

# Assessing Students' Attitudinal Response towards the Use of Virtual Reality in a Mandatory English Class at a Women's University in Japan

Felix David

**Abstract**—The use of virtual reality (VR) technology is still in its infancy. This is especially true in a Japanese educational context with very little to no exposition of VR technology inside classrooms. Technology is growing and changing rapidly in America, but Japan seems to be lagging behind in integrating VR into its curriculum. The aim of this research was to expose 111 students from Hiroshima Jogakuin University (HJU) to seven classes that involved VR content and assess students' attitudinal responses toward this new technology. The students are all female, and they are taking the "Kiso Eigo/基礎英語" or Foundation English course, which is mandatory for all first- and second-year students. Two surveys were given, one before the treatment and a second survey after the treatment, which in this case means the seven VR classes. These surveys first established that the technical environment could accommodate VR activities in terms of internet connection, VR headsets, and the quality of the smartphone's screen. Based on the attitudinal responses gathered in this research, VR is perceived by students as "fun," useful to "learn about the world," as well as being useful to "learn about English." This research validates VR as a worthy educational tool and it should therefore continue being an integral part of the mandatory English course curriculum at HJU.

**Keywords**—Virtual Reality, smartphone, English Learning, curriculum.

## I. INTRODUCTION

ALTHOUGH VR has been around for some time now, the recent developments in immersive technologies – in terms of visualization and interactions – have made VR increasingly attractive in the education field and therefore has the potential to be a useful tool for teaching English as a second language (ESL). The latest VR head-mounted displays (HMDs) allow users to experience a high degree of immersion [1]. Immersion here means how involved a user is in a virtual environment and how the awareness of time and the real world often becomes disconnected, thus providing a sense of actually "being there". In 2015, VR specialist Freina & Ott [2] defined this term as "a perception of being physically present in a non-physical world by surrounding the user of the VR system created with images, sound, or other stimuli" so that a participant can feel like he or she is perceiving it like a first-hand experience. Moreover, VR has been described as the learning aid of the 21<sup>st</sup> century [3]. Multiple VR researchers have suggested that students retain more information and can better apply what they had learned after participating in VR exercises [4]. Considering the potential learning enhancement through VR use, it is

understandable why researchers, organizations, and educators nowadays look at this technology closely, trying to add an extra dimension to the classroom with respect to both teaching and learning.

Finally, in spite of the technological advances that keep coming in, there is a growing sense in the VR community that VR has yet to take off. A BBC article [5] on January 10<sup>th</sup> aptly titled "What went wrong with virtual reality?" did a great job at highlighting the various disappointments of VR despite the initial hype around this new comer only a few years ago.

## II. METHODS

### *Participants*

In all, 111 students from the HJU participated in this research. They are all female students and they are taking their "Kiso Eigo" or "basic English" class which is mandatory for all first- and second-year students. A total of four full-time English teachers were responsible for these Basic English classes but only one teacher's students were using VR in class. Of those 111 students, 100% own a smartphone and these smartphones had high quality screens. Three students did not have a 4G or 5G connection and had to rely on the free Wi-Fi connection provided by the university which was not always consistent for all classrooms. All students agreed to participate in the experiment and have their data used for the purpose of this research.

### *Procedure*

Two questionnaires were given to 111 students. The first questionnaire was given at the beginning of the semester to assess the students' level of enthusiasm about incorporating VR technology in their mandatory English class and to verify if they had previously been exposed to VR technology. This first questionnaire also aimed at gathering data on their ownership of a smartphone (VR headset models used in this experiment required a smartphone), in what condition their screen was (quality of the image) and what type of internet connections were at their disposition (4G, 5G and Wi-Fi).

The treatment itself consisted in seven different lesson plans for 90 min lessons. At the core of each lesson was a VR video available on YouTube. The VR videos that were selected were around 5 minutes long ranging from the shortest one of 3 minutes and the longest of 7 minutes. VR is not only a new

Felix David is with Hiroshima Jogakuin University, Japan (e-mail: canadian.caravan@gmail.com).

medium but it can potentially be an uncomfortable one. Strapping a highly technological brick to one's face while likely feeling disoriented, or even sick, is not the most natural thing to expose students to. A general rule for the ideal length of a VR video is that it should be as short as possible while still conveying what you want to convey. With this in mind, many have observed a significant drop-off of viewers for YouTube videos over the 5-minute mark. The rather affordable VR headsets used in this experiment with sometimes unreliable in-class Wi-Fi means that videos are not watched by students at their highest resolution possible.

The seven topics were "The International Space Station", "Visiting Petra", "Victoria Falls", "Visiting Switzerland", "The Great Wall of China", "Dinosaurs" and "Rio de Janeiro". The Basic English class (or Kiso-Eigo) at HJU has four pillars; speaking, listening, reading and writing. These four components had to be part of every VR lesson plan. Some warm-up questions were discussed at the beginning of the class to promote discussion such as "What is Brazil famous for?" and "Have you heard of Capoeira?". For the reading section, students had a list of 10 questions to answer using "Simple English Wikipedia" and many answers were given in the VR video so students had to listen carefully to the guide's voice. For the writing part, about 10 minutes at the end of the class were allocated to writing a postcard in English. The premise was that after the immersive VR experience in Rio de Janeiro for example, students had to imagine themselves still standing near the giant statue of Christ the Redeemer and write a postcard from Brazil.

The second questionnaire was given online using a Google Form at the end of the semester after the seven VR classes were conducted in the classroom. Due to the surge in COVID-19 cases, all classes at the end of the semester of February 2022 were conducted online and a Google Form questionnaire was a great alternative to a paper questionnaire. The first few questions were more technical regarding the quality of the

internet connection when using VR, their smartphone's condition, and preferences in Internet access (4G/5G vs Wi-Fi). This was followed by five simple questions:

1. Did you feel sick or dizzy while watching VR videos?
2. Do you think using VR during your English class is fun?
3. Do you think using VR during your English class is a useful tool to learn about the world?
4. Do you think using VR during your English class is a useful tool to learn about English?
5. Do you think VR classes should continue next year for "Kiso Eigo"?

A 5-point Likert scale was used by the respondents to quantify their subjective opinion on these questions. The final two questions of the questionnaire fall outside of this specific research objective due to their unquantifiable nature but could nonetheless shed some light on the results of the previous five questions. These open-ended questions were; "give one or two suggestions on what you want to see in VR" and "give your opinion of VR in class in 40 words or more".

### III.RESULTS

The first questionnaire which was given at the start of the semester before any VR lesson revealed that over 99% of students were willing to give it a try and include VR in their English lesson. The one student that objected had heard that VR causes headaches and did not want to try. Of the 111 respondents, 100% owned a smartphone and only 9.9% had trouble connecting to the free Wi-Fi on campus; 2.7% did not have a 4G/5G connection and were solely reliant on the free Wi-Fi. The use of the free Wi-Fi by students was fairly well distributed as shown in Fig. 1 where 1 in the x axis means "almost never" to 5 being "almost always". It suggests a flexibility amongst students to switch back in forth between these two options depending on the speed of the internet on a given day.

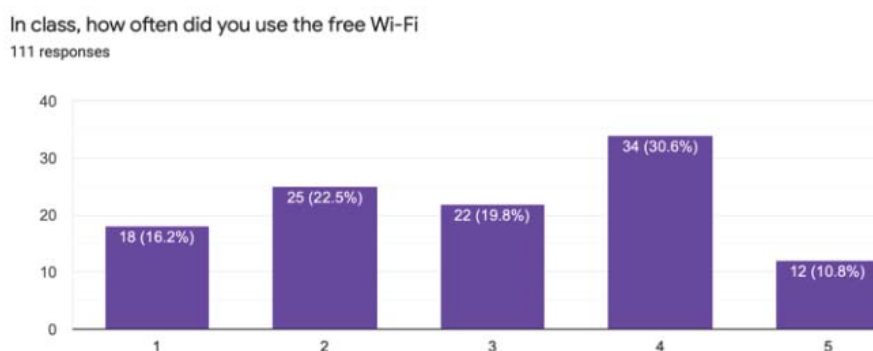


Fig. 1 In class, how often did you use the free Wi-Fi?

For the condition of the smartphone's screen, two students (1.8%) reported a very poor quality due to a cracked screen or air bubbles trapped between the protective sheet and the screen itself. Meanwhile, 83.7% reported that their screen was in either "very good" or "perfect" condition.

The second questionnaire was given towards the end of the semester after the seven VR classes, almost 4 months after the first questionnaire. Unsurprisingly, 87.3% reported that it had been their first experience using VR technology.

What is the condition of your screen (big cracks = 2, few little scratches =4)

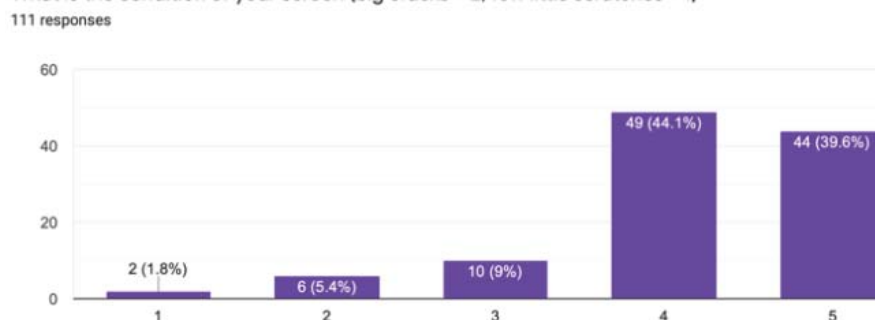


Fig. 2 What is the condition of your screen?

Did you feel sick or dizzy while watching VR videos?

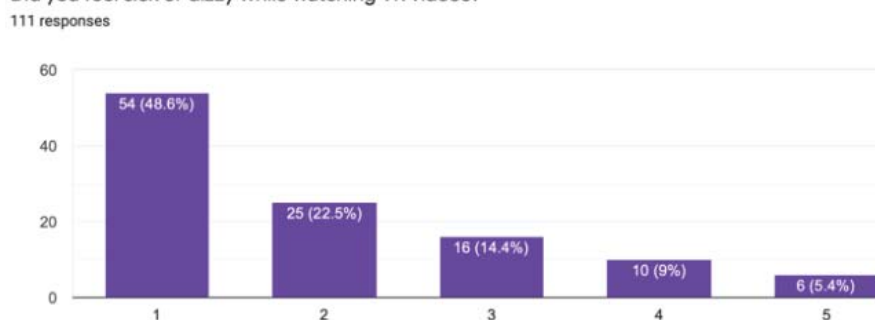


Fig. 3 Q1-Did you feel sick or dizzy while watching VR videos?

Do you think using VR during your English class is fun?

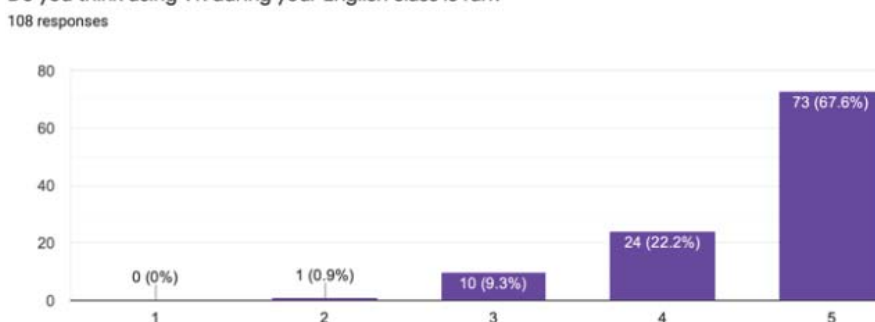


Fig. 4 Q2-Do you think using VR during your English class is fun?

Feeling disoriented and dizzy in VR is to be expected, especially with first time users. The VR helmet that is used by students has three controllers at the top to have a better fit to the individual since the distance between the eyes differs from one person to the other. These controllers can also adapt to the different strength of each eye which means that glasses should be removed before putting on the VR headset. Based on the results of this question, it seems that only a minority of the students either agreed (9%) or strongly agreed (5.4%) with feeling dizzy. This is a general feedback on the overall experience of using VR over a period of 4 months, it is therefore not clear if the feeling of dizziness subsided over time as the users gained experience on how to adjust the three controllers. In spite of repeated instruction from the teacher, some students in the first and second VR classes did not know they had to push the VR icon before watching the video on YouTube and that is

a guaranteed headache due to heavily distorted images that the brain desperately tries to make sense of.

Clearly the vast majority had a good time using VR. Out of 111 students, only one disagrees with the statement. Obviously, the goal was to have everyone onboard but realistically, there will never be any particular activity for teaching ESL that would get 100% support from that many teenagers “forced” to take this mandatory class.

The question of Fig. 5 was important given that it is in the nature of VR to be able to experience what is usually out of reach in the real world. Most of the students do not have a passport and thanks to VR, it was a way to travel abroad and “see” some of the wonders of the world. It goes without saying that the video in space and the one about dinosaurs are sights that cannot be easily seen even with a passport; 63.6% opted to “strongly agree” with the statement. The one person that chose “somewhat disagree” might have experienced a high level of

dizziness or simply was not very interested with the choices of destinations.

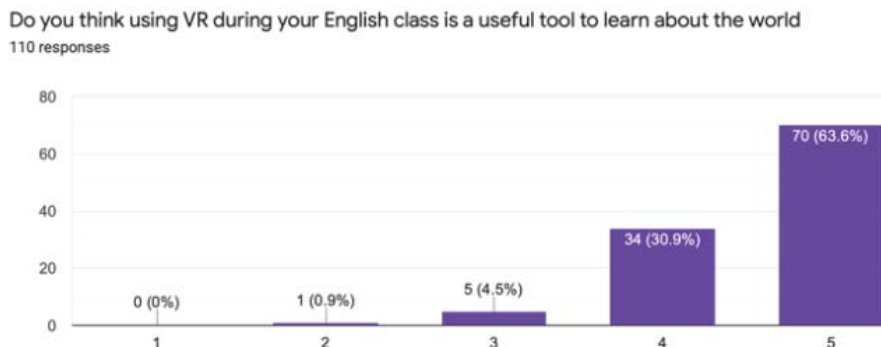


Fig. 5 Q3-Do you think using VR during your English class is a useful tool to learn about the world?

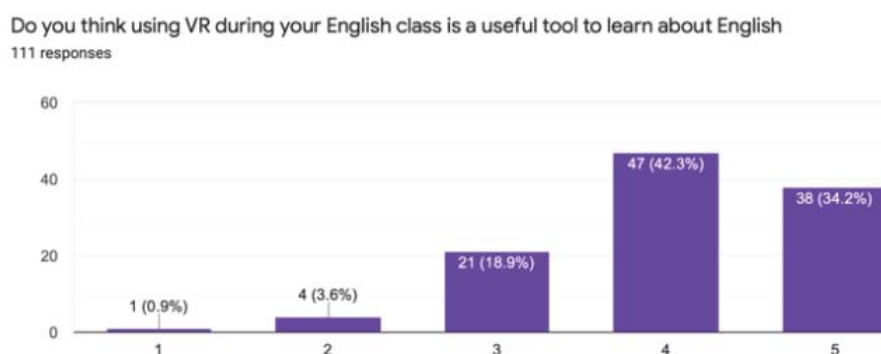


Fig. 6 Q4-Do you think using VR during your English class is a useful tool to learn about English?

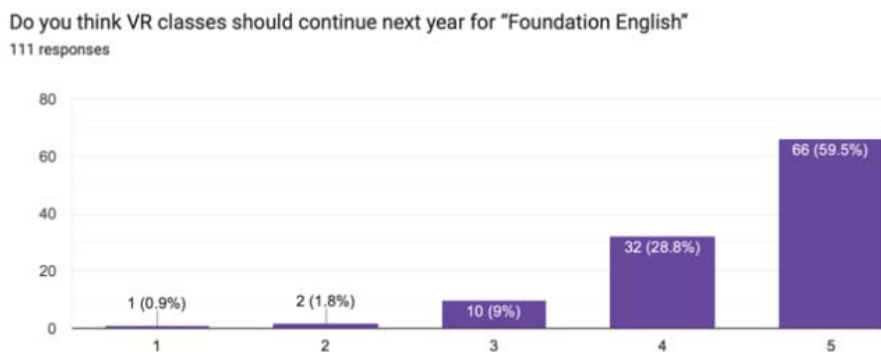


Fig. 7 Q5-Do you think VR classes should continue next year for the "Foundation English" class?

Fig. 6 is a similar result from Figs. 4 and 5 in the sense that the attitudinal response is overwhelmingly positive but this time the majority of students selected "somewhat agree" over "strongly agree" with the statement about how useful VR is in learning English. Perhaps some students are used to more traditional classes of ESL conducted in Japanese high schools where students have to memorize grammar rules and long vocabulary lists. Fig. 6 highlights the fact that VR alone does not guarantee that English is being learnt, it is just one tool amongst many in the teacher's tool box.

Fig. 7 is probably the most important in this research given that it is the question that validates VR as a worthy educational tool and should therefore continue being an integral part of the mandatory English curriculum. Fig. 7 is not only in line with

the previous four figures (i.e. Figs. 4-6) but is a logical result of the different strong points of VR that put together becomes a very positive learning experience to students.

#### IV. CONCLUSIONS

##### *The Technical Environment*

The reason why this research was even possible is thanks to having 100% of our students owning a smartphone which is a mobile computer with an integrated screen and its own gyroscope. A gyroscope uses Earth's gravity to determine its orientation. In smartphones it is also termed "gyro-sensors" and they measure the rate of rotation around the device's x, y and z axes. All this marvelous technology is packed into a small

device that comes as “free” to an English teacher. With a minimum investment in VR headsets, VR could become part of the curriculum of our mandatory English class. The other important point was the Internet availability in each classroom. At HJU university, free Wi-Fi is accessible to all students even if the quality of the connection was not always constant as almost 10% of students reported having difficulties connecting to the free Wi-Fi. It also explains the flexibility amongst students to switch back in forth between the free Wi-Fi and the 4G/5G option depending on the speed of the internet connection on a given day (see Fig. 1). Fig. 2 shows that a small minority had damaged screens to a point where the quality of the VR experience was compromised. One easy solution to this problem was pairing students and allowing two students to use the same headset.

### Feedback

Fig. 3 shows that even if dizziness was experienced by some students, it did not have a strong negative effect on their overall experience. More research should be done to assess if the feeling of dizziness subsided over time as the users gained experience on how to adjust their headset’s controllers to their individual needs. Figs. 4-6 all point in the same direction but from different angles.

Fig. 4 shows that VR technology allowed the class to be “fun”, which means that students were interested and engaged emotionally with the information presented to them. The research done by Freina and Ott [2] suggests that emotionally engaging content should help students retain knowledge. Fig. 5 indicates that students recognized that they were exposed to sights around the world that they would probably never have the chance to see in person but also sights that are out of reach without VR such as walking with dinosaurs and floating in the International Space Station. Learning ESL in Japan is meant to broaden the mind of students and open the door to a more international way of thinking. VR clearly has something to offer in that respect.

Fig. 6 shows that students perceive VR as a useful tool to learn English. While still being very positive, it is the only figure that has a majority of students choosing “somewhat agree” over “strongly agree”. One possible explanation is that in the mind of many students, VR is fun and interesting but is not perceived as a learning tool. A large number of students openly admit that they do not really like studying English, many to the point of hating it. So it could be that for these students, having fun with VR cannot equate to studying. Another reason could also be that the use of VR as a learning tool is very new to these students and is quite different from the more traditional teaching methods used by Japanese high school teachers.

Fig. 7 answers the question “Do you think VR classes should continue next year for “Kiso Eigo/Foundation English”. This figure summarizes Figs. 4-6. It is a logical result of the different strong points of VR that put together becomes a very positive learning experience to students. It validates VR as a worthy educational tool and should therefore continue being an integral part of the mandatory English course’s curriculum.

Given the attitudinal responses gathered in this research, students perceive VR as “fun”, useful to “learn about the world” as well as being valid tool to “learn about English”. More research is needed to go beyond the subjective perception of students on the usefulness of VR and actually test the impact on the student’s English proficiency.

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