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Comparing Two Worlds: Spanish Learners' Face-to-face and Immersive Social VR Speaking Experiences

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Abstract

This exploratory study examines student perception data from a survey regarding fully immersive social virtual reality (VR) speaking practice vs. comparable face-to-face (F2F) speaking experiences. The participants were 21 undergraduate Spanish majors and minors (English native speakers) from one advanced-level Spanish course at a large institution in the United States. Using a counterbalanced design, students carried out three sets of two dialogues each (one dialogue in VR using a head-mounted display, and one F2F), and each set was completed with different partners and content. These dialogues were completed in the departmental language lab as homework assignments for the course, and for the VR dialogues, the AltspaceVR app was used with Oculus Rifts. Quantitative data from the survey showed overall positive experiences with social VR, and comparisons between F2F and VR conversations also yielded statistically significant findings indicating that VR can be a more fun way to practice speaking that can also reduce feelings of self-consciousness. A thematic analysis of the survey's open-ended responses supported quantitative findings by highlighting lower stress when speaking in VR, increased enjoyment of being in virtual environments, and heightened engagement when speaking in VR. Themes also highlighted areas of improvement centering around curricular integration.

Keywords: Computer-mediated communication, virtual worlds, immersive VR, social VR, computer-assisted language learning.

Introduction

As Parmaxi (2020) illustrates in a systematic review of research on virtual environments in language learning, research on immersive virtual reality (VR) using head-mounted displays (HMDs) is very scarce in the area of language teaching. Indeed, this type of research is thought to be "on the fringes as technology keeps evolving and changes need to be made to adapt technological advancements to educational contents and materials" (Andujar & Buchner, 2019, p. 153). Despite the limited research, Lloyd et al. (2017) discuss how immersive VR can create rich opportunities for collaborative task-based learning and for practicing oral communication in an environment that promotes natural conversation and enhances motivation. The authors also introduce immersive "social VR" as a potential tool for language teaching, which highlights the idea that VR and social networks will be interlinked in the future. Nevertheless, immersive social VR has not yet been examined systematically in the language teaching arena, even though

Andujar and Buchner (2019) highlight that there is a large need for studies that specifically examine active oral interaction in immersive VR settings. This small-scale exploratory study, therefore, begins filling a gap in the research by examining student perceptions of target-language speaking experiences in immersive social VR.

Literature Review

Language students often identify that developing oral proficiency is their most important goal (e.g., Alalou, 2001), although anxiety can negatively affect speaking performance in language learning contexts (e.g., Horwitz, 2010). Even at the senior level, students have reported feeling ill-prepared for speaking in real-world situations (Enkin & Correa, 2018). Instructors have therefore incorporated oral-based computer-mediated communication (CMC) into their teaching to better support speaking proficiency development (e.g., Ko, 2011).

One CMC tool available to teachers is desktop virtual spaces/environments. These can offer students oral communication experiences through the use of avatars and/or gaming (e.g., social-based worlds such as Second Life and Massively Multiplayer Online Games such as World of Warcraft) (see e.g., Chun et al., 2016; Cornillie et al., 2012; Sykes, 2018). These desktop virtual environments are named as such because they are displayed on external screens (such as on a desktop PC), and do not allow users to "physically" step into 3D immersive worlds like newer HMD devices do (Freina & Canessa, 2015). However, Chun et al. (2016) note that desktop virtual environments are important tools, as they can allow students to reimagine their identities through avatars and to also rely more on linguistic cues rather than on physical ones during oral communication.

The combination of desktop virtual spaces, avatars, and oral proficiency development can perhaps best be seen in a platform like Second Life, with various research studies suggesting the merits of this virtual environment. For example, Wehner et al. (2011) found that Second Life could be useful in lowering learner anxiety and enhancing language learning motivation. Cooke-Plagwitz (2008) illuminates the potential advantage of Second Life for shyer students, as well as the benefit of freedom of expression through avatars. More recently, Chen (2016) examined English language students' perceptions of voice-driven task-based learning in Second Life, and the results showed that it was an enjoyable experience. While building objects and being in simulated and multicultural environments had a positive impact on learning, technical issues and a lack of paralinguistic cues were noted as drawbacks.

Unlike desktop social-based virtual environments like Second Life, immersive social VR is a new platform where the element of presence can enable more natural conversation and the use of nonverbal cues (Lloyd et al., 2017). This idea of presence is what sets immersive VR apart from desktop virtual environments, as users in immersive VR can feel as though they are truly in an alternate physical world (and disconnected from the real world) through the use of stimuli such as realistic sounds and vivid images (Freina & Ott, 2015). This unique quality, therefore, holds large implications for learning, as it can facilitate focus and a deep connection to learning material (Gadelha, 2018). EFL teachers have also echoed the notion of experiential learning through VR when highlighting its potential in accessing real-world places, creating opportunities for

authentic-based practice, and facilitating natural communication (Lloyd et al., 2017). Importantly, Lloyd et al. (2017) also found that students expressed excitement about immersive VR's potential, believed it could be motivating, and thought it could facilitate real-world interactions with native speakers as a supplement to classroom time.

Related to the notion of presence, an important concept that is also made possible through the use of immersive VR is "virtual embodiment" in another world through an avatar. Virtual embodiment refers to the ability of immersive VR to cause the illusion for a user that their virtual body is their own (Matamala-Gomez et al., 2019), and this makes immersive social VR very different from any desktop virtual world such as Second Life, where an avatar is controlled from a keyboard and the user is looking at a screen. Furthermore, virtual embodiment through immersive VR can have profound effects on behavior. For example, in their review of research, Matamala-Gomez et al. (2019) discussed how virtual embodiment can create a physiological response in users insofar as modulating pain perception, and Banakou et al. (2016) showed how virtual embodiment can reduce implicit racial bias. For language learning specifically, Cheng et al. (2017) found that being virtually embodied can help learners feel more culturally involved. More recently, de Borst et al. (2020) also found that the first-person perspective view specifically (rather than the third-person viewpoint) in immersive VR facilitated a sense of body ownership and enabled the ability to identify with a victim of domestic violence.

High-end immersive VR equipment facilitates user presence by offering six degrees of freedom (6DoF) in their experiences. 6DoF VR incorporates both rotational and positional movement of the head and hands, thereby allowing users the ability to track their head and hands within a virtual space, where one can also interact with objects through the use of controllers. This type of interaction can offer important benefits for learners, as they feel more immersed and present in the virtual environment. For example, Kwon (2019) more closely examined the possibility of experiential learning in 6DoF VR (using an HTC Vive) and found that the interactivity afforded by the system facilitated the internalization of virtual experiences as direct experiences as well as an enhanced learning effect.

Although sparse, there have been several studies in the language teaching arena that have examined the use and benefits of 6DoF VR. For example, Cheng et al. (2017) adapted the immersion-based Japanese language learning videogame Crystallize to be playable in an Oculus Rift, thereby increasing the sense of presence for users by enabling culturally-based interactions through full-body physical movements (bowing). By comparing participant experiences from a VR and non-VR version of the game, survey data indicated a statistically significant effect of VR on perceived cultural involvement, largely due to physically being able to interact. In a more recent study, Collins et al. (2019) describe the design and impact of an immersive VR Irish language learning experience developed for the HTC Vive Pro, named GaeltechVR. The task-based experience required interaction with non-player characters that had native speaker dialects, and it enabled users to grab objects to learn their names in Irish. Pretest-posttest survey data revealed that learners felt present in the environment, had lower anxiety levels towards the Irish language after the experience, and valued the target-language interaction. Finally, Enkin et al. (2021) used the Oculus Rift to create a VR-infused maker space where Russian language learners in a cultural studies course first viewed and described museums in immersive VR (a 360° experience with rotational head movement only), and then used the Adobe Medium digital sculpting VR app (a 6DoF experience) to create and

describe their own piece of artwork. Survey data showed excitement for the project and that the immersive settings students experienced, and the learning-by-doing aspect of the project largely helped the learning experience.

The Study

Research Questions

1. What are the quantitative perceptions (self-reported ratings) regarding the overall experience of using immersive social VR in a 6DoF system, and are there statistical differences in perceptions of F2F vs. VR experiences when it comes to enjoyment levels, feelings of self-consciousness, and perceptions of speaking improvement capability?
2. What are the main themes that emerge from qualitative data (open-ended responses) when it comes to speaking in F2F vs. social VR environments?

Methodology: Setup of F2F and VR Dialogue Activities and Student Participants

Undergraduate students (26 in total) in an advanced-level (fourth year) Spanish course (*Spanish Speaking Proficiency*) completed 5-8 minute dialogues as homework activities in the departmental language lab, both F2F and in immersive VR. Dialogues were carried out about every two weeks throughout the semester. During the final two and a half weeks of the semester, after all the dialogue activities had been completed, 21 of these students served as the participants in this study by completing an anonymous and optional online (Qualtrics) survey about their experiences. The study was approved by the Institutional Review Board (IRB), and the first page of the survey contained the consent form; participants checked a box at the bottom of the consent form, which then allowed them to go on with the survey (checking this box indicating that they had read the consent form and were voluntarily participating in the study).

As the class was geared towards developing speaking/oral interaction skills, the instructor was able to naturally include dialogue activities as homework assignments, thereby enabling the researcher to utilize the class for this study. With the help of the instructor, six dialogue prompts were therefore created for the course (and the study) that aligned with course materials. The instructor's course materials were based around literary works (short story/novel/film), which were used to illustrate grammatical concepts examined in class as well as to develop vocabulary breadth. Dialogues were split into three sets of two, with each set pertaining to a different theme: Set 1 dealt with casual conversations on personal topics (dialogue 1: introducing oneself, likes, and experiences with Spanish; dialogue 2: discussing a story from one's past centered around a picture/object); Sets 2 and 3 dealt with discussing Spanish literary works (shorter works: a short story for dialogue 3 and a short film for dialogue 4; and longer works: a full-length movie for dialogue 5 and a novel for dialogue 6). With this design, the researcher could ensure that all students would be speaking about the same themes twice, once F2F and once in VR.

To counterbalance order (and alleviate the workload of VR sessions in the lab), the researcher randomly divided the class into two groups – Group 1 ("VR-first") and

Group 2 ("F2F-first"): Group 1 always completed the first dialogue of each set in VR, whereas Group 2 experienced the opposite. Students worked with a different partner for each dialogue set (totaling three different partners), and partners were randomly assigned from within the same group by the researcher. With this design, learners' perceptions of VR could be based on more than one speaking experience, and any initial enthusiasm or challenges with VR could be mitigated. This setup also guarded against any unintended pairing-specific effects (such as proficiency levels and preestablished friendships). There was a total of 14 students in the VR-first group and 12 students in the F2F-first group; out of these students, 13 from the VR-first group and 8 from the F2F-first group completed the survey (for a total of 21 participants, as mentioned above).

For the VR dialogues, Microsoft's AltspaceVR app was used, along with two Oculus Rift HMDs (one for each partner). AltspaceVR is an app where users can meet up and chat through VR avatars they create (both orally and through text), play interactive games, watch movies, listen to music, and create and attend public/private events (e.g., live music shows, sports events, conversation tables). Prior to the first VR dialogue session, students created their free accounts through the AltspaceVR website, which allowed them to then use the app during the lab sessions.

F2F dialogues occurred in a private space in the language lab, and VR sessions occurred in two side-by-side private rooms in the lab (one for each Oculus Rift setup, which included noise-cancelling headphones for streaming sound from the app – see Figure 1 for a demonstration; see also Enkin & Kirschling, 2021, for a more detailed description of the creation and setup of these VR spaces in the language lab). The researcher ran each session with the students and was assisted by the language lab manager, who also provided technical support. At the start of the first VR session, students ran through the Oculus *First Contact* tutorial, which familiarized them with the Oculus Rift and hand controllers. This was then followed by students creating their AltspaceVR avatars.

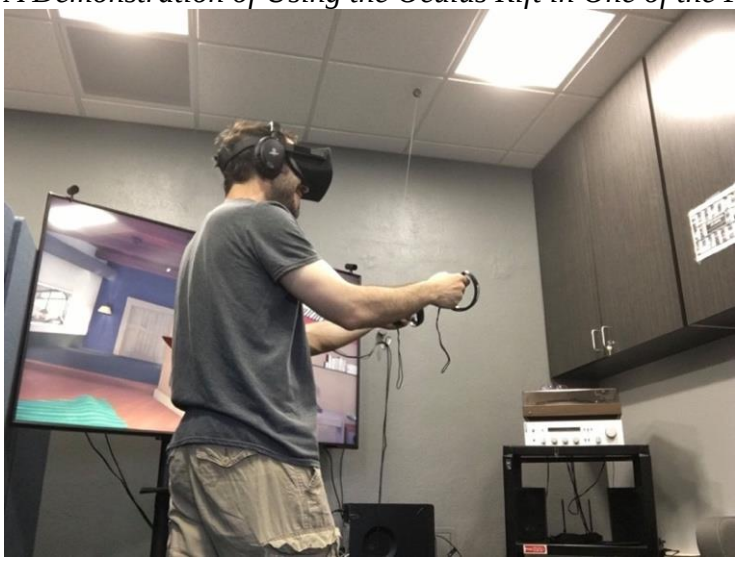
For all VR dialogues, students would meet up in private virtual spaces with their partners; there were three spaces in total that were utilized: a "House Party" (dialogues 1 and 2), a "Pirate Cove" (dialogues 3 and 4), and an obstacle course in outer space/"The Gauntlet" (dialogues 5 and 6) (see Figures 2, 3, and 4 for pictures of these spaces). Given that there was a limited number of private spaces to choose from, and that each space would be used for two different dialogues, the researcher could not specifically match spaces to dialogue content; however, an effort was made to connect dialogues to spaces when possible (such as choosing a house party environment for discussing personal topics). The specific spaces were also chosen to offer students a more complete picture of social VR and the range of environments that exist. Students learned the basics of AltspaceVR throughout the study and were all guided through the same new features with each session – for example, how to move around, teleport, send emojis, send messages, bring up a picture from their accounts, and bring up and use interactable objects (e.g., frisbees, burgers, fireworks, basketballs). Students were encouraged to use various features and interactable items during their dialogues.

So that a direct comparison could be made between F2F and VR speaking experiences on the participant survey (and because the instructor needed to view and grade dialogues afterward for course purposes), the researcher created similar conditions between F2F and VR conversations by recording all sessions and having students stay in front of a camera during the dialogues. VR sessions were video recorded using the Nvidia

Shadowplay screen recorder – students "positioned" themselves in front of a visible camera object in VR (see Figure 2 for a screenshot of two avatars in front of the camera object during a conversation session and see Figure 3 for a screenshot of a first person's view during a conversation). F2F dialogues were recorded with the Windows Camera app and a Logitech webcam – students were seated and positioned in front of the webcam.

Figure 1

A Demonstration of Using the Oculus Rift in One of the Private Spaces in the Lab



Note. The computer screen behind the user is displaying the HMD view.

Figure 2

Third-person/Camera Object View during a Conversation in AltspaceVR

Note. Users are interacting with a basketball while in the Oculus Rift by using the hand controllers. The scene (the "Pirate Cove") was used in dialogue 3/4.

Figure 3

First-person View from the Oculus Rift during a Conversation in AltspaceVR

Note. By utilizing the hand controllers, the user seen here is "grabbing" a spatula by the grill while in the Rift. This scene (the "House Party") was used in dialogue 1/2.

Figure 4

"The Gauntlet" Scene in AltspaceVR

Note. This scene was used in dialogue 5/6.

Participant Background

The 21 participants had a mean age of 21.5 (age range of 20-23), were all native English speakers, and were either Spanish majors (17) or Spanish minors (4). Participants were all graduating within one year (ranging from that semester to a year from then). Just over half (12) had studied abroad and therefore had experienced immersion before taking this speaking-centered course. The main reasons for taking the course included: counting towards required classes, developing speaking/oral fluency abilities, preparing for unrehearsed real-life conversations, increasing speaking confidence and comfort levels,

preparing for careers, and preparing for upcoming travel. Participants also noted wanting to take a class that was not reading/writing/literature-focused. Slightly over a quarter of participants (6) had tried VR before, though most had experienced only rotational head tracking systems (with no positional hand controls) (e.g., Temple Run on a Galaxy phone, Google maps, a roller coaster-type experience, and an underwater scene of moving sea creatures in the ocean).

Survey Materials

The survey contained questions about students' conversation experiences and some background questions that provided further information on the participants (see information above). Thirteen survey questions were focusing on conversation experiences.

First, there were two Likert scale-type questions. The first was a four-part question regarding overall perceptions of using VR (see Table 1). The second question was actually divided into three separate "question pairs" to facilitate direct comparisons between F2F and VR experiences; each question pair, therefore, consisted of two versions of the same question: the first question pair asked about enjoyment levels, the second asked about feelings of self-consciousness, and the third asked about perceived speaking improvement capability (see Table 2).

Second, eleven open-ended questions asked participants to: compare F2F and VR speaking experiences (including both benefits and challenges of each); explain their favorite (and least favorite) part about using and being in VR for activities; discuss their favorite VR environment and any specific features they enjoyed or thought were helpful; discuss whether they identified with their avatar; explain any benefits of speaking Spanish through their avatar; describe if being able to move around in the VR environments and to fully interact in them added to the conversations; discuss the effect of being in the VR-first group or F2F-first group; explain opinions related to the structure/format of activities (and any suggestions for the future); discuss if speaking in VR can be a successful language learning platform for developing oral communication skills; voice any additional comments about conversation experiences; and note before-project and after-project thoughts regarding using VR for the class.

Survey Validity

To ensure survey validity, several steps were taken concerning survey creation. First, the two quantitative Likert-scale questions did not utilize the same scales (though they both used 5-point scales, which ensured uniformity). Not only was this done because the question pairs in the second quantitative question necessitated specific categories (e.g., a "Not at all" category rather than a "Strongly disagree" level), but it also ensured that participants were paying attention. Second, a Cronbach's alpha analysis was planned for the first Likert-scale question (which examined overall VR perceptions) – this would serve as a way to assess internal reliability. Third, when constructing survey questions, previous research on both immersive VR and the development of speaking skills (which was discussed earlier in the literature review) was taken into account. Lastly, given the novelty of social VR in the language learning literature, open-ended questions were carefully constructed to be kept to a minimum while still also collecting the full range of thoughts about each aspect of the project (i.e., overall thoughts about social VR and

various aspects of it, F2F vs. VR comparisons, and project setup). To ensure student perceptions would be as valid as possible, and as discussed earlier, random assignment of groups and partners, switching partners for each dialogue set (from within the same group), and counterbalancing group-type (VR-first/F2F-first) were techniques used for the study's design.

Validity was also considered when it came to piloting and administering the survey. Prior to data collection, the survey was subjected to revision by the lab manager (who had assisted with each dialogue session), the instructor of the Spanish course (who was familiar with the participant population), and an undergraduate lab assistant (who was a Spanish major, had previously tried VR in the lab and was the same age as the participant population): content, order, and clarity of the questions were checked. Piloting the survey more extensively was not possible because an additional population who had utilized social VR in a language class was not readily available. However, data collection was tested by the researcher and the lab manager before the survey link was sent to students. This ensured that Qualtrics was recording responses correctly, and it also served as a final check for any typos or formatting issues.

Results

Self-reported Ratings

The first rating-scale question illustrates overall perceptions regarding the use of VR and shows that students enjoyed the experience of social VR, felt it helped support learning, and would welcome it into the curriculum. Table 1 contains the results from the first rating-scale question and includes the breakdown of responses per level in percentages (rounded to the nearest whole number) for each statement that participants were asked to rate. A Cronbach's alpha test, which was run in R (R Core Team, 2018), yielded an acceptable level of internal reliability: $\alpha = 0.96$.

Table 1

Overall Perceptions of Using Social VR in a Language Course

Statements	1-Strongly disagree	2-Disagree	3-Neutral	4-Agree	5-Strongly agree	Median/ Mean
I enjoyed using AltspaceVR (virtual reality) as part of a language course.	5%	0%	0%	24%	71%	5 4.57
Speaking Spanish in virtual reality is a helpful way to practice speaking.	5%	0%	10%	38%	48%	4 4.24
I enjoyed using a virtual reality avatar for Spanish speaking practice.	5%	0%	0%	43%	52%	5 4.38

Given the chance, I would practice my Spanish oral communication in a virtual reality format again.	5%	0%	10%	19%	67%	5 4.43

As can be seen in Table 1, most responses were at the "Agree"/"Strongly agree" levels, with only a few exceptions. Interestingly, one participant did note "Strongly disagree" for each statement, and from their open-ended responses, it appears that these ratings may have been due to the study's design (which was meant to create F2F and VR dialogue conditions that were as similar as possible to best enable comparisons). This participant discussed wanting to have been able to fully integrate each of the VR environments themselves into the conversations, which they strongly believed would have led to better engagement with the activity (this was a need noted by others as well). Reasons for both positive and neutral/negative ratings about VR are more comprehensively seen through the analysis of the open-ended responses (see further below).

Table 2 illustrates the results from the second rating-scale question, including the percentage breakdown of responses per level (rounded to the nearest whole number). Wilcoxon-Pratt Signed-Rank Tests were run in R three times (once for each question pair), and effect size (r) was then also calculated for statistically significant results. The results yielded significant differences in F2F and VR experiences for two out of the three question pairs, thereby showing that students believed that speaking in VR: is more enjoyable than speaking F2F (Z = -3.23, $p < 0.001$, r = 0.50), causes fewer feelings of self-consciousness than speaking F2F (Z = 3.51, $p < 0.001$, r = 0.54), and can help to improve speaking ability just as effectively as speaking F2F (Z = 0.38, p = 0.77).

Table 2

F2F vs. VR Conversation Experiences

Question Pairs (Median/Mean Ratings)	1-Not at all	2-Slightly	3-Somewhat	4-Moderately	5-Extremely	Avg. Diff.
(1a) Do you feel that speaking face-to-face is a fun way to practice speaking Spanish? **(*Mdn* = 3, *M* = 3.48)**	0%	14%	43%	24%	19%	-1
(1b) Do you feel that speaking in virtual reality is a fun way to practice speaking Spanish? **(*Mdn* = 5, *M* = 4.48)**	5%	0%	5%	24%	67%	

(2a) Do you feel self-conscious speaking Spanish face-to-face? **(*Mdn* = 3, *M* = 3.19)**	14%	10%	43%	10%	24%	1.24
(2b) Do you feel self-conscious speaking Spanish in virtual reality? **(*Mdn* = 2, *M* = 1.95)**	38%	38%	14%	10%	0%	
(3a) Do you feel that speaking Spanish face-to-face can help improve your speaking ability? **(*Mdn* = 5, *M* = 4.43)**	5%	0%	5%	29%	62%	0.1
(3b) Do you feel that speaking Spanish in virtual reality can help improve your speaking ability? **(*Mdn* = 5, *M* = 4.33)**	5%	5%	5%	24%	62%	

Note. The "Average Difference" refers to the difference between F2F mean rating and VR mean rating. The negative average difference (in the first question pair) therefore indicates that the VR mean rating was higher than the F2F mean rating, whereas the positive average differences (in the second and third question pairs) indicate that the F2F mean ratings were higher than the VR mean ratings.

Themes in Open-ended Responses

Qualitative/open-ended responses were subjected to a thematic analysis (Saldaña, 2021), which was conducted by the researcher. The data was first themed for recurring topics related to the second research question and were subsequently grouped into larger overarching themes. Furthermore, to correctly calculate the total number of participants who contributed to each main theme, multiple responses from one participant in any given theme were accounted for, thereby ensuring the analysis reflected the total number of participants rather than the total number of instances.

Table 3 shows the results of the thematic analysis and outlines six main/recurring themes that emerged from the data that were related to speaking in VR as compared to speaking F2F. The number of participants providing comments for each theme is noted, and samples of the responses are provided. The six themes are as follows: (1) speaking through social VR avatars facilitates less stress in conversation, (2) speaking in lifelike social VR environments encourages freer and more fun communication, (3) social VR environments should be utilized more effectively when integrated into a language course, (4) a game-like setting and playing in social VR enhances conversation experiences, (5) using social VR promotes learner motivation and engagement, and (6) social VR necessitates sufficient time to learn/get accustomed to/use it for assignments.

Table 3

Main Themes and Sample Open-ended Responses

Themes (# of participants)	Samples of open-ended responses (participant #)
Theme 1: Speaking through social VR avatars facilitates less stress in conversation (17)	*I think it is nice to be able to actually speak Spanish out loud, to someone else, without having to look at that person. I have a bit of social anxiety, especially with speaking Spanish (because I'm obviously not fluent) and this activity lowered my stress.* (P2) *Virtual reality was different because you couldn't rely on facial features and hand movements. But it also felt a lot less judgmental because of that.* (P3) *That degree of separation that you have from speaking through an avatar helps break a wall about feeling insecure about my Spanish.* (P4) *I think in virtual reality, you feel less self conscious because you have an avatar and the whole conversation takes place in a game setting. … Although face to face was also helpful, it is sometimes awkward to speak in this manner. I think by using virtual reality, users can speak Spanish more often, have more fun, and feel less nervous to speak.* (P5) *Using virtual reality was helpful because I felt less self conscious with an avatar to "hide behind."* (P7) *I think the avatar allows me to have a projection of myself and if something bad happens or there's a situation where I feel like I messed up, in my head I don't take it as personally because I almost share the blame if that makes sense. For some reason when I was behind an avatar I felt just so much more confident!* (P11) *There's no awkward eye contact or movement. You can focus on what you're saying instead of all the mannerisms involved, which I felt like improved my confidence in the conversation.* (P12) *I think that speaking through a VR avatar allowed for us to feel a little less anxious when speaking. It wasn't quite as awkward because you didn't have to worry about the other person watching your face or anything.* (P15)
Theme 2: Speaking in lifelike social VR environments encourages freer and more fun communication (15)	*I also enjoyed throwing snowballs or shooting hoops because it took your mind off of the Spanish and you could just let the words flow out of you, it gave you something to do with your hands, compared to just sitting in front of someone and talking.* (P6) *I loved that we were able to use Spanish in a completely different setting, as a different person – being in unique worlds was a distraction that helped me feel less nervous and more confident in my abilities.* (P7)

	I think one of my partners and I did a dialogue beside a grill and while we were speaking Spanish I was flipping burgers. I think that kind of simulated a real life experience because you aren't always just sitting face to face with someone having a conversation. You're finishing homework, looking at your phone, walking your dog, stuff like that! (P11) *I do think VR helped my Spanish speaking skills because the environment was completely different than the academic environment, which is the only one I've spoken Spanish in. Face to face felt like any other dialogue assignment. Speaking in VR, feeling like I was outside of a classroom, ironically, gave me more of a real-world speaking experience.* (P16)
Theme 3: Social VR environments should be utilized more effectively when integrated into a language course (11)	*I think doing more actually based around the activities and experiences available in VR would be better.* (P2) *I liked the interactivity of [VR] and the fact that we could shoot hoops, do obstacles courses, etc. But it was hard to see the point of being in this cool, imaginary world if all we could talk about was literature. It would be better if our conversations were more natural and about our surroundings in VR instead.* (P17) *… [W]e could have related the topics a bit more to the environment we were in in VR. We could have even written a play and been actors of our own "telenovela."* (P18) *I think maybe incorporating talking conversationally (ex. "¡Soy tan mal con frisbees!" while tossing the frisbee) could be an interesting way to simulate real-world experiences. How would you make small talk at a backyard barbecue in Spanish? Perhaps leaving the conversation topic more up to the participants would create this experience.* (P21)
Theme 4: A game-like setting and playing in social VR enhances conversation experiences (11)	*My favorite part was the feeling that we were having fun and enjoying games and other parts of the VR all while speaking Spanish. It felt less like a mandated assignment and more like something I would choose to do.* (P5) *I really loved when we got to use props. I have never been in a class that seems to specifically structure and promote exploration. That sounds weird but I truly felt like a kid again. I got to just mess around and have fun and speak Spanish. [Exploring surroundings] lightened the mood and made us have fun, which I think in turn made the dialogues so fun.* (P11) *I thought being able to move and use my hands during the VR experience added a fun element that allowed us to continue to take some stress off the situation.* (P15) *I liked the snowball and basketball game one! It was fun to play with the VR items while talking.* (P19)

Theme 5: Using social VR promotes learner motivation and engagement (11)	*My favorite environment was the Pirate cove because you're in VR, you're in a fantastical space, and there is only curiosity and excitement, which makes you excited to speak in the target language.* (P6) *I think [VR] is a worthwhile tool to add to the toolbox of teaching materials. Not only could it potentially lessen the "scary" part of speaking face to face, it is a way to get students involved and excited. Arguably, adult language learner attitudes and motivations are extremely important in acquiring a second language.* (P7) *I think I was super excited to come to VR over class. This is extremely important, as motivation for college students is often where many fall off track.* (P12) *The virtual reality makes the assignment more fun, … and it's a great way to engage students and bring some novelty to very typical conversation assignments.* (P20)
Theme 6: Social VR necessitates sufficient time to learn/get accustomed to/use it for assignments (11)	*Loved [VR]! But it is time consuming – maybe schedule some during class time?* (P1) *A hybrid structure might work best for this class though, to guarantee a time period where two people can meet to record.* (P2) *I would maybe have us just come in and play around in the VR before the first dialogue because the new experience can be a little distracting.* (P4) *At first, the virtual reality took some time to adjust. It was slightly disorienting until I got used to it. After the first VR experience, I knew what to expect and felt comfortable.* (P16)

Discussion

Overall, an immersive social VR environment can add benefits for target-language conversation experiences, as perceived and reported by learners. Specifically, VR can create a more enjoyable environment and one that facilitates fewer feelings of self-consciousness as compared to speaking F2F. The qualitative results support quantitative findings and further illuminated six main themes centering around the benefits and challenges of incorporating social VR into a course.

The first four themes relate to the notion of presence in immersive VR, which is an impactful element also seen in other immersive VR-based language learning studies (see e.g., Cheng et al., 2017; Collins et al., 2019) as well as more recently in a study examining how VR can assist with public speaking anxiety (see Davis et al., 2020). For the first theme, participants noted how social VR facilitates feeling less speaking-related stress because the entire conversation occurs through a virtual body that one can "hide behind" as one student put it, which encourages less self-monitoring and more risk-taking.

For example, as another student noted, “That degree of separation that you have from speaking through an avatar helps break a wall about feeling insecure about my Spanish.” For the second theme, participants explained that being immersed into another world enabled freer and more fun communication (e.g., feeling “less nervous and more confident” due to enjoying “being in unique worlds” and having “more of a real-world speaking experience” when in VR as compared to F2F). Another student described how VR benefitted their conversation experiences in greater detail:

> I also enjoyed throwing snowballs or shooting hoops because it took your mind off of the Spanish and you could just let the words flow out of you, it gave you something to do with your hands, compared to just sitting in front of someone and talking.

This theme, therefore, reflects that students formed a positive emotional connection to the act of speaking Spanish because of the affordances that immersive social VR could provide. Similar findings have also been found by Allcoat and von Mühlenen (2018) – when it came to a science-based lesson, as compared to engaging in both video and textbook conditions, the experience in an immersive VR condition led to increased positive emotions and a decrease in negative ones (whereas a decrease in positive emotions was found in the other conditions).

On related notes, the third and fourth themes addressed matters connected to curricular integration. The third theme illustrated students’ desire to have had better symmetry between the VR environments and conversation topics (which centered around course materials). For example, as one student described, “[W]e could have related the topics a bit more to the environment we were in VR. We could have even written a play and been actors of our own ‘telenovela.’” The fourth theme exemplified the 6DoF nature of the HMD system and its potential use in a curriculum, as learners enjoyed being able to play games and interact with the environment (and feeling “like a kid again” as one student put it) because this made the conversation more enjoyable and seem more natural rather than like a required assignment. As another student described, “My favorite part was the feeling that we were having fun and enjoying games and other parts of the VR all while speaking Spanish. It felt less like a mandated assignment and more like something I would choose to do.” These two themes, therefore, illustrate that because VR is so immersive and impactful, activities should be centered around it to fully utilize the contextualization and focus on the task that it can facilitate. The fourth theme also suggests that VR can encourage a game-like experience (see Sykes, 2018, for a discussion about the use of digital games in language learning). Thus, given these affordances, another possibility for a future social VR activity could be role plays (as also noted in the participant’s comment above), which are valuable when discussing works of literature (a topic of many of the dialogues in this study) (see Ryan et al., 2018).

Taken together, the first four themes also highlight the notion that one can truly be “virtually embodied” in another world when in immersive VR (see e.g., Cheng et al., 2017). For this study’s participants, the VR world was perceived to be more enjoyable, less stressful, and overall freer than the school environment when it came to speaking in Spanish. Participant comments from Table 3 allude to the virtual embodiment phenomenon. For example, one participant noted feeling like “a different person” in VR, and another student explained that “the avatar allows [them] to have a projection of

[themselves] and if … there's a situation where [they] feel like [they] messed up, in [their] head [they] don't take it as personally because [they] almost share the blame." However, there were also other instances in the data that showcased this concept – for example, one participant noted experiencing a "dissociation of [their] real personal being, [which] allows you to put on a facade of someone that you're not, thus taking some nerves out of the conversation," and another student jokingly commented that "looking down, at [their] 'hands'" in VR "almost felt borderline normal."

Finally, the fifth and sixth themes were related specifically to the practical implications of social VR in a language curriculum as a whole. For the fifth theme, learners expressed their heightened engagement and motivation for their activity as a direct consequence of using the technology and being present in an immersive and different world that was exciting to them. For example, one student described that their "favorite environment was the Pirate cove because you're in VR, you're in a fantastical space, and there is only curiosity and excitement, which makes you excited to speak in the target language." This result is therefore related to the positive emotional reaction that the second theme also highlights, and it echoes previous research findings showing that immersive VR can increase learner engagement as compared to more traditional platforms (Allcoat & von Mühlenen, 2018) and as compared to desktop virtual environments (Makransky & Lolleholt, 2018). Interestingly, in their review of literature, Jensen and Konradsen (2018) also report on findings that illustrate immersive VR's ability to foster student engagement and investment, and Enkin et al. (2021) found that the use of immersive VR can facilitate language learners' motivation on experiential learning-based activities.

The sixth theme directs attention to an area of improvement with respect to the curriculum once again. This theme highlighted that there is a need to allocate enough time to become acquainted with the equipment as well as the app, and for the activities overall when incorporating social VR into a language course. As one student put it, "Loved [VR]! But it is time-consuming – maybe schedule some [sessions] during class time?*"* Some ideas, as suggested by participants in their comments, could be to use social VR in "a hybrid structure" where lab time is counted in place of class time for example, and to provide an opportunity for pre-activity practice VR sessions. These sessions could entail speaking with other students or with native speakers in other parts of the world, which was a suggestion made by two participants.

Limitations and Implications

It is important to address the limitations of this study as well as implications for both future research and pedagogical advancement. As this was intended to be an exploratory study on a very new topic (which was especially true in the Spring 2019 semester when the study took place), there was a relatively low number of participants. This also occurred because participants were recruited from only one class, which had purposefully included VR and F2F dialogues. Furthermore, the only data collected was perceptions from a student survey. Though a survey was thought to be reasonable for an exploratory study, it was also the case that VR dialogue sessions necessitated a time commitment for the learners, researcher, and language lab manager; therefore, not to overwhelm participants, they were only asked to complete a survey after the project.

However, future research may want to utilize not only a greater number of participants but also the triangulation of data, which would therefore incorporate additional data sources, such as interviews and/or focus groups.

The results presented in this exploratory study can also set the stage for future research questions. For example, because conditions in this study allowed for direct comparisons to be made between F2F and VR oral interactions, the results illuminated that participants wanted to have taken full advantage of the immersive environments during their VR conversations; thus, one of the next steps might be to collect data on students' speaking experiences in various VR spaces while they are performing different task-based activities designed around a course's curriculum. This type of design could also enable the examination of specific learning outcomes, which would work to complement the results of the present study. Alongside these possibilities, it might also be important for future studies to more closely examine this study's finding of reduced speaking anxiety when in VR, as anxiety is a well-known challenge when it comes to second language learning (see e.g., Horwitz, 2010).

Recent advancements in VR technology also hold pedagogical implications for the future, which make the use of VR in teaching more feasible. Specifically, at the time of the study, immersive VR could only be run with an expensive VR-ready PC, which necessitated the availability of two of these PCs for the project, and each of them needed to be consistently maintained and kept up to date. Now, however, standalone immersive VR headsets (which do not require a VR-ready computer to run) are widely available; institutions may therefore find that the financial and technological barriers that once existed with VR have been largely reduced. Standalone VR headsets may also provide a more optimal experience for both students and teachers with respect to ease of use (for example, there are no wires and the equipment is easily movable). Schools and universities could thus be more willing to invest in this equipment now, though more than several headsets (if more than two students would want to use the equipment at the same time) could still become somewhat costly.

Social VR itself has also evolved, which opens the door to pedagogical advancements and additional research projects. In particular, and as Enkin and Kirschling (2021) also note, apps are now available that have successfully combined social VR with traditional video conferencing. This integration may thus make it potentially easier to incorporate social VR into a course, especially as more students acquire personal headsets and as more variety in course delivery options become available. For example, with an app like Mozilla Hubs, users can create and access virtual web-based 3D collaborative spaces via their PC/laptop/mobile device or through immersive VR; they are then able to communicate through voice and text chat, and share content (e.g., they can share out their screens or webcam views; share PDFs, videos, 3D objects/models; and use a 3D pen tool), all while being in a 3D world as avatars. Hubs can therefore provide learners with a closer-to-reality web conferencing experience that, as this study suggests, may help facilitate enjoyment and engagement, thereby also promoting a sense of classroom community.

Conclusion

This small-scale exploratory study examining student perspectives on F2F vs. immersive social VR speaking experiences has suggested that students found immersive

social VR to enhance their target-language speaking experiences by helping to lower speaking-related stress, adding a level of enjoyment to speaking practice, and creating a more natural conversation setting in comparison to the academic environment. Furthermore, due to the immersion level that immersive VR can provide, the results also suggest that learners may have experienced being truly virtually embodied in a VR avatar within a VR world, which in turn enabled students to feel freer and more confident when speaking to others in the target language. Interestingly, two of the participants even referred to the social VR platform as a "safe haven" and "safe setting" for practicing speaking, thereby confirming the unique space that immersive social VR can occupy when it comes to creating an enjoyable yet low-stress and lifelike environment. Moreover, the 6DoF environment (i.e., the use of interactable items) specifically can add a level of contextualization to speaking-based activities that no other platform (including desktop virtual worlds) can provide, and this environment can further assist with immersing students in lifelike situations that actually feel real. Activities should thus make full use of virtual settings to take full advantage of immersive social VR, provided that enough time is given to the students to learn the app and carry out the tasks.

This study adds to the existing literature on immersive VR – a topic that is still in its infancy – and has lent perspectives on how VR is perceived by students when it is used as a tool for speaking-based activities. Future projects might want to more closely examine learning outcomes and could also explore different types of conversations that are both possible and effective in social VR settings. As VR and other emerging technology continue to develop, and as they are progressively used in language labs and newer types of language resource centers (see Caspar, 2021, and Enkin & Kirschling, 2021), this type of research will become increasingly important.

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