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How do virtual reality lessons affect EFL learners' perceptions of speaking English?

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Abstract

This study investigates the effects of fully immersive Virtual Reality (VR) lessons on Japanese English learners' perceptions of speaking English. Seven undergraduate students volunteered for one-hour interviews after participating in VR English conversation lessons over seven months using Oculus Quest 2 VR headsets and the Immerse platform. Participants reported a favorable acceptance of VR for English-language learning because of its fun and comfortable nature compared to face-to-face or Zoom lessons. They felt more comfortable and less anxious when communicating in English through avatars and appreciated the gaming aspects of the VR experience. A positive shift was found in the attitudes of those who had not previously experienced English conversation lessons. However, participants highlighted the need for technical improvements in VR technology. These findings suggest VR's potential as an effective language-learning tool.

Keywords: *Virtual Reality (VR), English language learning, foreign language anxiety, avatar.*

1. Introduction

Since the onset of the COVID-19 pandemic, Virtual Reality (VR) tools have emerged as a viable option for remote learning. When applied to language education, these tools are claimed to facilitate learning through communication in virtual contexts (e.g. Chen et al., 2022; Zheng et al., 2022). VR-based communication with avatars can alleviate learners' psychological burden when speaking English and mitigate foreign-language anxiety (Melchor-Couto, 2017). In their research, the authors investigated the effects of fully immersive VR on Japanese English learners' conversational skills, anxiety and confidence levels during English conversations, and intercultural sensitivity. The results suggest that VR reduced anxiety toward English conversation and improved participants' confidence (Satake et al., forthcoming). Therefore, this study explores the reasons behind these observed effects.

1.1 Literature review

VR is increasingly recognized as an innovative tool for pedagogical purposes, particularly in language education. Ma and Zheng (2011) identified three distinct levels of immersion within VR environments: non-, semi-, and fully immersive. Non-immersive environments are typically computer-based, using conventional input methods

such as a keyboard and mouse and limited display capabilities. Semi-immersive VR uses larger screens and may incorporate gesture recognition for more organic interaction, whereas fully immersive systems employ head-mounted displays to create a compelling sense of total immersion.

In an analysis of 26 studies published from 2015 to 2018, Parmaxi (2020) found that primarily non- and semi-immersive VR applications enhanced interaction authenticity and cultural learning and reduced anxiety related to foreign-language learning. However, Parmaxi emphasized the need for educators and experts to thoroughly comprehend VR's potential benefits and applications within the language-education context before widespread deployment.

Dhimolea et al. (2022) examined 32 scholarly articles published between 2015 and 2020, primarily focusing on non- and semi-immersive VR in language education. They concluded that repeated exposure to VR was crucial for successful learning, with the technology proving particularly beneficial for vocabulary acquisition, and that learners' attitudes toward language learning within VR environments were generally positive.

In our previous study (Satake et al., forthcoming), we investigated the effects of fully immersive VR on English conversational abilities, emotional responses, anxiety levels, self-confidence during English conversation, and cultural sensitivity of 102 intermediate-level Japanese English learners (59 experimental and 43 control). Our findings did not reveal statistically significant differences in spoken-language test scores between groups or between the pre- and post-test results. However, we identified a notable enhancement with a substantial effect size in the questionnaire responses. There was no significant change in cross-cultural sensitivity. Students reported that interacting in English with VR avatars was less stressful and more comfortable than in-person English interactions. The research thus supports that the instructional application of VR in English-speaking classes can potentially diminish students' anxiety and boost their confidence in English-speaking abilities.

Although we previously confirmed reduced foreign-language anxiety and increased confidence among Japanese learners in VR English conversation lessons, the reasons remain unclear. Accordingly, this study interviewed participants in the earlier study regarding these effects.

2. Method

2.1. Participants

Figure 1. Screenshot of the Immerse platform.

Seven individuals were selected from the original pool of 59 participants who engaged in VR English conversation lessons as part of our previous study. They received a comprehensive explanation of this study and agreed to participate. The authors' previous research involved participants using Oculus Quest 2 VR headsets and the Immerse platform for English lessons (see Figure 1) several times a month over seven months, featuring avatar-based interactions (Satake et al., Forthcoming). Participants are identified using alphabetical designations (e.g. Student A, B) to ensure anonymity.

2.2. Interview

Two of the authors conducted one-hour Zoom interviews in Japanese with the seven participants, organizing them in pairs or trios. We asked all the participants the same questions based on a pre-established questionnaire. When the participants did not fully answer a question, we moved to the next question without pressing them further. The questionnaire comprised the following items:

1. Have you ever attended non-VR English conversation lessons?

① If yes, please describe the lessons (including your age, frequency, duration, and whether they were conducted face-to-face). Could you share what you liked and disliked about the lessons?

② If no, could you explain why you have not considered attending such lessons until now?

2. What aspects did you like and dislike about the VR English conversation lessons?

3. Has your perception of English conversation changed since your experience with VR lessons?

4. Are there any areas in VR English conversation lessons that need improvement?

The authors transcribed the recorded interviews and created a corpus of 1787 words from 109 responses. This corpus underwent morphological analysis using KHCoder, a quantitative text-analysis software, to separate the words for subsequent cluster analysis. In Japanese, words are written without spaces, necessitating this approach. Cluster analysis, a statistical technique that groups similar items into clusters, provided an overview of the participants' statements. Finally, each response was assigned the number of the respective question, and qualitative analysis was conducted.

3. Results and discussion

3.1. Overview

Figure 2 illustrates the results of the cluster analysis. From left, the first cluster comprises words such as 印象 'impression', 見る 'see', 実際 'actual', 海外' overseas', 面白い 'interesting', アバター 'avatar', 対面 'face-to-face', and 良い 'good'; the second, 自分 'I, me', 空間 'space', 話せる 'able to speak', 多い 'often', 英語 'English', and 伝わる 'understood'; the third, *VR*, 意味 'meaning', *Zoom*, 授業 'class', 英会話 'English conversation', 文法 'grammar', 行く 'go', and 慣れる 'get used to'; the fourth, 先生 'teacher', 楽しい 'fun', 受ける 'take', 意識' awareness', and 言う 'say'; the fifth, 難しい 'difficult', 家 'home', 本当に 'really', ゲーム 'game', 感覚 'feeling', 変わる 'change', and 声 'voice'; the sixth, メリット 'advantage', 内容 'content', 知る 'know', 相手' other people', and 顔 'face'; and the seventh, 向こう 'companion', 話す'speak', ある程度 'to some extent', 会話 'conversation', 楽 'comfortable', 表情 'expression', and 見える 'see'. Referring to the interview corpus and the words' context, the results of the cluster analysis can be summarized as follows:

While face-to-face conversation is good, seeing overseas as an avatar in a virtual space was interesting. Their English was often well understood when they spoke in the virtual space. Being accustomed to VR, they could speak in English conversation classes despite not being good at grammar. VR lessons were better than Zoom lessons, with fun classes. Though operating VR equipment at home was difficult, it felt like a game, and they did not feel the need to change their voice. Not showing their face to others was advantageous, and conversations were comfortable when companions did not see their facial expressions. The participants' assessments of the VR English conversation lessons were favorable.

While Chen and Kent (2020) suggested that learners could speak more freely and comfortably when anonymized by avatars, this study indicates that even when learners were aware of each other's identities, the inability to see facial expressions put them more at ease during conversations. This may reflect a characteristic caution among Japanese learners in communication settings.

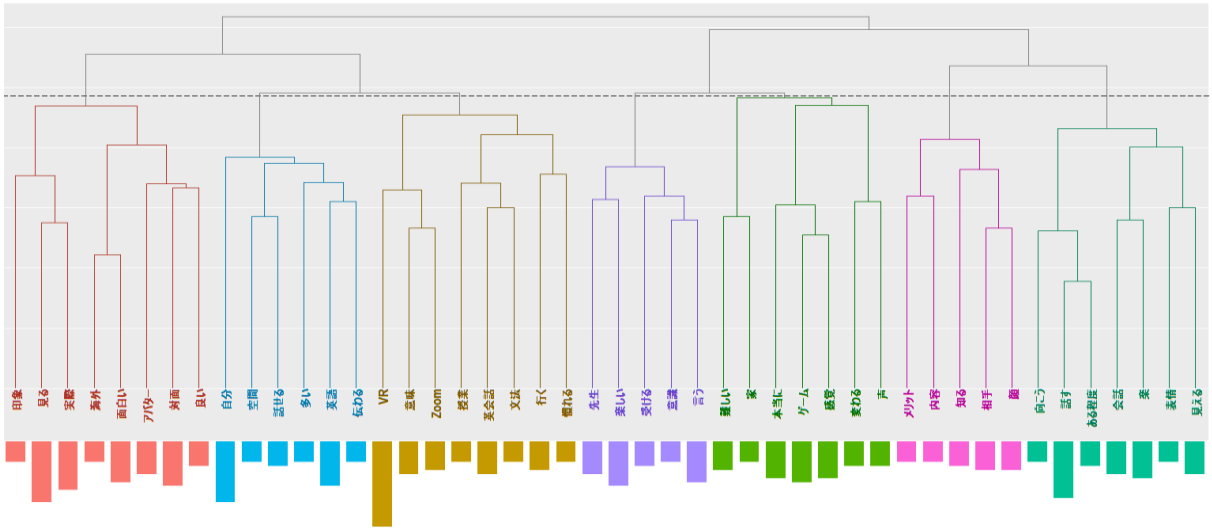

Figure 2. Cluster analysis of the interviews.

3.2. Experience in English conversation lessons

Three of the seven participants (Students A, C, and D) had previous experience with English conversation lessons. Students C (who had weekly lessons from age five to elementary school) and D (who had lessons during kindergarten) had face-to-face English conversation lessons in their childhood, while Student A had online English conversation lessons four times a week after entering university. Student C spoke about enjoyable lessons, such as playing games, and appreciated seeing people's facial expressions in face-to-face lessons. Those with experience in English conversation lessons generally had less foreign-language anxiety and therefore positive feelings about it. The other four participants (Students B, E, F, and G) had no prior experience with English conversation lessons. Student E believed that English should be spoken with grammatical perfection, a sentiment that reflected some foreign-language anxiety. Generally, when this study commenced, those with previous experience held positive feelings about English conversation, while those without experience had somewhat negative feelings.

3.3. Assessment of the VR English conversation lessons

Responses regarding the participants' assessment of the VR lessons comprised 1607 words, accounting for 89.2% of the responses and making it the most talked-about subject, about which participants were most interested in expressing their opinions. Because nouns indicated the topics and the participants' assessment was reflected in adjectives and adjectival verbs, we focused on the high-frequency nouns, adjectives, and adjectival verbs that the participants used. Table 1 shows the nouns, adjectives, and adjectival verbs that appeared more than five times in the assessment section. The nouns imply that the participants were interested in discussing topics related to VR English conversation, their conversation partner and/or teacher, face-to-face and Zoom lessons, feeling like playing a game, and using avatars. The high-frequency adjectives and adjectival verbs suggest that the participants positively assessed the VR English lessons. Referring to the context before and after the high-frequency words, we can summarize the participants' assessment: They enjoyed visiting various places abroad in the VR space, having fun playing sports, and engaging in game-like activities with the teacher and other participants. Avatars hid their faces from their conversation partners, allowing them to converse in English

more comfortably. Of the English conversation methods, face-to-face was considered the best, followed by VR. They would prefer VR over online Zoom lessons if the cost were the same.

Table 1. High-frequency nouns, adjectives, and adjectival verbs in the assessment section.

Noun	Frequency	Adjective/Adjectival verbs	Frequency
VR	21	楽しい' fun'	11
(英)会話 '(English) conversation'	16	面白い 'interesting'	10
相手・向こう' other people/companion'	12	楽だ 'comfortable'	9
英語 'English'	11	良い 'good'	6
対面 'face-to-face'	11		
ゲーム 'game'	10		
先生 'teacher'	8		
アバター 'avatar'	7		
Zoom	7		

Among the high-frequency words, 'game' and 'avatar' distinguished VR English conversation lessons from other English conversation lessons. Participants pointed out that the game-like aspect made it easy to continue conversations without overthinking about what to say, a common occurrence in face-to-face or Zoom online lessons. Regarding the use of avatars, participants found it comfortable not to have their facial expressions revealed, to read their partner's facial expressions, or to physically prepare for the lesson.

One participant appreciated using an avatar because it allowed them to avoid feeling awkward when experiencing anxiety while speaking English. Some participants mentioned that not needing to interpret the teacher's facial expressions made them feel more comfortable while speaking in English because they did not have to consider the teacher's feelings. The female participants especially highlighted the absence of a need to physically prepare. Nevertheless, there was a contradiction in that face-to-face lessons, in which expressions are visible, were still considered the best mode of lessons, and the interviews did not yield any convincing reasons for this preference.

3.4. Changes in impressions of speaking English

No significant change was found in the attitude toward speaking English among the participants with prior experience with English conversation lessons. However, students without such experience reported a positive shift in their perception. They found VR-based English conversation lessons fun, enabling them to speak even without perfect grammar. Moreover, their fear of speaking in English diminished after these VR lessons. Briefly, positive feelings about speaking English did not change among those who had experienced English conversation lessons, but they changed from negative to positive among those without such experience.

3.5. What needs to be improved in VR English conversation lessons?

The participants' feedback indicates several areas in VR technology that require improvement, including audio issues, such as: difficulties with hearing; space-related challenges when using VR at home and during

movement; poor responsiveness of movement controls to match users' desired actions; the complicated setup process; and discomfort, such as headaches from the weight of the VR goggles. Furthermore, the participants suggested the option to choose between avatars and real faces, depending on their preference to read facial expressions. Additionally, they recommended personalizing the avatars to better reflect individual characteristics. In short, the participants' feedback suggests a need for various improvements in VR technology.

4. Conclusions

Our study suggests that VR English conversation lessons can positively impact Japanese English learners by creating a comfortable learning environment. The game-like nature of VR and avatars eases the pressure associated with face-to-face interactions, thereby reducing foreign-language anxiety. While participants with no prior English conversation experience reported a positive attitude shift toward speaking English, several technological improvements were suggested to enhance the VR learning experience. Future research should aim to optimize the use of VR in language learning and address its limitations.

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