Virtual Reality to Increase Intercultural Competence and Openness

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Using the framework of Allport's contact hypothesis (1946) and Deardorff's pyramid for Intercultural competence (2006), this study examines the findings of using virtual reality (VR) in university communication classes to increase intercultural competence and motivation to learn about foreign countries and cultures. Twelve students spent fifteen to twenty minutes traveling the world using Wander software on an Oculus Quest VR headset. The students then completed a survey describing the experience. Every participant reported a positive experience and said they were now more likely to travel to the locations they visited and would recommend the VR travel experience to others. We posit other possible uses of VR in communication classes, including interpersonal communication and reducing public speaking anxiety. The researchers believe the applications for existing technology and new technology in classrooms are endless.

Keywords: Education, Virtual Reality, Intercultural Competency, Intercultural Communication, Openness, Study Abroad

Introduction

In a globalized world, intercultural communication has become an increasingly important asset (Zhang & Zhou, 2019). The 2020 US Census Bureau reports that the US population is more ethnically and racially diverse than ten years ago. Indeed, Americans cannot be content to limit their interactions only to people within their culture (de Guzman et al., 2016). The proliferation of social media and the internet has exposed individuals to different cultures while simultaneously creating polarization (Iyengar & Westwood, 2015). While ethnic groups can use social media to connect with like-minded people for support, the internet also provides tools for hate groups to gather and spread dangerous messages (Martin & Nakayama, 2022). Intercultural competence combats these dangerous messages by teaching individuals to value other cultures and withhold judgment (Deardorff, 2006). The openness and curiosity learned by intercultural competence increase individuals' willingness to engage with people who are different, which according to the contact hypothesis, lessens prejudice (Allport, 1953). Martin & Nakayama (2022) share many benefits of intercultural communication. Understanding intercultural communication increases a person's self-awareness and sense of cultural identity, making them aware of their ethnocentrism. Intercultural learning can lead to one's awareness of their privilege. Intercultural communication can also increase knowledge about cultures, resulting in less prejudice.

For these reasons, teaching intercultural competence and intercultural communication is more critical than ever. Sierra-Huedo & Nevado (2022) contend that universities must train students to work in a global environment and with people "who are very different from them and to appreciate and embrace diversity as a treasure and not as a threat" (p. 16-17). They contend that this knowledge does not come naturally, so universities must be intentional when teaching students to be global citizens.

Conceptual Framework

When discussing how to teach Intercultural Competence, many turn to Deardorff's pyramid of Intercultural Competence (2006). Deardorff's pyramid includes four levels of development. For our purposes, we focused on the base of the pyramid, Requisite Attitudes. Respect, Openness, and Curiosity and Discovery are included within this base. Respect involves valuing other cultures and respecting cultural diversity. Openness refers "to intercultural learning and to people from other cultures, withholding judgment" (p. 254). Curiosity and Discovery include "tolerating ambiguity and uncertainty" (p. 254). These characteristics are the beginning of intercultural competence.

Additionally, we considered the contact hypothesis for improving intercultural competence and communication. Martin & Nakayama (2022) explain that the contact hypothesis proposes that communication between people groups will improve by bringing the groups together and allowing them to interact. They propose eight conditions that must be met for the contact hypothesis to hold true. One condition states that interaction between groups should be collaborative rather than competitive. Institutional or organizational support for the groups is also needed. The contact hypothesis is more likely to hold true if the group members share values and beliefs.

The immersive nature of study abroad programs meets the conditions of the contact hypothesis, effectively increasing intercultural competence. Nishioka & Yashima (2018) used the contact hypothesis as a framework for their study on intercultural competence. They

designed a course in which international students studied together in a collaborative environment. The students completed a questionnaire before and after the course, and the scores indicated significant improvement in intercultural competence. Yilmaz et al. (2021) examined the results of contact between non-Muslims and Muslims in Australia. Their findings showed that young Muslim Australians, even when initially met with discrimination and prejudice, were able to change the views of non-Muslims through creative exchanges and dialogue. Genkova1 et al. (2022) studied predictors of xenophobia of international students. They learned that when international students had good contacts with locals while they studied abroad, xenophobia was reduced. If the student stayed abroad for an extended time, xenophobia was reduced only if the student displayed intercultural competence. Engle & Crown (2014) met the conditions of the contact hypothesis when they examined the impact of a short-term international experience on 135 university students and found that all four factors that make up intercultural intelligence increased significantly.

While study abroad programs are the traditional method for increasing contact and intercultural competence (Salisbury, 2013), studying abroad is not always affordable for U.S. minority group members. In America, students from white, wealthy families are most likely to study abroad (McNair, 2023). Many economically disadvantaged students in the U.S. are often unable to go abroad and cannot get the benefits of immersing themselves in another culture. Therefore, alternatives are needed.

Benefits of Virtual Reality for Study Abroad Experiences

VR is one method to provide study abroad experiences. Akdere et al. (2021) say virtual reality can offer a substitute for studying abroad in a post-pandemic world where logistics and expense are often a barrier. Indeed, when the pandemic interrupted study abroad programs for business classes, Liu & Shirley (2021) studied Collaborative Online International Learning (COIL) pedagogy approach that used virtual reality to redesign the class. Students were satisfied with the new courses. They said that while "VR cannot replace a full immersion in a different country" (p. 192), the VR cultural exchange did serve as a successful substitute during the COVID-19 pandemic and can provide rich experiences to those for whom studying abroad is inaccessible.

VR has already been successfully used in numerous applications. Xie et al. (2021) found that VR has become increasingly more affordable and accessible and can be beneficial in a number of different non-gaming applications, including First Responder Training (Koutitas et al., 2020), Medical Training (Gallaher et al., 2019; Hurd et al., 2019; Krösl et al., 2019), Military Training (Dalladaku et al., 2020), Transportation (Lang et al., 2018), Workforce Training (Viar, 2019) and Interpersonal Skills Training (Colbert et al., 2016).

Virtual reality's use in education is not a new concept. Zhao and Yang (2022) discovered that their use of VR in language learning increased proficiency and student motivation. Dobhal et al. (2023) reported that VR produces "huge engagement and connectivity with the students" (p. 1). Pellas et al. (2021) analyzed 46 articles regarding the use of VR in education published between 2009 and 2020. They concluded that VR provides learned benefits for students and teachers and "VR-supported instruction…successfully achieved better outcomes than their counterparts in traditional (lecture-style) formats" (p. 857). However, few studies include more than 30 students, so more research is needed.

One of the unique and positive aspects of VR is that it is an immersive tool, and participants feel as if they are really there. The experience "helps to increase student engagement, provide active learning, increase the frequency of authentic learning experiences, exercise creativity, and produce an environment to visualize abstract concepts concretely" (Alanís et al., 2023, p. 1). In addition, Alanis et al. (2023) reported the students found VR enjoyable and interesting. Hernandez-Pozas & Carreon-Flores (2019) reported students found VR "fun, engaging, safe and less expensive options to strengthen student's capabilities in International Business" (p. 207).

Improving Intercultural Competence through Virtual Reality

One of the ways to increase intercultural competence is by studying abroad (Dunn-Jensen et al., 2021). The Institute of International Education Open Doors 2022 Report on International Education Exchange states that the number of Americans studying abroad increased each year for the last twenty years before the pandemic. In the U.S., 347,099 college students traveled abroad in 2018-2019. That number decreased by 91% in 2020/2021 due to the COVID-19 pandemic. One of the reasons that study abroad programs are so successful could be due to the contact hypothesis.

We suggest that Virtual Reality (VR) can be a more affordable and accessible step needed to increase students' curiosity and openness toward intercultural competence and make contact with varied cultures more accessible and desirable to minority group members in the U.S.

This immersive quality creates a natural interest in using VR in intercultural competency. Akdere et al. (2021) found virtual reality effective for intercultural learning and competence. DeWitt et al. (2022) 's research found "significant improvement in ICC in the cognitive and affective domains of learning" (p. 629). In addition, they reported that students' attitudes and skills improved "after producing VR environments about Chinese culture" (p. 629). VR can effectively increase intercultural openness, an essential part of intercultural competence (Xie et al., 2021, p. 11). Li et al. (2021) used virtual reality to increase students' intercultural competence with good results. Li et al. reported that "the study demonstrated feasibility and effectiveness of the virtual reality approach in enhancing youth's intercultural sensitivity in Hong Kong with strong empirical evidences" (p. 633).

Because modern software and headgear give users a feeling of being in a new location, students may be less afraid to travel and interact with different cultures in the future. Liaw (2019) found that "VE [virtual environments] technologies created 'real' (e.g., uploading a map) and simulated (e.g., the train ride on Eurostar) environments that enabled different aspects of intercultural communicative competence to be exercised and developed. The affordances of physical presence provided by VEs and their role for intercultural communication learning deserve to be further understood and better exploited for instructional design" (p. 53). The immersive environments involve all the participants' senses and provide unique opportunities. Shadiev et al. (2020) proposed that an immersive virtual environment will increase learning. Going abroad via VR will familiarize them with the country they want to visit, making them more comfortable and less anxious about going to the same place in reality (Kuna et al., 2023; Higuera-Trujillo et al., 2017).

The above information leads us to our two research questions: RQ1: What is students' experience using "Wander" virtual reality traveling abroad software? And RQ2: Can VR promote interest in studying abroad and improve intercultural competence?

Methods

In this qualitative study (Strauss & Corbin, 1990), we examined the VR experiences of undergraduate students and their impact on the potential to participate in study abroad. Students taking the "Intercultural Communication" course were recruited to simulate study abroad using VR. Twelve students agreed to participate in the study. We used the Oculus Quest headset and Wander software. Students signed up for a 30-minute time slot. Fifteen to twenty minutes were spent using the VR, and fifteen minutes were used to complete the VR Intercultural Survey about the experience. Students were given a 14-question open-ended survey where they were asked to describe their experience. The goal of the study was threefold. First, we hoped the experience would increase students' openness to new experiences and cultures and even foreign travel or study abroad programs. We also hypothesized that the experience would increase understanding of cultural differences by letting students experience different cultures virtually. Finally, we were interested in enhancing the student's educational experience.

When students arrived for their session, the instructor showed them how to put on the headset and use the controllers. She then verbally guided them to find the virtual controls and how to navigate their travels. While several students seemed interested in visiting their own homes, the instructor asked them to take this opportunity to travel to new and different locations. Once the instructor felt confident that the participant understood how to work the headset, she remained quiet while the student explored the world through VR. She told the students when the fifteen minutes were complete, and the students then removed the headsets and completed the survey. She asked each participant about their experience.

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Data analysis involved reviewing the entire VT Intercultural Survey in its entirety. A priori coding was conducted using the concepts from the conceptual framework used to answer our research questions. Key quotes were placed into an Excel matrix for deeper analysis—selected quotes aligned with the conceptual frameworks used for this study. The data was examined multiple times using constant comparative analysis (Glaser & Strauss, 1965) to reduce the data for coherency.

Results

Overall Experience

Research question one asked students about their experience using "Wander" virtual reality software. During the experience, participants traveled to twenty-seven countries, covering all seven continents. The most popular destinations included France (n=4), Dubai (n=3), and Italy (n=3). A common theme of the experience is that students said they felt like they were really in the locations (n=9):

I felt like I was actually there. Felt like it was so real and I can actually teleport.

It was exciting to see all the places. When I went to Paris I was <u>inside</u> the Eiffel Tower, I could look down and see all of Paris. It was awesome! I was able to see how beautiful the water was in Bora Bora. Pretty blue water, just like I like them. Makes you feel like you are laid out on vacation.

Honestly, it felt surreal. I was just in shock by the details of the picture in front of my eyes. It honestly felt as if I was there [Bali].

I felt like I was actually walking down the streets exploring buildings and people.

I enjoyed how real it felt to be in each place; it was very beautiful.

While most participants said there was nothing they did not like about the experience (n=5), others did offer some criticisms (n=7):

The set hurt my head.

The lens were a little blurry.

I did not like the floating feeling.

Some places would have random blurred out areas…

Navigating around and selecting a certain place was hard.

The pictures were slow to render.

Other complaints included needing more time and not getting to see places that were unavailable in the software (such as rural areas or certain countries).

Students also complemented the experience:

The places were really cool to see and moving around was fun. The information it tells you about certain places was neat.

[I liked] *Everything!* [about the experience] *From the quality to variety; it was all great.*

I think that fact that I had the ability to go anywhere in the world for 15 minutes that coolest thing ever.

What I like the most is how they let you move and zoom in further down the street.

Another aspect of the experience students discussed is the accessibility and affordability of VR travel versus actual travel (n=9). The contact hypothesis proposed that under the correct situation, exposure to different cultures decreases prejudice. If students are unwilling to make contact with different cultures, contact will not happen. The VR experience can provide a substitute for students unable or unwilling to travel:

[I was interested in] *Being able to travel to places I'll never be able to afford. Like seeing the world in one sitting. Living life in a chair.*

They [VR travelers] *can gain experience that would be hard to gain in real life due to the fact that travel is time consuming and expensive.*

I would recommend other students to try [VR] *because it was very interesting to look at other countries without leaving my house.*

I think that students can gain the experience i.e. and knowledge of different cultures and how other places look that they might not have had the means to travel to.

[VR is a] *great way to experience traveling the world while on the coach.*

[VR] *helps students see how that country is and what they have to offer without the extra hassle of pay and stay.*

Responses also show that the VR experience made the students more open to travel, partly because the virtual experience allowed them to visit the different locations from the safety of home first. This lessens the fear of traveling to a new location since they feel they have already been there and know what to expect (n=4):

Now I am not flying blind; for example, now I know that I need a scooter to get around in Japan.

[VR] *would be useful to plan out a trip before spending all the money to go.*

I think VR tech can promote intercultural understanding by bringing to different places that have different cultures to see if you would like to experience these places in real life.

You see it all - gas stations, mountains, water - since I got a sneak peek view, it makes you want to be there more.

All participants said they recommend others try the VR headset and Wander software (n=12):

I would recommend other students come try because it is a great experience overall.

It's a fun experience and they get to travel for free.

Everyone should experience new tech and how it feels and how useful it is.

Requisite Attitudes

Research question two asked if VR can promote interest in studying abroad and intercultural competence, and the responses indicated that it can. Survey answers demonstrated the Requisite Attitudes (Respect, Openness, Curiosity and Discovery) described by Deardorff's pyramid of Intercultural Competence.

According to Deardorff (2006), respect includes valuing other cultures and respecting cultural diversity. Every participant expressed some appreciation at seeing the diversity of cultures they witnessed during their VR experience (n = 12). Comments included:

You can go see how other cultures live by going to different places.

You get to see how there are so many different people in the world and so many interesting historical places.

I think [VR] *gives people the opportunity to see what customs are; for example in the UK the VR was tailgating a police car. Also, everyone in Dubai was modestly dressed.*

They can experience different cultures and understand how other people live in the world.

Openness to intercultural learning and to people from other cultures and withholding judgment is another requisite attitude. Participants gained an openness to travel and new cultures after using VR. Participants shared that they were more likely to travel to new locations after the VR experience (n=12):

Now that I've seen those places it's a must I physically go there and create memories with my people.

I am more likely to travel because VR gives a good experience but seeing it in person is going to be a lot better.

I am [more likely to travel] *because it gave me a teaser of how beautiful the world is outside my country.*

I definitely am more likely to travel to other places. It felt amazing.

Participants' sense of Discovery and Curiosity also increased. Students commented on the new things they discovered:

I felt like a certain country looked one way because stigmas you hold with it and it turned out to be beautiful.

Not only would you see a lot of beautiful places but there's also an info column that tells you about where you are at and the history behind that place. Although I was too busy looking around to remember the small facts shared.

[I learned*] What they* [the countries] *look like, monuments, etc. differences from Texas (cars, gas prices, etc.)*

Japan really is as crowded as everyone states.

It seemed like the roads were a bit smaller in Germany.

There are a lot more people that ride scooters or bikes to get from place to place. A lot of one-way roads. You can tell it's been around for a while with the statues they have and some buildings that look ancient and getting remodeled and the hotel rooms are amazing.

Most places I visited had a different outcome than I expected so the outcome was nice.

Students' sense of curiosity was also stimulated:

Students can gain not just knowledge from seeing new places, but even gain new curiosity for new places.

It [VR] *can give you an inside view of different countries' living situations.*

By going to less developed countries or normally hard-to-visit places students discovered new perspectives:

Honestly, I felt privileged. I have always been told the infrastructure in the USA is amazing and now I know why.

[I was] *surprised at the state of some of those places.*

I guarantee what they [future travelers] *have in their head is not reality!*

The second tier of Deardorff's (2006) Pyramid of Intercultural Competence is Knowledge & Comprehension and some responses indicated these qualities. Participants suggested students could gain *Knowledge* (n=5), *Understanding* (n=3) or *Experience* (n=2) from the VR opportunity:

[VR] *will help them [other students] grasp an understanding of Intercultural Communication better.*

[VR] *can promote intercultural understanding by seeing what other countries are like and how not so different people are.*

[VR] *can promote intercultural understanding by showing the diversity that is in every single part of this world. This is very important for this branch of study.*

Future Considerations

Through this information, we realize that guides cannot tell students that they can go anywhere in the world. Also, the instructions should insist that students not go to their own home, since eight visited locations in the United States.

One idea for future study is a travel scavenger hunt where students are asked to find different locations or information through the VR headset. This would give students direction but could still be fun. This would also increase the areas explored since some students chose to spend their time in one location, while many chose to teleport from one country to another.

For instructional purposes, the objectives of the lesson might need to be more clearly tied to the location the students visit.

Conclusion

We considered the contact hypothesis (Allport, 1954) and Deardorff's Pyramid of Intercultural Competence (2006) as we answered the two research questions. The first research question asked what is the experience of students using "Wander" virtual reality traveling abroad software. The students reported a positive experience using the VR technology. They described the experience as feeling like they were really there and were impressed by how real the experience felt. Only a few negatives were listed for the experience, including an uncomfortable headset, and not liking the floating feeling. Others mentioned that there were some areas they could not travel to, and the software was sometimes slow. They appreciated that they could feel like they were traveling without leaving home or spending money. They also felt the experience could help them know what to expect if they could visit another culture in person.

The contact hypothesis says communication between people groups will improve by bringing the groups together and allowing them to interact. While bringing people together physically through study abroad may be ideal, financial limitations often prevent the experience. Moreover, because of those limitations, some students are not initially open to the experience. The VR experience addresses this by giving students a virtual experience if they cannot make contact in person. It also gives students a preview that will make them more willing to travel in the future since they know what to expect. The virtual contact made the places they visited attractive and increased their desire to visit other countries. The contact hypothesis tells us that familiarity can lead to likeability, and VR can start the familiarity process.

Research question two asked if VR can promote interest in studying abroad and intercultural competence. Again, the student responses indicate that VR can promote interest in studying abroad and intercultural competence. Survey answers demonstrated the Requisite Attitudes of Respect, Openness, Curiosity, and Discovery were present. Participants repeatedly indicated an appreciation for the diversity and cultures they witnessed. All participants said they were more likely to visit the countries they visited in VR, showing openness. Students also demonstrated curiosity and discovery, mentioning what they discovered about the countries they visited. Students made the connection between the VR experience and intercultural competence.

The experience made participants more open and curious about other countries. This curiosity and openness that can be lacking are the base of Deardorff's pyramid and the first steps toward Intercultural Competence. Presenting a safe and affordable VR experience can increase students' openness and curiosity, making them more willing to be in contact with other cultures. Intercultural competence begins with getting people interested in other cultures and learning about different countries.

Because this is a work in progress, the above are only the preliminary results, and the data is limited. However, the positivity of the preliminary results is motivation to continue using VR in Intercultural communication to increase intercultural competence. The plan going forward is to integrate VR into a course assignment in future semesters, and it will be assessed using pre and post-tests in addition to the qualitative questionnaire used in this part of the study. One suggestion is to use Deardorff's (2006) Intercultural Competency Questionnaire.

Improvements will also be made to future experiences, including making the wording in the directions more specific to avoid students going home. The students will do the VR experience to complement their "Foreign Country Report" assignment integrating the research aspect with the practical virtual visit to the country.

We see many possibilities in using VR technology in social sciences and other fields. For Languages, there is software to learn and experience the culture integrated with some textbooks that have a VR component. For History, the Anne Frank VR software is available. For Public Speaking, it can be used with avatars in the classroom to reduce stage fear. There is also the possibility of custom-designing a VR software experience that can be used for various courses and learning objectives.

Appendix

VR Intercultural Survey

1. Name _____
2. Date: _____
3. What made you interested in doing the VR Traveler experience?

_____

_____

_____

4. Were you more interested in:
   A. Experiencing traveling to other countries
   B. Trying out the VR technology
   C. Equalling interested in both

5. What country or counties did you visit using the VR set?

_____ _____ _____

_____ _____ _____

6. What did you learn about these countries or places?

_____

_____

_____

7. How many minutes did the experience last? _____ minutes

8. Describe how it felt and what you saw in as much detail as possible:

_____

_____

_____

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_____

9. After this experience are you more or less likely to travel to the places you visited and why so?

_____

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_____

_____

10. How do you think VR technology can promote intercultural understanding?

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_____

11. What do you think students can gain from using this software and traveling to other countries?

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12. What did you dislike about the experience?

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13. What did you like about the experience?

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14. Would you recommend to other students to come and try out the VR set and Traveler software and why or why not?

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