

Development of Japanese Language Learning Content Using Immersive Virtual Reality

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Abstract

In recent years, remarkable progress has been made in immersive virtual reality (iVR). However, iVR in Japanese language education (JLE) lags behind education for other languages. In this paper, the author reviews iVR Japanese language learning content that is currently under development. Further, the author argues that in order to collaborate with experts in different fields during the development process, it is necessary to accumulate knowledge in those fields and to consider how to reconstruct such knowledge.

Keywords: iVR, virtual environments, collaborate, Japanese, language education

要旨

本稿では、現在開発中の iVR 日本語学習コンテンツについて概説した上で、異分野の研究者と協働する際には、相互の分野を理解するためにも、異分野の知見を個人の中に蓄積し、その知見を日本語教育分野で再構築する必要があることを論じる。

キーワード：没入型 VR、仮想環境、協働、日本語、言語教育

1. Introduction

Recent years have witnessed the rise of technologies that incorporate virtual environments (VEs) and computer-generated, 3D interactive settings. In particular, the development of immersive virtual reality (iVR) — which has a 360-degree field of view and allows users to immerse themselves in VEs by rotating their heads and bodies to look in any direction — has been remarkable. iVR allows users to experience VEs with a high degree of realism, as if they were ‘being there’ (Peixoto

et al. 2021), making them ideal language learning environments as they include social learning, immersive learning, creativity, and relevance (Peixoto et al. 2021; Solak and Erdem 2015). iVR, then, can provide learners with a sense of realism in the learning environment and can allow each learner to act differently from his/her peers on a single online platform. Integrating iVR into the classroom can present a different learning environment and offer various benefits (Solak and Erdem 2015).

The use of iVR in Japanese language education (JLE) is limited to a few commercial applications, and its development has been slower than in other languages (Jian 2020). The reason for the lack of progress in the expansion of iVR in JLE is that the growth of iVR content requires the cooperation of not only language education experts, but also programmers and others, in addition it is costly to create full-fledged educational content that can be expected to be pedagogically effective (Hatasa and Baydar 2021; Jian 2020). The author is currently building iVR Japanese language learning content with content development companies to overcome this problem. In this paper, the author introduces iVR Japanese language learning content and discusses the importance of working with experts in content development.

2. Development organization for iVR Japanese language learning content

Creating iVR content for Japanese language learning requires the cooperation of programmers and other experts, in addition to a great deal of money to produce full-fledged educational content (Hatasa and Baydar 2021; Jian 2020). For this reason, previous studies have used 360-degree videos posted on YouTube (Jian 2020) and an application called Wander, which projects 360-degree photos from Google Street View (Hatasa and Baydar 2021). However, there is still no full-fledged educational content specific to Japanese language learning.

Due to Japan's declining birthrate and swiftly aging society, Japanese society is now forced to rely on foreign workers for much of its labor. For this reason, Company A, a web content development company, was looking for a social contribution project to create an environment in which foreign workers can smoothly receive JLE before they come to Japan. In response to Company A's request for cooperation in content development, the author, Company A, and Japanese Language School B launched a joint project, in November 2019, to develop iVR JLE content. Since this

endeavor is also a social contribution project of Company A, a great deal of support was provided in terms of cost, and it was possible to set up a system to develop full-scale educational content, as described in previous studies (Hatasa and Baydar 2021; Jian 2020).

3. Development of iVR Japanese language learning content

3.1 Overview of iVR Japanese language learning content

The iVR Japanese language learning content currently under development affords beginner Japanese language learners authentic experiences in VEs resembling Japanese towns, and to become proficient enough to live in Japan. The device used is an Oculus Quest 2 (Facebook Technologies, LLC), which can be employed as a headset alone, and can reproduce visual and physical movements (including hand movements) with a controller held in both hands.

At present, the learner can choose between a convenience store (Fig. 1) and a pub (*izakaya*) (Fig. 2), institutions where he/she is likely to be involved either as a customer or part-time worker; there is a plan to increase the number of scenes in the future. In each scene, there is a ‘scenario mode’ in which the learner reads aloud a predetermined conversation with the computer, and a ‘free conversation mode’ in which the learner is assigned a location in the virtual world (such as a convenience store or a pub) where he/she can talk freely and role-play with other learners who are online at the same time (Fig. 3).

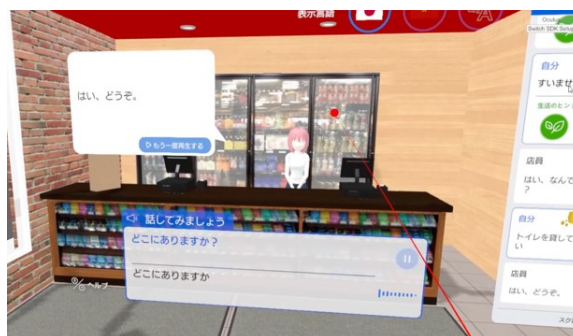


Fig. 1: Convenience store scene



Fig. 2: Pub (*izakaya*) scene



Fig. 3: Mode selection screen

3.2 Flow of iVR Japanese language learning content

When learners log into the content, it starts from the perspective of an avatar (a person who becomes one with the learner's movements in VEs) in a virtual town. The content proceeds as follows:

- 1) Walk around the virtual town and enter a convenience store.
- 2) Select the scenario or free conversation mode.

In the scenario mode:

- 3a) The learner chooses a scenario (from among multiple scenarios) in which he/she wants to learn.
- 4a) The learner engages in conversation according to the scenario.
- 5a) The computer performs an automatic evaluation.

In the free conversation mode:

3b) The learner selects the room he/she wants to enter.

4b) The learner has a free-form conversation with other learners in the same room.

In the scenario mode, multiple scenarios are provided (3a), but scenarios can also be added freely and teachers can add their own original stories tailored to the learner. Further, the computer conversation can branch out, or the voice can be recorded using the teacher's physical voice, thus providing the learner with a necessary and realistic conversation. Moreover, scenario-based conversation (4a) uses Microsoft's speech-to-text technology to transcribe what the learner has said and to measure the degree to which his/her speech coincides with the scenario. This allows for the entire scenario to be evaluated when it ends (5a). The voice from the conversation is recorded in the system so that the teacher can use it to provide feedback to each learner after the scenario is over.

The primary purpose of the free conversation mode is to provide a space for more open conversations. It is easy to imagine a chat room with scenes (3b). For example, in the case of the convenience store, learners can enjoy free-form conversations with each other (4b). In addition, face-to-face classes can make it difficult to be present in an actual location in role-playing, but with VEs, learners can immerse themselves in a scene where they can use the language.

In many cases, educational institutions are organized to bring learners together into one space. However, if we eliminate this premise, iVR Japanese language learning content can function from the sensory perspective of immersion, and also as an intercultural co-learning course where students from different linguistic and cultural backgrounds can learn through meaningful interactions. This point is significant for the future of JLE (Ito 2021), but due to limited space in this paper, it will be examined in future research.

4. Collaboration with experts in different disciplines

As seen so far, the iVR Japanese language learning content provides a realistic experience that differs from the learning that has primarily occurred via PCs and mobile applications. This new approach has been possible because of the collaboration between experts in JLE and in diverse fields, such as systems

engineers from web development companies. It is easy to see why JLE specialists would need to work with systems engineers from a technical standpoint when creating web content. On the other hand, systems engineers may think that using new technologies in various fields is desirable. However, the content production technology required by JLE does not necessarily have to be the most advanced. New technology attracts the attention of many people, and from the standpoint of content creators, it is understandable that they would want to work on incorporating new technology. However, in JLE — especially when building content for learners of Japanese — it is essential to think about how learners could benefit from learning Japanese along with the content. The question to be considered is not whether the technology is new or old, but what the learners need, what the issues are, and what the existing content lacks. In order for this to be understood in different disciplines, those in the field of JLE must be able to appropriately verbalize the challenges facing learners and the means to overcome them. Further, there is another barrier before the other person can understand what we in JLE have to say: the need to reconcile the assumptions underlying the other person's disciplinary expertise with one's own. To achieve this, everyone involved in the project must have an active understanding of each other's respective fields.

In recent years, JLE has drawn increasing attention amid changes in Japanese society. In the past, JLE has often focused on promoting its activities due to less attention than its social importance merits. However, as JLE has become increasingly vital in Japanese society, it has become necessary for JLE experts to collaborate with professionals in a wide array of societal disciplines. To understand each other's fields, individuals must accumulate knowledge from different areas and think about how to reconstruct such knowledge in JLE.

5. Conclusion

In this paper, the author has introduced iVR Japanese language learning content, which has not been developed in earnest in JLE until now. Moreover, this development process signals the importance of collaborating with experts from diverse disciplines in JLE. At present, there are approximately four million Japanese learners worldwide (Agency for Cultural Affairs, Government of Japan 2019; The Japan Foundation 2020). If we consider the number of people studying Japanese who do not belong to an educational institution, that figure is even higher.

COVID-19, which has been spreading since the beginning of 2020, has caused many educational institutions to shift their teaching methods from face-to-face to online classes. Initially, this was an emergency measure to prevent infection, but online classes — which enable education beyond physical distance and time — are also attracting attention more generally. In the future, it is unlikely that we will return to a situation of traditional face-to-face classes alone. Hence, we need to think more about online educational methods in JLE. In doing so, building cooperative relationships with experts from numerous fields will be essential.

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Bibliography

- HATASA Kazumi and BAYDAR Samet (2021). Nihongo kyōiku deno botsunyūgata VR no riyō ni kansuru tēan 日本語教育での没入型 VR の利用に関する提案 [Applications of Immersive Virtual Reality in Japanese]. *CASTEL/J 2021 Proceedings*. <kaken.sakura.ne.jp/castelj2021/on/PDF/86.pdf> [Accessed: 2021.8.24].
- ITO Hideaki (2021). From Native-Speaker Likeness to Self-Representation in Language: Views from the Acquisition of Japanese Transitive and Intransitive Verbs, *Acta Linguistica Asiatica*, Vol. 11, No. 1.
- JIAN Peiling 簡珮鈴 (2020). Nihongo kyōiku eno VR (Virtual Reality) dounyū ni tsuite no ichi tēan -- Google Cardbord no katsuyō wo rē toshite -- 日本語教育への VR (Virtual Reality) 導入についての一提案 —Google Cardboard の活用を例として— [An Approach of Applying Virtual Reality on Japanese Language Learning: Case Study of Using Google Cardboard]. *e-learning kyōiku kenkyū*, Vol. 14.
- PEIXOTO Bruno, PINTO Rafael, MELO Miguel, CABRAL Luciana and BESSA Maximino (2021). Immersive Virtual Reality for Foreign Language Education: A PRISMA Systematic Review. *IEEE Access*, Vol. 9.
- SOLAK Ekrem and ERDEM Gamze (2015). A Content Analysis of Virtual Reality Studies in Foreign Language Education. *Participatory Educational Research*, special issue 2015-II.

Government WEB material

Agency for Cultural Affairs (ACA) (November 1, 2019). *Rēwa gannendo kokunai no nihongo kyōiku no gaiyō* 令和元年度国内の日本語教育の概要 [Outline of Japanese Language Education in Japan in the First Year of Reiwa Era]. *Bunkachō Kokugoka* 文化庁国語課 [Japanese Language Division, Agency for Cultural Affairs]. <www.bunka.go.jp/tokei_hakusho_shuppan/tokeichosa/nihongokyoiku_jittai/r01/pdf/92394101_01.pdf> [Accessed: 2021.8.24].

Other WEB material

The Japan Foundation (2020). Survey Report on Japanese-Language education 2018. *The Japan Foundation*. <www.jpf.go.jp/j/project/japanese/survey/result/dl/survey2018/Report_all_e.pdf> [Accessed: 2021.8.24].