

by

Francis Adjei-Nyagbe

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ABSTRACT

This study explores the integration of virtual reality (VR) and linguistic landscape theory and frameworks as an innovative approach to second language acquisition with a particular focus on French language learning at Georgia State University. The research is grounded in constructivist, sociocultural, cognitive load, and linguistic landscape theories to investigate how immersive VR environments replicate real-world multilingual settings to enhance learners' proficiency, cultural awareness, and engagement. The study employs a mixed-method research design, which combines pretests and posttests, observation, and the debriefing session to go about its investigation, where participants engage in VR scenarios such as market shopping, dining, and transportation using Oculus Quest 3S headsets and Mondly VR software. This study seeks to position VR as a viable extension of the linguistic landscape paradigm, therefore contributing to the changing debate on digital language pedagogy.

INDEX WORDS: Virtual Reality, Linguistic Landscape, Second Language Acquisition, Digital Language Pedagogy

Virtual Linguistic Landscape for Teaching French language at Georgia State University

by

Francis Adjei-Nyagbe

Committee Chair: Éric Le Calvez

Committee: Éric Le Calvez

Marta Galindo Parra

Hakyoon Lee

Electronic Version Approved:

Office of Graduate Services

College of Arts and Sciences

Georgia State University

May 2025

DEDICATION

This work is dedicated to all my family members, the Nyagbe family, and especially to my beloved wife, Rhoda Brogya, whose love, support, and prayers have been the cornerstone of my academic path. To my mentors and professors, thank you for your guidance and inspiration. And to every language learner who dares to dream beyond the classroom, this work is dedicated to you.

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1 INTRODUCTION

This thesis explores the intersection of Virtual Reality (VR) and Linguistic Landscape (LL) in language education, analyzing how VR-enhanced linguistic landscapes contribute to language acquisition, multimodal literacy, and intercultural competence with a particular focus on French language learning.

According to Barni et al. (2014), while traditional language acquisition, which relies on structured pedagogical methods, including textbooks, grammar drills, and classroom-based instruction, these approaches cultivate grammatical competence that often falls short in fostering real-world fluency, cultural literacy, and immersive interaction with the target language. LL has emerged as a framework to open up this discussion, as cited by Barni et al. (2014), which, according to Gorter (2013), emphasizes the importance of written language in public spaces such as advertisements, street signs, commercial labels, etc., which help in shaping language exposure. Waliński (2013) has it that LL plays a significant role in second-language acquisition by providing informal yet authentic linguistic input that helps learners to develop pragmatic competence, sociocultural awareness, and contextualized language skills.

Hatoss (2022) points out that recent research emphasizes the necessity of expanding LL frameworks to include multimodal elements such as images, sounds, and interactive digital representations, aligning with broader theories of multimodality that underscore the integration of multiple semiotic resources in meaning-making. This expansion will be particularly relevant in language education, where traditional teaching methods are being supplemented and, in some cases, transformed by technological innovations such as VR.

Torres & Statti (2019) state that the integration of VR into language education represents a

paradigm shift, offering immersive and interactive environments that replicate real-world linguistic settings. By making use of VR, educators can move beyond the conventional classroom, providing learners with opportunities to engage in situated language use within simulated, authentic contexts. (Kessler, 2018)

Many learners of foreign languages in monolingual or geographically isolated settings lack access to multilingual public spaces where they can engage with linguistic landscapes naturally (Hatoss, 2022). This restriction might hinder their ability to acquire contextually embedded linguistic knowledge. According to Aladjem & Jou (2016), a learner studying French in an Anglophone country, for example, is unlikely to encounter sufficient French-language signage or public discourse outside the classroom, thereby limiting their exposure to authentic linguistic cues.

To overcome this challenge, technological advancements such as VR have opened new avenues that can be used to extend LL into digital environments. VR provides an immersive, interactive medium for language learners to explore multilingual spaces virtually, facilitating engagement with LL in ways previously impossible (Ivkovic & Lotherington, 2009). Song et al. (2023) posit that VR-based language learning allows students to engage in situated learning experiences that enhance their fluency, intercultural competence, and confidence in language use by digitally reconstructing real-world linguistic environments.

In addition to its benefits for language immersion, VR also aligns well with cognitive theories of learning particularly constructivist and sociocultural frameworks, which emphasize learning through interaction and engagement with contextualized materials (Zhou et al., 2018). VR-mediated LLs provide learners with an interactive and situated learning environment where they can engage with linguistic elements as they naturally occur in social

settings thereby reinforcing comprehension and retention (Panagiotidis, 2021). According to Rafiq et al. (2022), VR fosters both motivation and engagement that are key factors in sustaining long-term language acquisition. Furthermore, VR applications such as Mondly VR and Google Expeditions have been shown to provide effective scaffolding for language learners, allowing them to receive instant feedback while interacting with language in authentic settings (Torres & Statti, 2019).

1.1 The Role of Virtual Reality in Language Learning

To define, Virtual Reality (VR) refers to a computer-generated simulation of a three-dimensional environment that users can interact with using specialized equipment, creating a sense of presence in a virtual space. It immerses the user in a synthetic world that can replicate real or imagined settings, often engaging multiple senses such as sight, sound, and touch (Sherman & Craig, 2018). VR technology has revolutionized the field of education by creating dynamic, interactive, and context-rich learning environments. As cited by Merchant et al. (2014) , unlike traditional computer-assisted language learning (CALL) tools, VR enables learners to experience first-person interactions within fully immersive, multimodal environments. Also, Kessler (2018) states that VR fosters engagement by allowing students to interact with simulated native speakers, explore foreign cities, and navigate real-world language scenarios in a controlled setting, which reduces the anxiety often associated with real-world language practice.

Studies on VR-based language learning platforms, such as Mondly VR, Google Expeditions, and VR-enhanced chat applications, demonstrate the effectiveness of immersive technology

in enhancing language acquisition. Berns & Reyes-Sánchez (2021) noted that these platforms utilize voice recognition, gesture-based communication, and real-time adaptive feedback to create authentic linguistic experiences, helping learners improve pronunciation, comprehension, and cultural awareness. Additionally, Waliński (2013) asserts that VR enables the replication of multilingual public spaces, offering learners the opportunity to engage with linguistic landscapes that would otherwise be inaccessible.

Furthermore, Merchant et al. (2014) point out that the effectiveness of VR-based instruction has been widely acknowledged in meta-analytical studies, which reveal significant improvements in student engagement, knowledge retention, and overall learning outcomes. Song et al. (2023) state that the constructivist and cognitive load frameworks suggest that experiential learning through VR enhances deep cognitive processing, which reinforces language retention through active participation rather than passive memorization.

1.2 The gap in traditional language Learning

Traditional classroom-based language learning may remain quite limited in its ability to replicate real-world linguistic experiences. Algryani and Syahrin (2021) point out that language learners often struggle with pronunciation, cultural nuance, and spontaneous language use due to the lack of real-world exposure. In the same vein, Rafiq et al. (2021) state that many students experience anxiety and self-consciousness when attempting to communicate in a foreign language, further inhibiting their fluency development.

Linguistic landscape was foundationally defined Laudry & Bourhis (1997) as “the language of public road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings combined to form the linguistic landscape of a given territory, region, or urban agglomeration.” This research provided valuable insights into contextual language acquisition by demonstrating how public language displays influence language learning. However, its application has remained largely confined to urban multilingual settings, making it inaccessible to learners in monolingual or rural environments (Hatoss, 2022). Zhou et al. (2022) state that the integration of VR technology into LL studies presents a viable solution to this problem because it will open an avenue for learners to navigate digital linguistic landscapes that replicate real-world language exposure. Nurjaleka et al. (2024) agree that through VR, students can explore virtual Francophone cities, engage with realistic public signage, and participate in immersive language activities that close and connect the gap between theoretical knowledge and practical language use.

1.3 Research significance: Virtual Reality as an Extension of Linguistic Landscapes

Digital language education has advanced significantly, with some researchers leading the first integration of VR into LL studies. Virtual Linguistic Landscape (VLL) was initially introduced by Etuş (2024), therefore extending traditional LL study into digital spaces. Özlem’s work highlights the need to include future English language teachers in critical analysis of digital multilingual environments’ speech policies.

Voss (2024) also investigated how VR artificial intelligence (AI) technology might be used in LL research. Voss (2024) addresses how AI may improve data collection and analysis in LL studies, hence improving digital language instruction.

Among others, these researchers mentioned above have been extremely valuable in including

virtual reality into LL studies, which promotes the discipline of digital language education. The LL literature describes written language present in public spaces that exposes individuals to language in an informal yet meaningful way. Meanwhile, access to such environments is primarily available in multilingual urban centers, making it a challenge for learners in monolingual communities or remote areas. It is important to extend the discussions on how VR technology may offer an alternative tool for students in a monolingual environment by replicating and extending linguistic landscapes into immersive digital spaces.

Most learners gain the opportunity to experience firsthand authentic audio-visual content, which encompasses critical cultural elements. These simulated settings may allow for development in language understanding, intercultural skills, and real-world interaction through the learning of the subject matter itself. This study attempts to close this gap by providing pedagogical considerations for VR-enhanced LL that add to the current literature in this area. In addition, it may serve as a means of guiding and promoting the practical applications of LL at the early stages of technological development and use, as well as its potential long-term benefits.

The importance of VR in LL-based learning is that it allows learning through issues-based thinking, and the relevance of VR in language learning based on the law of LL is explained through three major aspects, which might reflect cultural and intercultural competence, language retention and application, and accessibility and equity.

VR provides an innovative platform for extending LL beyond physical spaces by offering immersive and interactive learning environments. As noted by Panagiotidis (2021) and Sadler and Thrasher (2021), VR technology enables learners to engage with linguistic

elements in real-time and also well simulate authentic interactions in multilingual and multicultural settings.

Additionally, Aladjem & Jou (2016) demonstrate that LL functions as informal contextual learning spaces, reinforcing formal language instruction by suggesting that employing LL as a mechanism to augment learners' consciousness of language application in their immediate environment and as well promoting the ongoing engagement with the target language outside the classroom.

Similarly, Algryani and Syahrin (2021) highlight how bilingual public signage might enhance language learners' awareness of linguistic diversity, their translation skills, and cross-cultural literacy. They suggest that this model can be effectively adapted to VR environments. Integrating LL into VR, educators can design interactive learning experiences where students can explore language in its natural sociocultural context.

1.4 Improve Cultural and Intercultural Competence

Waliński (2013) states that cultural knowledge and the processes of learning a language are intricately linked together because the more fluent and pragmatic the student is in a language, the better they will create the social values that are also part of the language. Cai and Neneh (2022) and Han and So (2020) suggest that with VR, learners can virtually step into multilingual environments, interacting with rich cultural contexts in ways that go beyond conventional classroom instruction. Students are able to traverse virtual Francophone metropolises, interact with AI-generated native speaker characters, and analyze linguistic data in situ to experience the social effects of language use (Nobrega & Rozenfeld, 2019).

This exposure might be useful when encouraging learners' cross-cultural awareness because they might be able to understand the subtle details of regional dialects, sociolinguistic differences, and cultural references within everyday exchanges. Compared to the passive learning environments, Chen et al. (2022) conducted a meta-analysis on VR technology's enormous potential to improve language learning outcomes, implying that VR-assisted education can raise learners' motivation and performance above conventional approaches. Likewise, Cerezo et al. (2019) found that preschoolers using VR-assisted learning who practiced English vocabulary pronunciation exhibited notable increases in motivation and performance above those using conventional approaches.

1.5 Address accessibility and equity issues.

According to Citing Dembe (2021), many language learners cannot afford to travel to an immersive linguistic environment, live in a multilingual community, or take language courses that utilize immersive techniques due to factors such as financial constraints, limited travel opportunities, or the absence of multilingual communities in their regions. One of the most promising aspects of VR is its potential to democratize language learning by overcoming barriers related to geography, socioeconomic status, and institutional resources. VR technology provides equal access to high-quality immersive language experiences for all learners, regardless of their geographical location. Students can explore international linguistic ecosystems and practice real-life communication in an increasingly cooperative yet realistic environment.

2 LITERATURE REVIEW

2.1 Defining Linguistic Landscape in Learning

The concept of linguistic landscapes (LL) refers to the visual presence of written language in public spaces, including signs, advertisements, billboards, graffiti, and street names (Barni et al., 2014).

According to Shohamy and Gorter (2009), “LL touches various fields and attracts scholars from a variety of different and tangent disciplines: from linguistics to geography, education, sociology, politics, environmental studies, semiotics, communication, architecture, urban planning, literacy, applied linguistics, and economics; they are interested in understanding the deeper meanings and messages conveyed in language in places and spaces.” In language learning, LL serves as a real-world linguistic resource, offering learners exposure to authentic written discourse, multilingual interactions, and sociocultural contexts (Waliński, 2022). Hatoss (2013) emphasizes that LL studies emphasize how these elements shape language acquisition, helping learners develop pragmatic competence and cultural awareness by engaging with language in real-world settings.

Conversely, as already pointed out by some scholars, Ivkovic & Lotherington (2009) hold the view that traditional LL research has primarily focused on physical environments, such as multilingual cities, where learners are surrounded by diverse linguistic inputs. Meanwhile, citing Dembe (2018), with technological advancements, VLLs have emerged as an extension of LL to replicate real-world textual environments in digital and VR-based spaces. This shift necessitates an exploration of how LL operates in virtual contexts, where learners engage with simulated linguistic environments that resemble real-life interactions.

2.2 The evolving concept of LL and the integration of VR in language education

The concept of the LL may be seen as undergoing a significant transformation since its inception. According to Landry and Bourhis (1997), LL is define as the "visibility and salience of languages on public and commercial signs in a given territory or region." Hatoss (2022) contends that this definition predominantly emphasized the static presence of language in physical spaces, neglecting the dynamic and interactive aspects that characterize modern communication. However, Shohamy (2011) and Aladjem and Jou (2016) have advocated for a broader interpretation of LL that incorporates multimodal elements such as images, sounds, drawings, and movement, aligning with contemporary theories of multimodality Ivkovic. Additionally, Lotherington (2009) suggests that linguistic landscapes should extend beyond text-based signage to include various semiotic resources, reflecting a more holistic view of language use in public spaces. The inclusion of multimodal elements not only enhances our understanding of language visibility but also provides insights into sociocultural and ideological dimensions of communication. Barni et al. (2014) notes that this broader interpretation has crucial implications for language education, particularly in fostering learners' ability to navigate and interpret complex linguistic landscapes.

2.3 Theoretical frameworks

To understand the role of LL in language learning, this section examines some theoretical frameworks that explain how learners interact with linguistic landscapes, such as constructivism, sociocultural theory, cognitive load theory (CLT), linguistic landscape theory, and the social interactionist perspective. To Song et al. (2023), the incorporation of VR into language learning aligns seamlessly with constructivist theories, sociocultural

perspectives, and cognitive frameworks that emphasize active engagement, contextual learning, and problem-solving skills. That is, by placing learners in immersive environments that mimic real-world settings, VR fosters authentic communication, enhances cognitive retention, and supports the development of linguistic competence.

This literature review explores the theoretical underpinnings of VR in language learning that draw insight from the constructivist learning theory, sociocultural theory, cognitive load theory, linguistic landscape theory, and social interactionist perspectives. These frameworks collectively provide a robust foundation for understanding how VR can optimize language acquisition by creating rich, contextually relevant learning experiences.

2.3.1 Constructivism and linguistic landscape

Constructivism conceptualized as learning through experience, can be seen as a learning theory that argues that knowledge is actively constructed by learners rather than passively received (Song et al., 2023). It enshrines the idea that learners derive meaning from their interactions with their environment, which in effect shapes their cognitive structures based on experience and reflection. Zhou et al. (2019) state that Piaget's constructivist framework highlights that knowledge is not merely transferred but actively reconstructed through learner experiences. In the context of language learning, constructivism may be emphasized as experiential learning, real-world engagement, and interactive problem-solving as key mechanisms for acquiring linguistic proficiency.

Constructivist approaches in linguistic landscapes may be aligned with the notion of providing learners with exposure to authentic, contextually rich language input. When learners encounter

multilingual signs in their environment, they engage in meaning-making processes that enhance comprehension and retention. According to Aladjem & Jou (2016), the contextualization of language fosters deeper cognitive processing, allowing learners to internalize linguistic structures more effectively. A key aspect of constructivist learning is its emphasis on contextualized language acquisition. As Aladjem and Jou (2016) highlight, linguistic landscapes serve as dynamic educational tools that enhance language awareness and pragmatic competence. VR can replicate such landscapes that immerse learners in simulated environments where they engage with authentic textual and auditory stimuli, reinforcing language acquisition in meaningful contexts. Additionally, Berns & Reyes Sánchez (2020) assert that VR-based linguistic landscapes further reinforce constructivist principles by offering immersive environments where learners can actively explore language within realistic communicative settings. This engagement may not only improve linguistic competence but also cultivate cross-cultural awareness that will make language learning a dynamic and participatory experience. This process fosters semantic retention, contextual understanding, and cross-cultural awareness (Hatoss, 2013). For instance, a French language learner in a multilingual environment like Montreal (Canada), where French and English are official languages might observe a bilingual sign that states, "*Arrêt / Stop.*" This simple encounter may help them construct meaning by associating the French word "Arrêt" with the English equivalent "Stop." Over time, repeated exposure to such practical and real-world language usage may reinforce their learning and aid in long-term retention. Furthermore, the constructivist approach promotes autonomy and self-directed learning. Nobrega and Rozenfeld (2019) demonstrate that students using Google Cardboard VR in a Brazilian public school exhibited heightened motivation and linguistic competence through immersive French language

activities. These findings underscore the potential of VR to cultivate learner autonomy by encouraging exploration and self-regulation in language practice.

2.3.2 Virtual Reality as a Constructivist Linguistic Landscape

Virtual reality extends constructivist learning by providing immersive and interactive linguistic landscapes (Berns & Reyes Sánchez, 2020). Citing Merchant et al. (2014), it has been noticed that immersive environments enable learners to interact with language in context, strengthening their cognitive and communicative abilities. VR also supports experiential learning by providing real-time interaction with texts, symbols, and conversational elements, thereby reinforcing memory retention and comprehension (Sulisworo et al., 2024). Additionally, Özgün & Sadik (2023) consider that the interactivity of VR enables learners to experiment with language in low-stakes settings that foster confidence and fluency. In essence, VR-based language environments simulate real-world multilingual spaces, allowing learners to:

- Navigate virtual cities where signs, advertisements, and conversations reinforce language learning.
- Engage with contextualized text (e.g., reading a menu in a virtual French café).
- Interact with AI-driven characters who provide real-time language feedback.

This experiential approach aligns with constructivist learning principles, ensuring that learners develop linguistic competence through exploration and interaction rather than rote memorization (Rafiq et al., 2021).

2.3.3 Sociocultural theory.

The sociocultural theory as propounded by Vygotsky performs the role of interaction in linguistic landscapes. This theory posits that learning occurs through social interaction and mediation within a cultural context (Vygotsky, 1978). Kessler (2018) holds that Lev Vygotsky's sociocultural theory emphasizes that language learning is inherently social, shaped by interaction, cultural context, and mediated learning experiences. In effect, it can be construed that, unlike constructivism, which focuses on individual learning processes, the Social Cultural Theory (SCT) emphasizes the importance of communication and social participation.

VR environments create opportunities for meaningful social exchanges, enabling learners to engage with virtual interlocutors, collaborate in interactive tasks, and navigate multilingual settings. According to Barni et al. (2014), linguistic landscape theory intersects with sociocultural perspectives by emphasizing the role of public signage and visual texts in shaping language awareness. Incorporating VR into language learning fosters intercultural competence by exposing learners to culturally diverse linguistic elements. Perez Peguero (2024) notes that "VR-enhanced bilingual education supports cultural understanding by immersing learners in authentic, multilingual experiences that mirror real-world interactions." By engaging with virtual cultural artifacts, learners develop a deeper appreciation for language as a dynamic and socially embedded phenomenon. Moreover, social interaction theory underscores the importance of communicative practice in language acquisition. Zhou and Wei (2018) argue that technology-enhanced language learning facilitates peer collaboration and interaction, which are crucial for developing communicative competence. In VR environments, students can participate in role-playing

scenarios, negotiate meaning, and refine their conversational skills through simulated interactions with avatars and native speakers.

2.3.3.1 Linguistic landscape as social and cultural artifacts.

Linguistic landscapes may serve as sociocultural artifacts that reflect historical, political, and linguistic diversity; for instance, as cited by Barni et al. (2014), in bilingual cities, public signage represents cultural coexistence and language policy. Waliński (2022) also agrees that engaging with such landscapes enables learners to develop sociolinguistic competence, understanding not just words but also how language functions within society. For example, a learner visiting Cameroon may encounter *"Bienvenu / Welcome."* This bilingual signage might reflect multilingual cohabitation, prompting learners to consider cultural and linguistic intersections.

2.3.4 Cognitive Load Theory.

Cognitive Load Theory (CLT) as a means of managing information processing in linguistic landscapes examines how learners process and retain information based on their working memory capacity. VR-based language learning must balance cognitive demands to optimize comprehension and retention. Song et al. (2023) propose a VR-CCL framework that integrates constructivist principles with cognitive load management to enhance language acquisition.

One of the advantages of VR is its ability to scaffold learning by providing multimodal support. Boreland et al. (2022) found that digital tools in French as a second language (FSL)

teacher education facilitated differentiated instruction by adjusting linguistic input to suit learners' proficiency levels. Similarly, VR can offer adaptive feedback, visual cues, and interactive exercises that align with learners' cognitive processing capabilities. However, Sulisworo et al. (2024) cautions that VR applications must be designed with clear instructional goals to prevent cognitive overload and ensure meaningful engagement. These will help to offset excessive cognitive load that can hinder language acquisition. Therefore, strategic design elements such as guided navigation, task-based activities, and contextual reinforcement should be provided to help mitigate cognitive strain while maximizing learning outcomes.

2.3.5 Linguistic landscape and virtual environment

Linguistic landscape examines how public signage and textual representations influence language perception and acquisition. In VR-enhanced learning, digital linguistic landscapes provide immersive exposure to target language texts, reinforcing vocabulary acquisition and reading comprehension. Algryani and Syahrin (2021) advocate for integrating linguistic landscapes into translation education, emphasizing that "bilingual signage enhances learners' awareness of sociolinguistic variations and pragmatic usage." By replicating multilingual cityscapes, VR applications can immerse learners in authentic, language-rich environments, which fosters literacy skills and cultural competence. The "Signs in the City" project, as discussed by Barni et al. (2014), demonstrates that interacting with urban linguistic landscapes enhances students' ability to decode and analyze language in context.

VR simulations of real-world signage, advertisements, and public notices provide learners with invaluable exposure to everyday language usage.

2.4 The Role of VR in Enhancing LL learning

The integration of VR into linguistic landscape studies represents a significant advancement in language education. VR technology allows learners to immerse themselves in virtual linguistic environments, where they can engage with language in context-rich settings that mimic real-world interactions (Nobrega & Rozenfeld, 2019). By simulating real-world linguistic landscapes, VR enhances language acquisition which provides students with opportunities to experience language use in different sociocultural contexts (Torres & Statti, 2019).

VR-based linguistic landscapes facilitate a more interactive and experiential approach to language learning, promoting engagement, motivation, and retention (Berns & Sánchez, 2020). The immersive nature of VR enables students to navigate multilingual spaces, interact with signage, and analyze linguistic diversity in ways that traditional classroom settings cannot provide. Additionally, VR applications such as Google Expeditions and Mondly VR offer tailored learning experiences that allow students to practice language skills in simulated real-world scenarios (Chateau et al., 2019).

2.4.1 Pedagogical role of multimodal linguistic landscapes

The integration of multimodal elements into LL studies offers significant pedagogical benefits, particularly in language education. By incorporating diverse media, educators

can create interactive and engaging learning environments that mirror real-world communication scenarios (Zhou et al., 2018). This approach aligns with constructivist and sociocultural theories of learning, which emphasize active engagement and context-based language acquisition. Research has shown that multimodal linguistic landscapes foster critical thinking and creativity, as students learn to analyze and interpret language use within a broader sociocultural context (Algryani & Syahrin, 2021). Linguistic landscapes also serve as powerful tools for developing intercultural competence because they expose learners to the diversity of language practices in different communities. By engaging with LLs, students can develop a more profound awareness of sociolinguistic power dynamics, reflecting on how language visibility influences societal attitudes and policies (Waliński, 2013). The ability to critically assess the presence and absence of languages in public spaces is an essential skill in navigating multilingual and multicultural environments.

2.4.2 Travel benefit of Virtual Reality in Foreign Language Learning.

As noted earlier, VR has revolutionized foreign language learning by offering immersive, interactive environments that replicate real-world linguistic and cultural settings. Traditionally, language immersion required physical travel to a target language country, which was often costly and inaccessible to many learners. However, Torres & Statti (2019) hold that VR has bridged this gap, providing learners with virtual travel experiences that enhance language acquisition and cultural competence. This is due to the fact that, traditionally, language learners have relied on study abroad programs to immerse themselves in a target language environment, yet such programs are often limited by financial constraints, visa requirements, and logistical challenges (Dembe, 2024). It may be observed,

as cited by scholars, that VR steps in to overcome these barriers by allowing learners to virtually get in touch with foreign linguistic landscapes and interact with speakers in real-time to develop contextual language proficiency. Nobrega & Rozenfeld (2019) hold that, one of the most significant advantages of VR in language education is its ability to transport learners to immersive linguistic environments without the need for physical travel. Sadler & Thrasher (2021) indicate that studies have demonstrated that VR fosters linguistic immersion by allowing students to interact with native speakers, simulate real-life conversations, and receive real-time feedback on pronunciation and grammar. This method aligns with Krashen's Input Hypothesis, which states that learners acquire language more effectively when exposed to comprehensible input in meaningful contexts. (Panagiotidis, 2021)

2.4.3 Creating contextualized language learning environments

VR creates dynamic and interactive spaces where learners can explore real-world scenarios, such as markets, restaurants, and historical sites, while engaging in authentic language use when inferred (Intra International Sarl, 2024) . According to Panagiotidis (2021), this exhibits situated learning theory, which emphasizes that language acquisition is most effective when embedded in real-world contexts. Torres & Statti (2019) agree that, learners who are exposed to VR-based scenarios tend to retain vocabulary, grammatical structures, and cultural norms more effectively when compared to those using traditional textbook-based instruction. Additionally, VR platforms such as Mondly VR and ImmerseMe provide learners with personalized virtual enviroment, where they can simulate interactions like ordering food at a café in Paris, booking a hotel in Montreal, or navigating public

transportation in Dakar. These experiences may offer linguistic, cultural, and pragmatic knowledge that ensures that learners develop both intercultural competence and fluency.

2.4.4 *Enhancing Fluency, Pronunciation, and Real-time Feedback*

Through the work of Sadler & Thrasher (2021), we have been well informed that VR fosters linguistic immersion by allowing students to interact with native speakers that simulate real-life conversations and receive real-time feedback on pronunciation and grammar, which makes this study aligns with Krashen's Input Hypothesis, according to Panagiotidis (2021). It is also beneficial to emphasize that, VR applications integrate speech recognition technology that enables learners to improve their pronunciation through real-time corrections. According to Rafiq et al. (2022), VR-assisted instruction in French significantly enhanced learners' phonetic accuracy, fluency, and confidence in speaking. This means, when compared to traditional classroom settings, VR offers unlimited opportunities for spoken interaction, where learners can refine, repeat, and reinforce their pronunciation without having to worry about the anxiety of making mistakes in front of their peers.

2.4.5 Virtual Study Abroad: The next evolution in language immersion

Given the financial and logistical constraints of physical study abroad programs, scholars argue that VR serves as a viable alternative to in-country immersion. Matar et al. (2022) emphasize that virtual study abroad experiences can provide learners with cultural exposure and authentic linguistic interactions when put on par with physical travel. The work of Berns & Sánchez (2020) adds that learners using VR to navigate digital versions of Paris,

Dakar, or Quebec demonstrated similar levels of cultural awareness and pragmatic competence as those who physically traveled abroad. In this way, their physical appearances, where they have to leave their home countries for those destinations, will no longer be necessary.

Waliński (2013) also continues to add that VR-based immersion fosters cross-cultural communication skills that enable students to engage in multilingual interactions, navigate diverse linguistic settings, and develop cultural sensitivity. This may be particularly beneficial for learners in monolingual environments where exposure to the target language is limited.

2.4.6 Increasing accessibility and democratizing language education.

Another key advantage concerned with the travel aspect of VR in language education is its potential to increase the accessibility for learners from diverse socioeconomic backgrounds. As already noted by Hatoss (2022), that not all students have the means to travel internationally for language learning; the coming in of VR to aid learning in this sense makes it a powerful tool to democratize access to immersive education for all, irrespective of your background.

In this way, we could say that VR is particularly beneficial for:

Students in remote or rural areas who lack access to multilingual environments.

Learners with disabilities who may face mobility challenges in traditional study abroad programs.

Zhou et al. (2018) also state that it will also be more beneficial to institutions aiming to integrate global perspectives into curricula without the logistical constraints of physical exchange programs. Therefore, as cited by Dembe (2024), by simulating real-world linguistic landscapes, VR ensures that learners receive the same level of exposure to authentic language environments as those who study abroad.

2.5 Challenges and future possible directions

While the integration of VR in linguistic landscape learning presents numerous pedagogical advantages, it also poses certain challenges. Dembe (2024) points out that accessibility and cost remain key barriers to widespread adoption due to VR equipment and software appearing to be expensive. Moreover, educators must receive adequate training to effectively implement VR in their teaching practices to ensure that technological tools are used to enhance learning outcomes rather than serve as mere novelties (Panagiotidis, 2021).

Future research should explore the long-term impact of VR-based linguistic landscape learning, particularly in assessing its effectiveness across different proficiency levels and learning styles. Additionally, collaborative efforts between educators, researchers, and technology developers are essential in refining VR applications to better support language learners. By addressing these challenges, VR has the potential to revolutionize language education, providing students with innovative and immersive learning experiences that prepare them for the complexities of a globalized world.

2.6 Research Questions

This study is guided by the following research questions:

RQ: 1. How can virtual reality be used to replicate and enhance linguistic landscapes for French language learners in the classroom?

RQ: 2 What is the effect of immersive VR environments on students' learning and retention of French language learning?

RQ: 3 How does VR contribute to cultural immersion and intercultural competence in second-language learners?

2.6.1 Research Objectives

a. To evaluate the pedagogical implications of using VR technologies in teaching French in classroom environments.
b. To analyze the impact of VR linguistic landscape approach on the language learning experience and the outcomes of different proficiency levels in French?
c. To examine the effect of immersive VR environments on students' learning and retention of all aspects of French and references to culture in contrast to regular classroom settings?
d. To examine the theoretical foundations of linguistic landscapes in language learning.

3 METHODOLOGY

The methodology chapter of this study outlines the design, methods, and procedures employed to investigate the use of VR as a tool for LL in teaching the French language in the USA, with a specific focus on Georgia State University (GSU). This chapter justifies the study approach, data collecting strategies, participants, tools, and data analysis methodologies. Given the nature of this research, a mixed-methods strategy is used by combining qualitative and quantitative research frameworks.

3.1 Research design

This study uses a mixed-method research design to look into how VR technology influences the French language learning process through the lens of linguistic landscapes. This design was selected because it can link empirical data with subjective experiences. Combining these strategies guarantees a thorough examination of the research problem. It will also enable the identification of trends in learner involvement, their interaction with the LL, and as well measure their language acquisition improvement.

3.2 Research setting

The investigation is carried out at Georgia State University (GSU), particularly within its French Language program. Given some factors, such as a varied student population, commitment to innovative educational technologies, and the presence of language courses GSU stands as a suitable setting for this study. The Center for International Resources and Collaborative Languages Engagement (CIRCLE), a unit under the Department of World Languages and Cultures, located in Langdale Hall, Room 128 at GSU, is the specific location where all activities associated with this study are carried out. The location

is selected for several reasons. First of all, CIRCLE is a committed language learning center. It is the appropriate place to apply creative pedagogical strategies like VR in foreign language education. Second, the facility provides spacious and controlled surroundings that enable VR experiences with no outside disturbances. Furthermore, the availability of language learning resources within CIRCLE further enhances the research setting because, students can participate in extra language activities both before and after the virtual reality session. Additionally, the technological infrastructure at the center, which includes display screens for audience viewing, gives an optimal experience for both participants and facilitators. Again, the accessibility of CIRCLE by students enrolled in elementary French language courses for tutoring and language practice supports its suitability as a research setting.

3.3 Participation and Sampling

The study focuses on students of French 1001 and 1002, which are the beginner parts of the French language course at GSU. Participants are given the chance to participate in a learning session where VR is used to simulate real-world language settings that allow students to engage with authentic cultural and linguistic contexts. By using these VR sessions, the study examines how virtual linguistic landscapes contribute to the development of language proficiency, cultural awareness, and learner engagement. For the purposes of sampling, eight (8) students who are registered in elementary French language courses at GSU were the purposeful sample for the study as the participants. Participants include undergraduate students enrolled in the beginner French course who satisfy the criteria of enrollment into the French language program and willingness to participate in the study.

3.4 Research instrument

As already indicated, the mixed-method approach employs the pretest, posttest and debriefing session as instruments that are carefully selected to provide both objective learning outcomes and subjective feedback regarding user experience, engagement, and pedagogical value.

3.4.1 Pre-Test Questionnaire

In this instrument, as found in the appendix, a structured survey in the form of a pretest is used to gather information on the past knowledge of the French language and cultural familiarity of participants. The question gathers information on vocabulary recognition, listening comprehension, speaking, and cultural awareness. This is to establish a reference point to measure learning gains.

3.4.2 The VR experience session

This session as part of the research instrument constitutes the core of the study. The session is structured to simulate real-life interactions in a French-speaking environment. This helps to provide an engaging and interactive approach to language acquisition. Participants are immersed in at least one of the carefully designed VR role-play scenarios. The rationale behind this session is that the VR experience is designed to support linguistic immersion. This immersion then facilitates the development of communicative competence by exposing participants to contextualized dialogues, cultural references, and situational problem-solving tasks. The session is facilitated by the researcher and the principal investigator in a

controlled setting at Langdale Hall Room 128 at CIRCLE. Participants use the Oculus Quest 3S VR headsets and interact by the use of Mondly VR software as a preloaded language learning application. The following are some of the designed scenarios where participants get to immerse themselves in :

3.4.2.1 Market Shopping

The Market Shopping scenario is designed to center on transactional language and social interactions related to commerce. Participants will immerse themselves by practicing bargaining, discussing prices, and asking for specific products in a market setting. This enhances their ability to function in real-world economic exchanges.

3.4.2.2 Taxi and Travel

This scenario also focuses on the combination of numbers and social interactions related to transportation. Participants engage in a simulated taxi ride scenario where they practice negotiating fares, providing directions, and engaging in small talk with the driver. This component of the session introduces key vocabulary that is related to transportation, distances, and urban navigation. This helps in reinforcing practical language skills, which essential for everyday interactions in a French-speaking environment.

3.4.2.3 Restaurant / Café

In this part of the learning session as part of the research instrument, participants immerse themselves in an environment where they order food, interact with wait staff, and answer common dining-related questions. This situation as a component of the research instrument is meant to improve conversational fluency and support their commonly used vocabulary

about dining and manners. Participants get to learn how to make reservations, request particular menu items, inquire about dietary restrictions or ingredients, and handle payments. This is designed with real-time VR interface feedback, which may help to develop confidence in natural dialogues.

During all these session, the interactions of participants are mirrored on a display screen for audience viewing. This ensures real-time observation and guidance from facilitators. Participants are also encouraged to engage actively by responding to prompts and navigating the challenge presented within the VR environment. In all, this session of immersive experience aims to create a sense of presence by making language learning more intuitive and natural through the VR technology.

3.4.3 Post-test Questionnaire

As part of the research The post-test mirrors the pre-test in structure but incorporates some additional questions that evaluate the experiences of participants during the VR learning session. This measures their linguistic improvement, challenges faced, and perceptions of VR as a language-learning tool.

3.4.4 Debriefing Session

This session takes place immediately after the posttest. It is a carefully structured session that engages participants in a discussion to reflect on their experience with the VR session. Participants discuss their perceived advantages and challenges of the VR-based language learning and provide open-ended feedback about their engagement, the usability of the devices and software, and the learning effectiveness of the session for them.

3.4.5 Device and Software

3.4.5.1 Oculus Meta Quest 3s

For this study, an Oculus Meta Quest 3S standalone mixed-reality headset, developed by Meta, is chosen as the primary virtual reality headset. This is due to its advanced capabilities, such as wireless functionality and suitability for immersive language learning environments. It has an enhanced VR processing technology with an improved high-resolution display and enhanced tracking capabilities. The device is seen as more mobile and convenient since it allows for classroom use or personal study without setting up a whole computer or connecting to an external sensor. The Qualcomm Snapdragon XR2 Gen 2 CPU improves its graphics, performance, and user experience. The 4K+ Infinite Display of the device, as well as the inside-out tracking employing superior pass-through technology and spatial awareness, also makes virtual surroundings easier to operate without any problem. This creates a means for users to explore naturally in a virtual environment without sensors; this makes it easier for language learners in varied circumstances. That is, by means of hand-tracking and controller-based interactivity, users can interact with virtual objects in real time to support vocabulary and sentence patterns. Furthermore, the device has Wi-Fi 6E capability that offers VR-based language learning applications that enable real-time interactions with teachers and other students. This helps students to link their physical environment with the digital language learning landscape, thereby improving their language and cultural learning process.

3.4.5.2 Mondly VR

Mondly VR was chosen as the main language learning tool for the software element of the research. It is noted to be a prominent platform that focuses on interactive language learning via speech recognition, gamification, and immersive experiences. The VR iteration of Mondly expands upon its mobile and online applications by providing an interactive, immersive experience aimed at improving language retention and engagement.

Mondly VR also offers realistic conversational practice by replicating genuine dialogue scenarios such as ordering food at a restaurant, reserving a hotel, or participating in casual chat with native speakers. These scenario-based learning experiences correspond with the Communicative Language Teaching (CLT) methodology, which stresses practical language usage over rote memorization. The application incorporates an AI-driven speech recognition technology that allows learners to articulate and obtain immediate feedback on pronunciation and grammatical precision.

Additionally, the attribute of Mondly VR as having the capacity to adjust to proficiency level of users serves as another major reason behind its selection over other software. The software also customizes learning pathways depending on the progress of the user. This makes it fit for both novice and proficient learners. Mondly VR again has a multimodal learning strategy, which combines visual, aural, and kinesthetic components that improve memory retention by stimulating various cognitive processes.

Furthermore, the gamification features of Mondly VR, such as point accumulation, accomplishment unlocking, and challenge completion, enhance student motivation significantly. This renders the software as an effective instrument for overcoming communicative anxiety in second language acquisition (SLA).

Another important part of Mondly VR is its ability to incorporate cultural themes into language training. The software integrates culturally pertinent phrases, gestures, and practices that facilitate learners' acquisition of both linguistic proficiency and intercultural awareness.

3.5 Ethical Considerations

The study carefully aligns with the ethical standards established by the Georgia State University Institutional Review Board (IRB). All the required procedural guidelines were followed as advised by the IRB to guarantee that we comply with the ethical research practices before the study began. As part of the process, the principal investigator and the researcher successfully completed the required IRB training courses on human subject research ethics, participant rights, and data security. Upon completion of the training, a certification was issued to them team to verify the researchers' qualification to conduct studies involving human participants.

Additionally, a different review process was carried out to examine the whole research procedure, which includes the data collection, recruitment process, informed consent procedures, as well as risk mitigation strategies. This second examination ensured that the study adhered to the highest ethical standards such that participants' rights were fully safeguarded. Following the completion of this review, another separate certification was issued to confirm that the research design and consent procedures met all institutional and federal guidelines.

4 RESULTS

4.1 Pretest Results

First, the study began its intervention process with pretest administration, where a sample can be found in the appendix. The pretest was given to establish participants' fundamental understanding of their linguistic competency and cultural awareness, as well as their eagerness and prior experience for immersive virtual reality (VR)-based learning. By means of thorough insights from the pretest replies, the following analysis helps to match participant data with the theoretical frameworks and research goals that support this study. Investigation was done on every item to evaluate its applicability to the pedagogical implications associated with the use of VR in linguistic landscape (LL) as a means of second language instruction for French learners.

Table1. 1 Current proficiency level of participants

Current proficiency level of participants		
Proficiency level	Number of participants	Percentage (%)
Beginner	8	100
Intermediate	0	0
Advance	0	0
Total	8	100

This test item, as shown in *table 1.1* sought to inquire about the current proficiency level of the participants. The result showed that, that all 8 participants, representing 100%, identified themselves as beginners. This is exactly in line with the target group of the study, where

students enrolled in French 1001 and 1002 at Georgia State University are the focus. This also supports the choice of immersive VR scenarios. This beginner status of the pretest also justifies the integration of Mondly VR that it adopts to learner's proficiency levels and enhances vocabulary learning and retention, as cited by Berns & Reyes-Sánchez (2021).

Table1. 2 Participants usage/ experience with VR

Usage/ Experience with VR		
Response	Number of participants	Percentage (%)
Yes	3	38
No	5	63
Total	8	100

This item in *table1.2* sought to know whether the participants had had previous VR experience before. The result came out that only 3 out of the 8 participants, representing 38%, had had an experience with a VR session before. This exposes a technology exposure gap that supports the accessibility claim by Dembe (2021). This is because most students find VR to be a novel tool for learning. This lack of prior knowledge on VR also supports the justification for including the cognitive load theory since participants' unfamiliarity may let them experience initial overload.

Table1. 3 Participants Belief in VR technology

Participants Believe in VR technology		
Response	Number of participants	Percentage (%)
Yes	7	88

No	1	13
Total	8	100

This item shown in *table 1.3* was used to solicit the belief participants had in VR as a means of learning a second language. It was noticed from the response that despite the low usage experience, a large majority, which is 7 of 8, representing 88% of them, still believed that VR can be a useful tool for learning French. This result confirms a positive learner mindset among participants toward technology-based education. This, according to Chen et al. (2022) identifies as very important for motivation and performance.

Table1. 4 Participants' confidence level with French

Participants' confidence level with French		
Level	Number of participants	Percentage (%)
Not Confident	0	0
Somewhat Confident	5	63
Very Confident	3	38
Total	8	100

Table 1.4 is a test item that was used as part of the pretest to inquire about participant confidence level in speaking French. It came out that there was not a person who was not confident. 5 out of the 8 participants, representing 63% of the participant, were somewhat confident. 3 out of the 8 participants, representing 38%, where very confident. This high baseline confidence among participants suggests that they are motivated and open to experimentation. This presents an ideal foundation for constructivist learning as espoused by

Zhou et al. (2019). It is believed that VR scenarios that provides learners with the opportunity to make mistakes in low-risk environments can further boost this confidence, as addressed as part of overcoming language anxiety per Kessler (2018).

Table1. 5 Participants' Purpose of learning French

Participants' Purpose of learning French		
purpose	Number of participants	Percentage (%)
Academic	4	50
Professional	3	38
personal	1	13
Total	8	100

This test item in *table 1.5* was used to solicit the participant's reason for learning French. It came out that 4 out of the 8 participants, representing 50%, indicated "academics" meaning they are learning French because it is part of and a requirement of their program. 3 out of the 8 participants representing 38%, had "professional" as their reason for learning French. This means they had the ambition of using French as part of their career. 1 out of the 8, representing 13%, had a personal reason for learning French. This diversity in motivation confirms the reason for making the instructional design a multifaceted one, which aims to enhance real-life communication skills across academic, professional, and personal domains. For example, VR scenarios that mimic daily life (like ordering food or using transportation) resonate with participants who seek practical language competence.

Table1. 6 How often French is practiced by participants

How often French is practiced by participants		
Rate	Number of participants	Percentage (%)
Rarely	5	63
Sometimes	2	25
Often	1	13
Total	8	100

This test item in *table1.6* as part of the pretest was used to acquire information on participants' rate of practicing French after school. It was realized from the results that 5 out of the 8, representing 63% of the participant, said they really practice French after school. 2 of the 8, participants representing 25%, indicated that they sometimes practice French after class. 1 out of the 8 participants, representing 13%, indicated that they practice French often after class. This supports the assertion made by Hatoss (2022) that learners in monolingual environments lack exposure to authentic linguistic contexts. Therefore, by using technology to replicate multilingual settings, the VR intervention session directly addresses this gap. It also emphasizes the necessity of consistent immersion, which this study seeks to make accessible through virtual means.

Table1. 7 Participants' biggest challenge in learning French

Participants' biggest challenge in learning French		
Challenge	Number of participants	Percentage (%)
Speaking	3	38
Listening	2	25
Reading	1	13

Writing	1	13
Cultural understanding	1	13
Total	8	100

This test item in *table 1.7* was used to investigate on the biggest challenge learners encounter when learning French. From the results, it came out that 3 participants, representing 38 %, had challenges in speaking, and 2 of the participants, representing 25%, had listening as their biggest challenge. Reading, writing and cultural understanding each had 1 participant representing 13%, as their biggest challenges in each of them. This supports the selection of VR as a tool for spoken language development. The utilization of Mondly VR, which focuses on voice interaction and real-time feedback, aligns similarly. The thesis is well substantiated since it positions VR as a solution for speaking anxiety and pronunciation difficulties, as indicated by Rafiq et al. (2022), particularly among beginners who rarely engage in real-life dialogue.

Table1. 8 Participants' cultural awareness in French

Participants 'cultural awareness in French		
Level	Number of participants	Percentage (%)
Not aware	4	50
Somewhat aware	3	38
Very aware	1	13
Total	8	100

This test item in *table 1.8 was* used to inquire about the cultural awareness the participants had concerning the French language. It was observed out of the result of this pretest that 4 out of the 8 participants, representing 50%, indicated that they were not aware of the cultural figure

associated with the French language. 3 out of the 8 participants, representing 38%, indicated that they were somewhat aware of the cultural awareness. 1 out of the 8 participants, representing 13%, where very aware of the cultural awareness associated with the French language. This vital data points to the third research question on intercultural competence. It affirms the necessity for immersive learning where students experience cultural differences and pragmatic language use.

Table1. 9 Participants' prior immersive experience

Participated in immersive French Lesson before?		
Response	Number of participants	Percentage (%)
Yes	1	13
No	7	88
Total	8	100

In *table 1.9* is a test item as part of the pretest, inquiring from the participants as to whether they have participated in an immersive French lesson before. It came out from their responses that 1 out of the 8 participants, representing 13%, had participated in an immersive lesson before. 7 out of the 8 participants, representing 83%, had never participated in an immersive instruction before. This outcome reveals that the vast majority of participants (87%) were not acquainted with immersive French learning. This discovery firmly substantiates the central premise of this work that, students in monolingual or non-immersive environments are at a disadvantage due to limited exposure to real-world language contexts (cited by Hatoss, 2022; Aladjem & Jou, 2016). This gross absence of prior immersion highlights the originality and significance of the VR intervention. The simulated environments offered by Mondly VR, such as the market, taxis, and

café scenes, are not just ancillary but serve as initial immersive experiences for majority of the participants. This confirms the case of the study that Virtual Linguistic Landscapes (VLLs) through VR can replicate experiences that are otherwise inaccessible, particularly in Anglophone settings like GSU.

Table1. 10 Participants' ability to understand French

Participants' ability to understand French		
Rate	Number of participants	Percentage (%)
1	3	38
2	5	63
3, 4 , 5	0	0
Total	8	100

This pretest item in *table 1.10* was employed to gather information regarding participants' ability to understand French language in a lesson by the use of a rating scale from 1 to 5. It was observed from the results that 3 out of the 8 participants, representing 38%, rated 1 for their ability to understand. 2 was rated as the capacity to understand by 5 out of the 8 participants, representing 63%. No participant rated 3 ,4, and 5 as their ability to understand the French language. These low self-perceptions support the goal of this work of using VR for contextual understanding. Through interactive tasks and situated learning (Panagiotidis, 2021), VR environments can help improve comprehension by embedding meaning within real-world scenarios, reinforcing input that learners may not grasp in textbook-only settings.

Table1. 11 Participants' Listening comprehension ability of French

The Listening comprehension ability of Participants in French		
Rate	Number of participants	Percentage (%)
1	3	38
2	5	63
3, 4 , 5	0	0
Total	8	100

This question in *table 1.11* as one of the pretest items was utilized to assess the listening abilities for French conversation in a form of rating from the scale of 1 to 5. 3 out of the 8 participants, representing 38%, rated 1. Also, 5 out of the 8 participants, representing 63%, rated 2 as their ability to listen to French conversation. No participant rated 3, 4, and 5. As active listening is essential in unplanned interactions, and participants evidently feel inadequately prepared, this corresponds to the study's premise on constructivist and sociocultural theories, wherein real-time VR listening offers rapid, pertinent feedback and facilitates natural language processing.

Table1. 12 Participants' ability to speak French fluently

Participants' ability to speak French fluently		
Rate	Number of participants	Percentage (%)
1	5	38
2	8	62
3, 4 , 5	0	0

Total	13	100

This item in *table 1.12* was also asked as a pretest question to assess the participant's ability to speak French fluently in a form of rating from 1 to 5 scale. It was noted that 5 out of the 8 participants, representing 62%, rated 1 as their ability to speak French fluently. 3 out of the 8 participants, representing 38%, rated 2 as their ability to speak French fluently. No participant rated 3, 4, and 5. These responses stress on the need for interactive, voice-based VR modules. This study accurately diagnoses speaking as a common beginner barrier and as also proposes VR as a risk-free space to build fluency. The feedback loop in Mondly VR is particularly pertinent, allowing learners space to refine their pronunciation and conversational flow (Sadler & Thrasher, 2021).

Table1. 13 Participants' ability to read and write in French

Participants' ability to read and write in French		
Rate	Number of participants	Percentage (%)
1	2	25
2	6	75
3, 4 , 5	0	0
Total	8	100

This item in *table 1.13* as part of the pretest items was used to inquire about information on participants' ability to read and write in French from the rating of 1 to 5. The results showed that 2 out of the 8 participants, representing 25%, rated 1 as their ability to read and write French. 6 out of the 8 participants, representing 75%, rated 2 as their ability to read and write

French. No students rated 3, 4, and 5. This data reveals that none of the participants regarded themselves as possessing moderate or strong reading and writing skills in French before the VR intervention session. This indicates that participants have some exposure but low functional proficiency. It indicates a critical skill gap among the participants, particularly in the aspect of literacy.

4.2 Posttest results

The post-test results provide an insightful finding into the impact of VR-enhanced linguistic landscapes (LL) on French learners at Georgia State University. In Comparison to the pretest, the results of the posttest reflect measurable improvements in learners' proficiency, confidence, and cultural awareness of French language learning. This improvement shows an alignment with the theoretical foundations of constructivism, sociocultural theory, and cognitive load theory as outlined in the work. Below is a detailed analysis of each post-test item in relation to the objectives of the study.

Table 2. 1 Current Proficiency level of participant

Current Proficiency level		
Proficiency level	Number of participants	Percentage (%)
Beginner	6	75
Intermediate	2	25
Advance	0	0
Total	8	100

This posttest item in *table 2.1* was meant to measure the proficiency level of participants after the VR session. It came out that 2 out of 8 of the participants, representing 25 %, were bold enough to indicate that their level had improved from beginner to intermediate, while 6 out of the 8 participants, representing 75 %, still maintained that they were beginners. The progression of participants from 100% beginners in the pretest to 25% reaching intermediate level in the posttest indicates a positive impact of VR on language acquisition. This becomes consistent with research by Berns & Reyes-Sánchez (2021), which indicates that VR can facilitate language development through immersive but real-world simulations. The movement of some learners into the intermediate category suggests that situated learning environments in VR accelerate language development more effectively than traditional methods.

Table 2. 2 Experience of Participants in VR based learning

Experience of Participants in the VR based learning		
Proficiency level	Number of participants	Percentage(%)
Poor	0	0
Fair	1	13
Good	2	25
Excellent	5	63
Total	8	38

This test item in *table 2.2* solicits feedback on participants learning experience with the VR session since most of the learners had not previously engaged in such an immersive learning session before. It came out that 5 out of the 8, representing 63% of the participants, experienced

an excellent VR session. 2 out of the 8, representing 25% of the participants experienced a good VR session while 1 out of the 8 participants, representing 13 %, experienced a fair VR session. The majority of learners (88%) rated their experience as either “good” or “excellent,” which demonstrates high satisfaction and engagement. This effectively validates the constructivist approach to learning detailed in the study, which posits that interactive, immersive learning promotes enhanced cognitive processing (Song et al., 2023). The absence of negative ratings further substantiates the argument that VR enhances motivation and learner agency.

Table 2. 3 Expectation of participants after VR session

VR met your expectation		
Response	Number of participants	Percentage(%)
Yes	8	100
No	0	0
Total	8	100

This posttest in *table 2.3* inquired from the participants as to whether the VR learning experience fulfilled their expectations. All 8 participants, representing 100%, responded in the affirmative to the question that the VR session met their expectations. All participants agreeing to the fact that the VR session met their expectations confirms the effectiveness of VR in delivering immersive linguistic landscapes. This discovery validates the claim made in this study that VR is perceived as an effective pedagogical tool for language learning (Torres & Statti, 2019). Given the pretest data, where 88% believed in VR’s potential before using it, the posttest result suggests that actual experience with VR reinforced this initial belief.

Table 2. 4 Confidence level of participants after the VR experience

Confidence level participants after the VR experience		
Level	Number of participants	Percentage(%)
Not Confident	0	0
Somewhat Confident	1	13
Very Confident	7	88
Total	8	100

This posttest item shown in *table 2.4* was used to inquire about participants' confidence level after the VR learning session. The results were that no student acknowledged a lack of confidence. 1 participant representing 13% expressed that they were somewhat confident. 7 out of the 8 participants, representing 88%, expressed that they were very confident after the VR session. It was noted after the VR exposure that, the confidence levels of participants increased sharply. Almost 90% of the participants felt "very confident" compared to only 38% on the pretest prior to the intervention. This correlates with the sociocultural theory earlier discussed above which indicates that, interactive engagement in simulated conversations reduces anxiety and enhances self-efficacy (Kessler, 2018). The significant decrease in "somewhat confident" responses suggests that the VR session provided the experiential reinforcement needed to convert hesitant learners into confident speakers.

Table 2. 5 Area of French improved by participants

Arear of French improved by participants		
Skill	Number of participants	Percentage(%)
Speaking	3	38
Listening	2	25

Reading	1	13
Writing	1	13
Cultural understanding	1	13
Total	8	100

As part of the posttest items, the item in *table 2.5* was used to inquire about the area of French that participants were able to improve upon. The results were that 3 participants out of the 8 participants, representing 38%, improved in speaking. 2 out of the 8 participants, representing 25 %, improved in listening. 1 participant, representing 13 % each demonstrated an improvement in each of the following: reading, writing, and cultural understanding. This information indicates that there has been an improvement across all the various aspects of language learning, where each skill area showed improvement. As part of the fundamental arguments of this study is that VR improves oral proficiency by facilitating immersive, interactive communication. This is confirmed by the most significant improvement in speaking (38%). It is thus consistent with the literature review, as cited by Rafiq et al. (2022), which is to the fact that realistic speech simulations promote spontaneous production and alleviate language anxiety.

Table 2. 6 Challenges faced by participants during the VR session

Challenges faced by participants during the VR session		
Challenge	Number of participants	Percentage(%)
No challenge	4	50
Usability/discomfort	1	13
Technical issue	2	25
Difficulty understanding content	1	13

Total	8	100

This posttest item in *table 2.6* was used to inquire from participants as to the challenges they faced during the VR session. It came out that 4 participants out of the 8 participants, representing 50%, Reported that they had no challenge. 1 participant out of the 8 participants, representing 13%, reported that they had challenge with usability or discomfort. 2 out of the 8 participants, representing 25%, reported technical issues as their challenge. And 1 participant out of the 8 participants, representing 13%, reported difficulty understanding the contents as a challenge they had. The fact that half of the participants reported no challenges indicates a high degree of adaptability to the VR format. However, the presence of technical difficulties (25%) and usability issues (13%) suggests that future VR-based learning experiences should include enhanced user guidance and technical support. This is consistent with cognitive load theory, which posits that the efficacy of learning can be impeded by the excessive mental effort required to navigate new technology (Sulisworo et al., 2024).

Table 2. 7 Participants' improved Ability to understand French

Participants' improved Ability to understand French		
Rate	Number of participants	Percentage(%)
Not at all	0	0
Significant	2	25
Very significant	6	75
Total	8	100

This test item in *table 2.7* as part of the posttest was used to get information from participants concerning their improved abilities. Participants were to rate their improved ability to understand French from “not at all” to “very significant.” It came out from the result that no participant rated as not having any improvement at all. 2 participants, representing 25% of the 8 participants, rated as having a significant improved ability to understand French. 6 participants out of the 8 participants, representing 75%, rated as having very significant improved ability to understand French. It can be noted that all students reported some level of improved comprehension, with 75% experiencing “very significant” improvement. This reinforces the study’s position that VR has the ability to enhance contextualized learning, such that learners decode meaning within interactive, visual environments (Aladjem & Jou, 2016). The absence of “not at all” responses validates the study’s argument that VR enhances retention through experiential learning.

Table 2. 8 Participants’ improved Ability to understand French

Participants’ improved ability to speak French fluently		
Rate	Number of participants	Percentage%
Note at all	1	13
Significant	4	50
Very significant	3	38
Total	8	100

This posttests item in *table 2.8* was used to inquire from participants concerning their improved ability to speak French fluently. The results came out that 1 participant out of the 8 participants, representing 13%, reported not having any improvement. 4 out of the 8 participants, representing 50%, had improved ability to speak French fluently. 3 out of the 8 participants, representing 38%

reported having a very significant improvement in their ability to speak French fluently. It is noteworthy that only13% saw no change. The rest (87%) said they had considerable increased in fluency. This validates the research claim that VR lowers speech anxiety and promotes natural communication (Sadler & Thrasher, 2021), since all participants assessed their fluency at the lowest levels in the pretest findings.

Table 2. 9 Participants' improvement in understanding of French Cultures

Participants' improvement in understanding of French Cultures		
Rate	Number of participants	Percentage(%)
Note at all	2	25
Significant	3	38
Very significant	3	38
Total	8	100

This test item in *table 2.9* was used as part of the posttests to inquire from participants about their improvement in understanding of French culture after the VR session. the result came out that 2 out of the 8 participants, representing 25%, reported as not having any improvement in understanding French cultures. 2 out of the 8 participants, representing 38%, reported as having significant improvement in understanding French cultures. 3 participants, representing 38%, indicated that they experienced an improvement in understanding of French cultures after the VR session. the significant proportion (76%) reported increased cultural awareness, which supports this thesis claim that VR fosters intercultural competence by exposing learners to realistic linguistic landscapes (Nobrega & Rozenfeld, 2019). However, the 25% who saw no

improvement suggest that more explicit cultural instruction, such as pre-VR discussions, reflection tasks, etc., might be needed to maximize the cultural learning potential.

Table 2. 10 Participants' recommendation of VR to others

Participants recommendation of VR to others		
Rate	Number of participants	Percentage(%)
Note likely	0	0
Likely	2	25
Very likely	6	75
Total	8	100

This test item in *table 2.10* was used as part of the posttest to ask the participants how likely they are to recommend the VR learning session to others. rating from "not likely" to "very likely." no participant rated "not likely." 2 participants, representing 25%, rated it "likely" to recommend to others. 6 participants out of the 8 participants, representing 75%, rated "very likely" to recommend to others. Having 100% of participants intending to recommend vr learning strongly validates the claim that VR enhances learner engagement and motivation (Berns & Sánchez, 2020). This feedback also suggests that VR learning has strong potential for scalability in broader language-learning programs.

Table 2. 11 Participants' suggested area of VR for improvement

Participants' suggested area of VR for improvement		
Challenge	Number of participants	Percentage(%)
Technical aspect	2	25

Content Quality	2	25
Duration	2	25
Engagement strategies	2	25
Total	8	100

This test item as part of the posttest, as shown in table 2.11, was used to solicit information from participants as to the area of the VR session they wish for improvement in. It came out from the results that 2 participants out of the 8 participants, each representing 25%, each rated each of the challenges outlined being “technical aspect,” “content quality,” “duration,” and “engagement strategies.” The equal distribution of suggested improvements highlights the need for a more refined VR experience. This corroborates with the study’s discussion of VR’s limitations, which emphasizes that optimization in technological reliability, pedagogical content, session length, and interactive elements will maximize learning outcomes.

4.3 Debriefing

The debriefing session was conducted immediately after the posttest to gather qualitative feedback from participants to talk about their experience using the virtual reality for French language learning. It aimed to understand learners’ perceptions, challenges, and self-assessed improvements in linguistic and cultural competence

It was observed that the results from the debriefing session were almost the same as the posttest. For this purpose, some of the key themes from the debriefing session are enumerated below:

1. All participants expressed that they had an increased confidence in speaking and understanding French after the VR session. This supports the post test results.

2. Learners described the session as realistic, engaging, and fun.
3. They also expressed the feeling that the VR session helped particularly with speaking, listening, and cultural awareness.
4. Participants highlighted that interacting with culturally situated scenarios such as the market and restaurant enhanced their understanding of the Francophone culture.

4.4 Implications

The results of this research have major considerable implications for applied linguistics, digital education, development of curriculum, and language learning. This study redefines the ecology of second language instruction in the framework of French language acquisition by combining VR with (LL) framework. This combination has therefore transcended the validation of a technological instrument. With the pedagogical strategies, theoretical contributions, and learner outcomes derived from this study, there has been a promotion and facilitation of more inclusive, interactive, and impactful language learning experiences. The following implications have been put in three important domains, which are pedagogical practice, instructional technology, and theoretical advancement.

4.4.1 Pedagogical implications for reimagining the language classroom

One of the immediate implications of this study includes suggestions for how language classrooms can be restructured to boost students' active participation to foster a cross-cultural awareness and communicative competence. This study reveals that immersive VR learning scenarios, such as ordering food in a virtual French café or bargaining fare in a Dakar taxi, facilitate significant interaction and situational language use. These activities correlate with Communicative Language Teaching (CLT) and Task-Based Language Teaching (TBLT)

approaches that situate learners in authentic, goal-oriented contexts. For this cause, it mandates educators to transition from mere knowledge transmitters to facilitators of immersive experiences. This will then enable students to actively generate knowledge instead of them passively absorbing it.

Additionally, the increased confidence and self-assessed enhancement in speaking and comprehension among learners that resulted from the intervention emphasize the affective benefits of VR. According to Krashen's Affective Filter Hypothesis, emotional variables like anxiety, motivation, and self-confidence directly affect language acquisition. From the results gathered from the study, it appears that VR lowers this filter but rather provides a safe, low-stakes environment in which students can engage and experiment with language without the apprehension of embarrassment or failure.

Therefore, educators are encouraged to use VR not only as a mere novelty but as an essential and core component of a comprehensive student-centered language curriculum particularly for those students in monolingual environments as well as non-immersive settings.

4.4.2 Technological implications towards scalable and equitable digital learning

The technology aspect of this research has significant implications for scalability, equity, and accessibility in language acquisition. Most participants had never had an engagement with VR before prior to the study's VR intervention, as shown by the pretest. However, the post-test response demonstrated great satisfaction, improved fluency, and enthusiasm to recommend that the approach was effective.

This supports the case that VR could broaden access to immersive language instruction. VR provides a fair substitute for students who cannot afford to study abroad programs or live in

linguistically homogeneous surroundings that give exposure to multilingual signage, cross-cultural debates, and public communicative actions. Using reasonably priced VR systems like the Oculus Meta Quest series, schools and organizations without the means for overseas travel can now replicate those experiences in the classroom.

4.4.3 Theoretical implication in advancing language learning frameworks.

Another implication of this work is that, by expanding the linguistic landscape framework from physical public space to virtual, digital spaces, this work theoretically contributes to the expansion process. Traditionally, LL has been confined to urban settings where learners observe signage and public language use passively. This study steps in to advance the concept of the virtual linguistic landscape (VLL). It shows that learners can actively engage with signs, dialogues, gestures, and cultural context through digital immersion.

This research study provides a multi-dimensional understanding of how VR language acquisition by situating within multiple theoretical frameworks, such as constructivism, sociocultural theory, cognitive load theory, and interactionist perspective.

The theoretical synthesis in this study opens a pathway for future studies to explore VR not merely as a tool but as a space of linguistic and cultural negotiation where we construct meaning through embodied experience. Furthermore, the findings reinforce the concept that language is both a social practice and a multimodal phenomenon. VR enables learners to develop language skills beyond written text whereby they can incorporate gestures, spatial orientation, visual cues and cultural references. These multimodal components are essential for practical fluency and are mostly absent in conventional pedagogical approaches. The inclusion of VR therefore elevates the LL framework into a more dynamic and socially relevant model for language education.

4.5 Limitations and future research

The first limitation that can be identified with this study is the limited sample size and generalizability. A significant limitation of this study is its small sample size. Only 8 participants from the 1001 and 1002 courses at Georgia State University availed themselves to take part in this study. While this focused group allowed for rich qualitative insights, the findings may not be confidently generalized to broader learning populations. Their limited diversity in terms of participants' proficiency level institutions and demographics may restrict the external validity of their results. For greater impact and applicability, future studies should include a large and more varied cohort to validate findings across contexts and leaner profiles

Another limitation encountered by this study is the short duration of the VR exposure session. The intervention of this study was limited to a single VR session, which may present challenges in understanding the long term benefits of integrating VR with linguistic landscape pedagogy. Since language acquisition is an extended and evolving process, a brief exposure may only reflect initial reactions or short term gains in language confidence and awareness. It may be difficult to assess whether such improvement is retained or applicable in real world language use. Therefore, long term integration of VR into language instruction could provide more reliable evidence to show its effectiveness over time.

Limitations in assessment methods are also another factor that confronted this research. The study employed a mix of pretests and poster questionnaires as well as debriefing sessions. These instruments may not have captured the full spectrum of the learning outcomes.

Especially different development like intellectual sensitivity, pragmatic language use and long term retention, may not have been fully represented. The reliance on immediate surface level assessment tools could limit the understanding of how VR affects deeper linguistic and cultural competencies. future research should adopt more comprehensive longitudinal assessment strategies to measure the multifaceted effects of VR language learning.

5 CONCLUSION

This study Had the quest to examine the integration of virtual reality into linguistic landscape pedagogy for French language instruction with a specific focus on learners at Georgia State University. This thesis work employs a mixed-method study approach to demonstrate that VR can meaningfully transform language learning by simulating immersive, real world linguistic, task based scenarios. The study is grounded in the theoretical framework of constructivism, sociocultural theory, cognitive load theory, and linguistic landscape framework to provide compelling evidence that VCR can significantly enhance second language acquisition when strategically integrated into language pedagogy, especially in monolingual and non-immersive settings.

The findings indicate significant improvements in their linguistic proficiency, multicultural awareness, confidence and motivation among learners. These findings validate that VR is not just an emerging technological innovation but also an important educational instrument that can enhance the boundaries of second language acquisition (SLA), especially in monolingual or resource constrained environments.

In the theoretical perspective, this research contributes to the redefinition paradigm of the linguistic landscape. This thesis presents an actionable framework for language instructors to connect with virtual linguistic landscapes (VLL) To bridge the gap in the use of conventional teaching methods. In addition, this study positions learners from passive viewers of language in context to active participants in meaning making through multimodal contextualized interactions.

The research employed the use of Mondly VR and an Oculus quest 3S headset to simulate real-world French speaking environments such as markets, coffee shops, and transportation hubs. Participants were given the opportunity to interact with culturally rich context-based language scenarios. This massive task supported meaningful engagement with both linguistic content and sociocultural elements, which enabled learners to develop not only communicative competence but also intercultural awareness. The pretest and posttest results showed measurable improvement in student speaking through fluency, listening comprehension, vocabulary acquisition and cultural understanding, which confirmed the pedagogical effectiveness of VR-based LL

The qualitative findings from the debriefing session also emphasize the learners' enthusiasm, confidence gains, and motivation as a result of their VR experiences. It was noteworthy that although the majority of participants had never used VR before, they quickly adapted to it and recommended aids for broader adoption.

Pedagogically, the study supports a shift towards experiential, task-based learning models that mirror real world language use. It was evident from the results that learning with VR aligns well with communicative language teaching (CLT) and task based language teaching (TBLT).

The technological implications of this study were equally noted to be significant. This successful use of the Oculus quest 3S and Mondly VR software demonstrated that language immersion is no longer limited by physical boundaries. Therefore, with the right tools and training, educators can replicate immersive environments within classroom settings or even at home.

Though some challenges were noted, they were very minimal and manageable, which suggests that their continual refinement will well make the adoption of VR a sustainable instructional tool.

In conclusion this study demonstrates that VR really holds immense promise for enhancing language education through the expansion of linguistic landscapes into virtual spaces. It confirms that VR is a transformative, inclusive, and practical tool that can enrich learners linguistic and cultural competencies in meaningful and measurable ways. With thoughtful integration into curriculum design, adequate teacher training, and continued innovation, VR enhanced linguistic landscape can redefine how second languages are taught and learned in this current era. This will make language learning more engaging, equitable, and effective for all going forward.

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APPENDICES

Appendix A

CITI PROGRAM

Completion Date 03-Nov-2024
Expiration Date 03-Nov-2027
Record ID 65631534

This is to certify that:

Francis Adjei-Nyagbe

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Basic/Refresher Course - Human Subjects Research
(Curriculum Group)
IRB Reference Resource
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Georgia State University

CITI
Collaborative Institutional Training Initiative
101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

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Appendix A.1

Georgia State University
Informed Consent

Title: The Use of Virtual Reality as a Tool of Linguistic Landscape in Teaching French Language in the USA: The Case of Georgia State University

Principal Investigador: Dr. Encarnacion Galindo Parra (mgalindo@gsu.edu)

Student Investigator: Francis Adjei-Nyagbe (fadjeinuagbe1@gsu.edu , 4706521704)

Institution: Georgia State University

Department: World Languages and Cultures

Introduction and Key Information

We invite you to participate in a research study. You will decide if you would like to participate.

The purpose of this research study is to explore the effectiveness of virtual reality (VR) as a tool for teaching the French language in the context of linguistic landscapes. This study aims to assess the potential of VR to enhance learning outcomes and engage students in immersive linguistic and cultural experiences.

Your role in the study is as a participant and will last at least 45 minutes and not more than 75 minutes within a day.

If you decide to take part in this study, you will be asked to do the following activities:

1. Pre-Test Questionnaire (5 minutes)
2. VR Language Learning Experience (20 minutes)
3. Post-Test Questionnaire (10 minutes)
4. Debrief session (15 minutes)

Procedures: The study's purpose is to explore the effectiveness of virtual reality (VR) as a tool for teaching the French language. We invite you to take part in this research study because you are enrolled in an elementary French language class. We will invite a total of five students to participate in this study.
Session Breakdown:
1 The Informed Consent form will be given and explained by the researcher or the PI when you arrive at the CIRCLE (Langdale Hall Room 128. 38 Peachtree Street. Atlanta, GA 30303) (5 minutes)

2. Pre-Test Questionnaire (5 minutes): You will be asked to complete a survey assessing your prior knowledge of the French language and culture.
3. VR Language Learning Experience (20 minutes): After completing the pre-test questionnaire, you will engage in one of three immersive VR role-play scenarios:
- Café/Restaurant Role-Play– Practicing ordering food and engaging in conversation.
- Market Shopping – Learning numbers, bargaining, and shopping interactions.
- Cultural Exploration – Exploring a famous French landmark and learning key vocabulary.
4. Post-Test Questionnaire (10 minutes): After having the VR experience, you will be asked to complete a survey evaluating what they learned and their experience with VR.
5. Debrief session (15 minutes): You will be invited to participate in a debriefing session after completing the post-test questionnaire.

Risks and Discomforts: Participants may experience a little discomfort, such as dizziness when using the VR headset for the first time. To avoid that, smooth movements and pausing every 5-7 minutes is recommended.

Benefits: Your participation will contribute to a better understanding of how virtual reality can be used as a tool for language education. While you may not directly benefit from this study, your feedback will help improve future VR-based teaching methods.

Voluntary Participation: Your participation in this study is entirely voluntary. You may choose not to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled.

Confidentiality: Your participation in this study will remain confidential. All data will be stored securely on encrypted devices and password-protected cloud storage, accessible only to authorized research team members for two years. The following groups will have access to the information you provide:

- The research team: the PI and the researcher,
- GSU Institutional Review Board.

When we present or publish the results of this study, we will not use information that may identify you.

Contact Information: If you have any questions or concerns about the research, please contact the student investigator, Francis Adjei-Nyagbe at fadjeinuagbe1@gsu.edu or (470) 652-1704, or the principal investigator, Dr. Encarnacion Galindo Parra, at mgalindo@gsu.edu

The IRB at Georgia State University reviews all research that involves human participants. You can contact the IRB if you would like to speak to someone who is directly involved in the study. You can contact the IRB for questions, concerns, problems, information, input, or questions about your rights as a research participant. Contact the IRB at 404-413-3500 or irb@gsu.edu.

Consent: We will give you a copy of this informed consent to keep. If you are willing to be in this research study, please sign below.

Signature of Participant: _____

Date: _____

Name of Researcher (Print): _____

Signature of Researcher: _____

Date: _____

Appendix A.2

INSTITUTIONAL REVIEW BOARD
University Research Services and Administration

Mailing Address:
P.O. Box 3999
Atlanta, GA 30302-30303

In Person:
58 Edgewood Ave NE
3rd Floor
Atlanta, GA 30303

Office 404-413-3500
Email irb@gsu.edu
Web gsu.edu/irb

February 11, 2025

Principal Investigator: Encarnacion Galindo Parra

Key Personnel: Adjei-Nyagbe, Francis; Galindo Parra, Encarnacion

Study Department: World Languages & Cultures

Study Title: The Use of Virtual Reality as a Tool of Linguistic Landscape in Teaching French Language in the USA: The Case of Georgia State University

Submission Type: Exempt Protocol Category 2,3

IRB Number: H25390

Reference Number: 382991

Determination Date: 02/10/2025

Status Check Due By: 02/09/2028

The above referenced study has been determined by the Institutional Review Board (IRB) to be exempt from federal regulations as defined in 45 CFR 46 and has evaluated for the following:

1. Determination that it falls within one or more of the eight exempt categories allowed by the institution; and
2. Determination that the research meets the organization's ethical standards

If there is a change to your study, you should notify the IRB through an Amendment Form before the change is implemented. The IRB will determine whether your research continues to qualify for exemption or if a new submission of an expedited or full board application is required.

A Status Check must be submitted three years from the determination date indicated above.

When the study is complete, a Study Closure Form must be submitted to the IRB.

This determination applies only to research activities engaged in by the personnel listed on this document.

It is the Principal Investigator's responsibility to ensure that the IRB's requirements as detailed in the Institutional Review Board Policies and Procedures For Faculty, Staff, and Student Researchers (available at gsu.edu/irb) are observed, and to ensure that relevant laws and regulations of any jurisdiction where the research takes place are observed in its conduct.

Any unanticipated problems resulting from this study must be reported immediately to the University Institutional Review Board. For more information, please visit our website at www.gsu.edu/irb.

Sincerely,

Susan Vogtner

Susan Vogtner, IRB Co-Vice Chair

Appendix B

Oculus Meta Quest 3S

Mondly VR software

Appendix B.1

Pre-test

French Language Proficiency			
Question	**Beginner**	**Intermediate**	**Advanced**
What is your current proficiency level in French?			
Virtual Reality (VR) Usage			
Question		Yes	No
Have you used VR technology before?			
Do you believe immersive technology could aid language learning?			
Confidence and Purpose			
Question	Not confident	Somewhat confident	Very confident

How confident are you with VR tools?					
Question	Academic purpose	Professional purpose		Personal interest	
Why/for what purpose are you learning French?					
Practice and Challenges					
Question	Rarely	Sometimes		Often	
How often do you practice French outside of class?					
Question	Speaking	Listening	Reading	Writing	Cultural Understanding

What is your biggest challenge in learning French?					
Cultural Awareness and Collaboration					
Question	Not aware	Somewhat aware		Very aware	
How aware are you of French cultural contexts?					
Question		Yes		No	
Have you ever participated in an immersive French learning activities?					
Language Skills Rating					
skill	1	2	3	4	5
Rate your understanding of spoken French.					

Rate your ability to speak French fluently.					
Rate your ability to read and write in French.					

Appendix B.2

Post-test

French Language Proficiency					
Question	**Beginner**	**Intermediate**		**Advanced**	
What is your current proficiency level in French?					
VR-Based Learning Experience					
Question		Poor	Fair	Good	Excellent
How would you rate your VR-based learning experience?					
Program Expectations and Confidence					
Question		yes		No	
Did the VR program meet your expectations?					
Question	Not confident	Somewhat confident		Very confident	
How confident are you with VR tools after this program?					
Improved Skills					
Question	Speaking	Listening	Reading	Writing	Cultural Understanding
Which aspect of French were you able to improve upon with the use of the VR program?					
Challenges Faced					

Question	No Challenge	Usability / Discomfort	Technical Issues	Difficulty Understanding the Content
What challenges did you face during the VR sessions?				
Effectiveness of VR				
Question	Not at all	Significant		very Significant
How effective was VR in helping you understand the aspect in French you improved upon?				
How well did VR help you improve your French?				
How has your understanding of French cultural contexts improved?				
Recommendations				
Question		Not at all	likely	Very likely
How likely would you recommend VR-based language learning to others?				
Program Improvements				
Question	Technical Aspects	Content Quality	Duration	Engagement Strategies
What improvements would you suggest for the program?				