Does Virtual Reality Enhance Language Fluency?

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Introduction

Research has demonstrated that Virtual Reality has a positive outcome for language learners. Many studies have been done looking at the benefits of using virtual reality in the classroom at every level. Many of these studies focused on benefits such as increased motivation, vocabulary acquisition, and cultural understanding among other things, however, few focused on fluency. In order to understand what constitutes fluency, we need to take a look at some of the definitions out there. Some identify fluency as a synonym of oral proficiency, generally meaning that one speaks on a level close to that of a native speaker, smoothly and rapidly. Another approach follows that of communicative language teaching (CLT), which evaluates "the effectiveness of language use within the constraints of limited linguistic knowledge" (Chambers, 1997). Learners use strategic competence to adapt to the required skills of a situation.

Most researchers agree that fluency entails some sort of automaticity. Think of learning all that grammar in school – how to conjugate verbs, make adjectives agree in gender and number, etc. When you are fluent, you can communicate using these structures for a long segment of speech without much hesitation. Language learners tend to internalize these sentence constructs after studying abroad and immersing themselves in the target culture. The question is, will this ability be replicated in the immersive experience of virtual reality, and what other mediating variables affect the fluency outcome?

For the purposes of this research proposal, I have decided to define fluency as a type of oral proficiency which encompasses the ability to discuss topics extensively and

deal with unfamiliar situations (Global Tasks and Functions), as well the lexical range (Content/Context), grammatical structures (Accuracy), and smoothness and length of delivery (Text Type) as defined in the ACTFL Oral Proficiency interview rubric. Basically, it's your comfort in another language and the ease with which you communicate on a variety of topics.

I've had an interest in language from a young age which sparked my curiosity about the world. I went on to study French and Spanish in college and spent a few years abroad in both France and Bolivia. I was always fascinated with language acquisition and continued on to get my Master's in Bilingual/Bicultural Education. After teaching for a few years, I conducted tours internationally and continued to explore the world. Then I came back to teaching about the time the internet started, and discovered my second love – technology. Now I'm doing a Master's in E-Learning Design and Technology, and I'm fascinated by how much technology has evolved over the past twenty years. When I studied language there was a monthly radio program on Sunday nights in French and one Spanish language radio station in town. Now, present-day language learners have access to international television, websites, and podcasts, and I wonder if that language exposure helps their fluency. Virtual Reality could take language learning to the next level, and replicate the immersive experience abroad.

The purpose of this study is to evaluate language fluency acquired in a virtual setting. I'd like to add to the knowledge base, and in doing so, have an institutional impact by providing the virtual reality research that funding sources require. Until now, there are only a few studies, probably due in part to the high cost of virtual reality and the lack

of available virtual reality resources in foreign language education. There are other barriers as well, including teachers' familiarity and comfort with implementing virtual reality experiences in the classroom.

Significance

This research is significant because virtual reality is going to play a greater role in the future. Twenty-first century students need twenty-first century skills and they will be left behind without them. Gaming and television have captured the heart of the young and education needs to keep up with the new normal in order to continue to stimulate students. Language learning is no exception. Virtual reality could help develop fluency in another language without having to spend costly time abroad and also help foster cultural competence which is so needed in our global society. The research is limited and we need to add to the knowledge base so that universities will be justified in adopting such programs.

There are studies conducted years ago which are important, but outdated nonetheless. Many of the pilot programs using virtual reality have taken place in other countries, and it doesn't appear that the United States is leading the charge. Virtual reality is more prevalent at the university level for English Language Learners in foreign universities, which may account for some of the discrepancies. If we want to continue to be a world leader, we must be marketable on the global playing field. Developing more multilingual citizens will help us to this end.

Review of the Literature

One of the more recent studies is from 2021 and is a literature review regarding the use of extended realities in language learning. It includes eighty-eight articles which met their criteria and covers the period between 2004 and 2018 (Huang et al., 2021). Out of the eighty-eight articles, twenty-eight focused on using augmented and virtual realities for vocabulary acquisition, ten for cultural awareness, and eighteen for speaking, which is the focus of my proposal. They found that fluency, pronunciation and grammar improve with the use of virtual reality as well as cultural learning since virtual reality can place participants in a cultural context. They also concluded that there was an increase in learner motivation, and that is an aspect of extended realities that has been touted in other studies as well.

There are some limitations, however, so they believe there should be guidelines for teachers who incorporate extended reality tools into their teaching. Students could get easily distracted by the tools and not actually achieve the intended learning objectives which creates challenges for classroom management. Furthermore, it would take time for teachers to become familiar with the technologies and they may have to change their approach to one that works well with these technologies such as a self-directed or task-based learning approach (Huang et al., 2021).

Another article from 2021 was a systematic review of empirical research, aimed at looking at foreign language learning gamification using virtual reality. They identify gamification as "a collection of steps to solve an obstacle adopting characteristics of game-related elements with score points and rewards and completing objectives" (Pinto et al., 2021). They believe that games are a great medium to learn language since native

and non-native speakers communicate within the games. There is nothing better than learning vocabulary in context which is one of the advantages of living abroad. You communicate because you have to, and the same holds true for gaming. Language is not the goal of the game but you have to use it to reach your goal.

Another quasi-experimental study from 2021 compared immersive virtual reality to mobile applications looking at engagement, engrossment, and immersion. They included two questionnaires, one measuring vocabulary skills (pre and post-test), and one measuring engagement, engrossment and immersion. There was a significant statistical difference with vocabulary skills, that of the virtual reality group being much better. However, there wasn't much of a difference in terms of engagement, engrossment nor immersion (Nicolaidou et al., 2021).

Parmaxi, a Postdoctoral Research Associate from the Cyprus University of Technology, analyzed the scholarly literature on virtual reality as an emerging technology in language learning and focused on manuscripts from 2015 to 2018. She focused on high-impact journals and conferences in the fields of Computer-Assisted Language Learning and Educational Technology. She researched the technologies used in the language classroom as well as the benefits, limitations and the need for the future. She agrees that there needs to be pedagogical grounding while using virtual reality. Although other meta-analyses have been reviewed in this proposal, much of the literature she reviewed was not replicated in other studies (Parmaxi, 2020).

DePape conducted a meta-synthesis study in 2020 and he looked at students' experiences with extended realities in higher education. They stated that almost half of

universities in the United States are using some form of virtual reality. They chose twenty-three articles using extended realities and eleven of those studies were from the United States, and not all of the studies focused on language learners. They determined that there were four themes to be taken into account when incorporating these technologies into higher education: technological factors, student characteristics, learning outcomes and recommendations (DePape et al., 2019).

In 2017 a Causal Comparative study looked at the use of the InCell VR game since that was available both in virtual reality with a headset and on a tablet so that they could compare the same content (Silva et al., 2017). This took place in a technical high school in Brazil called NAVE Recife, where students learn regular high school content along with technical knowledge of digital game development. Since this is an unusual school where all students learn about game development, I'm not sure there is much external validity, but I think this study could be replicated here in the United States. They aimed to identify which method led to higher motivation – immersive or non-immersive. Students came into the room in pairs and one was given the headset, and the other the tablet, and they used Keller's ARCS Motivational Model to create their questionnaire. Although I'm not studying motivation, we know that if students are motivated, they are more focused on the subject, and consequently learn more. Secondly, they used a program, inCell VR, with the same content to compare the immersive and non-immersive experiences, and I hope to do the same.

Their results indicated that virtual reality was more effective in attention and relevancy, that there was no significant difference in confidence, but the satisfaction level

was higher for the virtual reality experience (Silva et al., 2017). In the end, they asked an additional question not related to motivation and discovered that students in the virtual reality experience would definitely do it again. My concern is the confidence parameter since that has direct correlation to the learning process. In this case, the game focused on biology and mine would focus on language.

Another study was conducted in 2014 and it involved the use of mobile computing glasses combined with hand gestures which allowed participants to interact with cultural objects. Although this is an older study, it's a precursor to the type of immersive interactions found in virtual reality. This was a true experiment with 44 engineering graduate students from 22 to 26 years old who were randomly divided into two groups of twenty-two each (Yang et al., 2014). An interesting aspect of this program is that all the participants' devices were connected which supported three types of interactions – Learner-Instructor, Learner-Content, and Learner-Learner. Moore identified the importance of these interactions (Moore, 1989) in Distance Education. Their instructor was a native English speaker and their objective was cultural and there was a significant statistical difference in terms of cultural understanding.

Overall, these studies have demonstrated that extended realities can enhance language learning in more than one way if they are used properly. What is missing is the most recent research available since 2018. Extended realities have changed in leaps and bounds since 2018 and are only recently becoming more prevalent in language classrooms. This has been a limitation in the past due to its prohibitive cost, but as mobile technologies improve, so does access to extended realities. What is lacking, therefore, is

research beyond 2018 and a more in-depth look at how extended realities contribute to fluency.

METHODS

Research Design

The question I propose to research is, "Does Virtual Reality Enhance Language Fluency?" I hope to prove that it helps develop fluency, especially those that incorporate some kind of immersion experience. I will use a nonequivalent groups design with a pre- and post-test and then include quantitative observational data. There will be one independent variable with two conditions which will not be randomly assigned. Second year language students will be in one of two groups. The experimental group will learn language with virtual reality headsets, while the control group will learn language the traditional way through a book supplemented by online activities. Students will register on their own for the desired course. I think the challenge would be not in the collection of data, but rather in the extraneous variables which could affect the outcome. A potential study involving these college language students could be influenced by family values, socio-economic status, and teaching styles among other variables.

Participants

Participants would be recruited from public and private colleges who employ virtual reality for language learning and have a non-virtual option as well. Colleges would be sent an initial survey questionnaire which would help determine the sample from

which classes are chosen. The prevalence of virtual reality would determine the sample size. I would use multistage sampling by selecting the schools first, and then randomly select students within each school. I would like to choose enough participants to assure a higher external validity. Since I plan to use an established proficiency test, I would have to build fidelity into the observation parameters rather than the proficiency test.

The participants will have to be native English speakers from the United States who don't know another language, who aren't language majors, and whose parents or grandparents don't know one either. This would eliminate many students who have some exposure to language but would be open to students of any race or culture in the United States who have never been exposed to another language. Both male and female college students in their second year of language learning would be included. These parameters would have to be addressed in an initial questionnaire.

Ethically, participants will be informed that a proficiency interview will be administered at the beginning and the end of the year by a trained evaluator. There are no hidden agendas. In terms of diversity, questionnaires could be bilingual, however, since they are measuring language proficiency, it doesn't make sense to translate the questionnaire.

Measurement and Procedures

After determining the research sample, students in both the experimental and control groups will be tested at the beginning and end of their second year of language learning. They will take the ACTFL Oral Proficiency Interview exam. All classes will be

observed by two observers using a structured checklist twice in the Fall and twice in the Spring. As part of this checklist the observers would have to check implementation to assure the program is being used the way it was designed to be used.

I plan to use the ACTFL Oral Proficiency Interview (OPI) both at the beginning and end of the year for second year language students at the college level. Since the ACTFL raters pass through a rigorous training in order to be certified as raters, I plan to use them and find the money to fund this ($140 per exam). However, if that is not possible, I would go through the rater training myself and get certified as a Spanish rater. Spanish language classrooms will be the focus since that is the most prevalent language in the United States. It is worthwhile to explore the use of this test since this evaluation method has been proven to be valid and encompasses the applied use of vocabulary as well. The rubric they use is listed below.

Proficiency Level	Global Tasks and Functions	Context / *Content*	Accuracy	Text Type
Superior	Discuss topics extensively, support opinions and hypothesize. Deal with a linguistically unfamiliar situation.	Most formal and informal settings from concreate to abstract perspectives. *Wide range of general interest topics and some special fields of interest and expertise.*	No pattern of errors in basic structures. Errors virtually never interfere with communication or distract from the message.	Extended discourse
Advanced	Narrate and describe in major time frames and deal effectively with an unanticipated complication.	Most informal and some formal settings. *Topics of personal and general current interest.*	Understood without difficulty by speakers unaccustomed to dealing with non-sympathetic listeners.	Paragraphs
Intermediate	Create with language, initiate, maintain, and bring to a close simple conversations by asking and responding to simple questions.	Some informal settings and a limited number of transactional situations. *Predictable, familiar topics related to daily activities.*	Understood, with some repetition, by speakers accustomed to interacting with language learners (sympathetic listener).	Discrete sentences
Novice	Communicate minimally with formulaic and rote utterances, lists, and phrases.	Most common informal settings. *Most common aspects of daily life.*	May be difficult to understand, even for speakers accustomed to interacting with language learners.	Individual words and phrases

(ACTFL website)

ACTFL has their own Center for Assessment Research & Development to ensure validity and reliability in their tests. They have determined certain guidelines for their assessments which more or less follow Crocker and Algina's suggestions regarding test development. The purpose of the Oral Proficiency Interview is to evaluate someone's proficiency in a language and the construct and content domain evaluates the test-taker's ability to communicate through initiating, maintaining, and ending conversations, discussing topics extensively with supporting opinions and hypotheses, and communicating in unanticipated situations of linguistic complexity (ACTFL website).

Using this rubric would provide a good framework for evaluating fluency. Participants would be divided into the four areas above: Novice, Intermediate, Advanced, and Superior. Then, based on their pre-test scores, they would be matched with another participant at the same level in their group. This would help control the extraneous variables so there would be more internal validity. The exclusion criteria would also help with this.

Since I plan to select any school that uses virtual reality in language learning and participants from within that limited pool, I would hope to assure some kind of external validity. I may find, while researching this, that the schools who have these virtual reality resources are more prevalent in certain types of communities, in which case population validity may suffer.

Another thing I would do to ensure test-retest reliability is to see if the scores are consistent over time, so it might be worth it to have a two-year study if time and finances allow. I would also have a rigorous training program to ensure inter-observer reliability. As part of the initial testing, I would assign two observers to a class of students and make sure that they document how the materials are administered since a lack of strict adherence to the virtual reality method could affect the outcome. Many researchers have pointed out that how virtual reality is administered affects its effectiveness. I suppose you could say the same about those using the conventional way of language teaching. It's how you teach and how and what activities you choose to integrate.

Data Analysis

Following the rubric above, students would be assigned a level of oral proficiency of Novice, Intermediate, Advanced and Superior. They would have two sets of results: before and at the end of their second year. There are further categories of distinction: Global Tasks and Functions, Context/Content, Accuracy and Text Type. These would have to be analyzed as well since a student may improve but may not improve on all of these categories. I chose second year language students because by the end of the first year they should be familiar with gender and plural distinction, adjectives, and present, past and future tenses. In their second year of language learning, they would get more practice with these concepts and be at the cusp of conversation. Some improvement is expected, since they will be learning some new concepts as well.

I would analyze the pre- and post-test scores within the pair in the experimental group and see what the standard deviation is between the two scores and then compare

and contrast that with the matched set of scores from the control group. I will employ matching only within the same class to assure more internal validity and account for teacher variation and program implementation. Since this is a quasi-experimental design with matching and pre- and post-tests and a focus on second year language students, the internal validity should be fairly high. I will then use an independent t-test to determine if there is enough of a significant statistical difference to reject the null hypothesis.

I will use Cohen's D to calculate the effect size once the means of the scores and the standard deviations are determined. As much as I would hope to have a large effect size, I expect the sample size will be small since there will be a small pool of universities to choose from and only two variables. Furthermore, there will be a cost of $140 to administer the Oral Proficiency Interview each time so it'll cost $280 per participant. There will also be a cost to employ two observers per class, three times a year. Therefore, the size will have to be limited.

Conclusion

I hope to reject the null hypothesis and demonstrate that virtual reality is important to developing language fluency. I suspect that it is and that it'll be used more at the university level. Virtual reality is already prevalent in medicine and aviation by creating immersive experiences in those fields, so I believe they can do the same for language. Even though my focus is on fluency, there are many other benefits to virtual reality such as vocabulary acquisition, motivation, and cultural understanding. Virtual reality can be a real game-changer for our country and our world and change the course of learning.

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