A BRIEF INVESTIGATION INTO THE POTENTIAL FOR VIRTUAL REALITY: A TOOL FOR 2ND LANGUAGE LEARNING DISTANCE EDUCATION IN JAPAN

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A BRIEF INVESTIGATION INTO THE POTENTIAL FOR VIRTUAL REALITY: A TOOL FOR 2ND LANGUAGE LEARNING DISTANCE EDUCATION IN JAPAN

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ABSTRACT

The emergence of new communications technologies in the 20th century opened up new avenues for sharing information and ideas. Traditional venues for information transfer such as the classroom can now incorporate technologies to expand the scope and sequence of communication beyond face-to-face contact hours. Distance education has leveraged new communications technologies to extend learning opportunities to new places and demographics. Distance education appears to be the future of instruction, but as of 2018 has only seen relatively minor adoption in the Japanese educational system. Some inherent weaknesses with technologies commonly used for online instruction may be the cause of this reception. However, technology continues to evolve and offer new, rich platforms for communication. Virtual reality (VR) allows users to enter and interact with virtual environments using their senses of sight, hearing, and touch. The affordances of VR may make up for the shortcomings of the current distance education model. This paper will explore the potential for VR as a tool in enhancing second language learning distance education, outlining some of its possible affordances and limitations.

INTRODUCTION

Distance education has been widely accepted around the world as a way to reach learners in various environments and situations. However, this trend has not been readily adopted by the majority of Japanese higher education institutions. In addition, the teacher-centered, one-directional methods of delivering information through distance education may not be the most effective for many learners. This paper will explore the affordances and limitations that are associated with both distance education and virtual reality (VR) education. Finally, the paper will conclude with an analysis of the rationale for improving distance education with VR technology. It may be beneficial for the Japanese context to further investigate new technologies to enhance and enrich distance education.

Distance Education in the Japanese Context

Current state of distance education

Within Japan, distance education is largely underutilized with only around 50 universities offering correspondence/distance education programs (Ministry of Education, Culture, Sport, Science and Technology, 2016). Distance education, while a valuable and flexible option for both students and teachers, also brings with it some limitations and concerns stemming primarily from the relative

lack of uptake of technologies that can aid in teaching and learning (Kyoto University, 2014; Nakamura, 2017). However, distance education could be an extraordinary addition to not only more secondary and tertiary schooling contexts, but also to continuing education, where non-traditional students in Japan are seeking new qualifications.

Affordances

Distance education is a valuable tool that could be applied to a wider range of universities across Japan if proper analysis of curriculum, technological development, and teacher training is conducted. There are a variety of benefits that are associated with this sort of learning. A large component to distance education is self-directed learning, which may lead to learner autonomy. Learner autonomy is defined as the ability for learners to be responsible for and make decisions about their learning (Holec, 1981, p. 3). In tertiary contexts, as distance education moves towards online, self-paced hybrid course materials (Nguyen, 2015, p. 311), it could lead to the development of autonomous skills like critical reflection, decision-making, and independent actions (Little, 1991, p. 4). Although distance education is associated with self-regulated learning, it does not guarantee that autonomous behaviors will form. There are additional learner and external variables that contribute to the success or failure of distance education. However, when distance education is properly implemented, autonomy may develop as the learner responds to the requirements of the courses (White, 1995, p. 209).

Another beneficial aspect to distance education is its appeal to non-traditional students. Often the structure to these courses allows for flexibility with regards to time, location, and structure due to its asynchronous nature. Asynchronous content allows distance education to break the traditional classroom paradigm by offering an on-demand model of instruction that fits in the lives of more people. Especially in the Japanese context, this reaches many students that may otherwise not have equal access to education. These learners could include people living in rural areas with a low school-aged population, people with no means of entry (resources or proximity) to an educational institution, individuals who suffer from conditions like anxiety (Hurd, 2005), as well as homemakers and officer workers seeking further education to expand their employment opportunities (Nakamura, 2017).

Limitations

However, distance education in its current state suffers from a number of limitations when compared to traditional face-to-face instruction. One of distance education's most deterring factors is that it is often a solo experience, with little 'face-to-face' contact with a teacher, instead relying on video-based lessons wherein students rarely collaborate on work with peers (Aoki, 2012; Nakamura, 2017). This can lead to lower motivation levels among the learners and their work may become unfocused, unbalanced and trivial (Schwienhorst, 1998, p. 119). Further negative effects have been highlighted by the Theory of Transactional Distance, which defines distance education in terms of not only the physical separation of teacher and student, but of a psychological separation as well (Park, 2011). Far transactional distance, which is an ingrained part of distance education, negatively impacts learning due to limited communication options between students and teachers. As communication between teachers and students increases, transactional distance decreases (Park, 2011). The inherent flaws in the current distance education system could be mitigated if geographically distant parties' transactional distance was shortened through richer, more engaging communication technologies. VR, for example, is a technology that could increase

the connectivity of distance education, and is worthy of investigation as a way of mitigating the effects of far transactional distance and creating richer distance education environments. VR may be a valuable avenue for the unique Japanese context as a means to service the population's needs internally and engage in the global community.

Adoption of VR in Education

Virtual reality (VR) is a powerful technology, which in recent years has led to great advances in design, entertainment, science, and education. However, this technology has not been typically applied to advance the field of language education. There has been use of virtual worlds like *Second Life* and *Minecraft*, which may be categorized as virtual worlds, but do not fit the definition of VR that will be used in this paper. VR is defined as "replacing one's surroundings with new digitally created environments through the use of a head mounted display, provid[ing] a way to immerse users in wholly novel situations and environments" (Lege & Bonner, 2017, p.149). This allows for affordances such as kinesthetic learning, heightened awareness of social components in negotiating tasks (Wu et al., 2013), and simulating novel environments inaccessible within classrooms (Luckey, 2016). In part, a great deal of these affordances are due to the construct of "presence" in which users within an artificial, virtual world, feel physically present in interactions (Sanchez & Slater, 2005, p. 4). In order to achieve a sense of presence in virtual worlds, reminders of the outside world such as pixelated displays, low refresh rates, and encumbering hardware need to be minimalized (Slater & Wilber, 1997, p. 6). Recent mainstream VR technologies such as *Oculus Quest* allow users to experience presence, therefore creating more immersive and powerful experiences, perfect for learning applications in educational contexts. In allowing users to enter both fictional and real distant worlds, VR is a natural fit for distance education.

Application of VR to language learning education

The use of VR in language learning education is largely grouped into two categories based on the equipment used, high-end VR and mass-distributed VR. High-end VR consists of a headset connected to a powerful computer capable of delivering realistic, high-resolution content in conjunction with positional motion tracking sensors. Mass-distributed VR uses mobile phone displays to provide a somewhat inferior VR experience.

High-end VR provides the most immersive experience and has been used in classroom practice. *Google Earth VR* is a popular application that allows users to visit locations around the globe, supporting instruction in a variety of subjects, including but not limited to history, politics, international relations, and media studies. Furthermore, there are a variety of tools available in VR such as *Mindshow* for creating novel immersive environments and using them for role-play activities. There are also numerous job, presentation, and task simulators that can be used to practice skills in specific environments. Many of the activities in VR are a perfect fit for language instruction, as they create the conditions necessary for real communication to take place. For instance, educators have used *Job Simulator* to focus on procedural instructions (Bonner & Murphy, 2018).

All major VR headset makers now have social spaces which could be used to bring distant people together, however these are rarely used for educational purposes. Mass-distributed VR is more widely employed in classrooms, including language classrooms. As mass-distributed VR leverages the nearly ubiquitous smartphone, it is much easier to employ in classroom activities. This kind of VR is the easiest way to access 360° video, which enable users to experience presence in virtually

any environment. At the date of printing, millions of 360° videos can be found on popular platforms such as *YouTube* and *Facebook.* Teachers can use mass-distributed VR to transport their students to any location where they may complete tasks or look for information. Applications such as *Google Expeditions* make it easy for teachers to guide students on tours of famous contemporary or historical locations. This can be used to supplement lessons with immersive content or to provide background knowledge. There are some stellar applications that may be used for language education such as *Moatboat*, wherein the user must use voice commands to build and control a small world. On the whole, this tier of VR is an effective way of supplementing lessons with immersive content.

Limitations

While many of these VR applications seem perfectly suited for the creation of new and exciting lessons by teachers, there are still large hurdles that need to be overcome before more educational institutions can embrace VR in classrooms. The costs of implementation in classes, prolonged comfort, stability and continued availability of VR applications continue to be significant factors that work against the adoption of VR in education.

In regards to cost, with the exception of mass-distributed VR such as *Google Cardboard*, which still requires a smartphone, VR remains a luxury product outside the budgets of most educators. While prices have dropped significantly over the past 5 years, the prospect of buying entire class sets of even the cheapest all-in-one headsets remains prohibitive. In 2018, the cheapest headset, the *Oculus Go*, which does not require a PC or smartphone, costs ¥23,800 (oculus.com/go/). While a capable device, surpassing cheaper smartphone powered headsets such as *Google Cardboard*, the *Oculus Go* has its drawbacks. Without positional tracking these cheaper devices may result in discomfort or motion sickness. They also lend themselves more towards passive experiences such as watching 360° videos rather than active participation experiences that benefit from object and scene interactions.

Ergonomics is another factor that has an impact on comfort and is perhaps the most significant in limiting the usability of VR in education. Even amongst experienced VR users, the amount of time an individual can comfortably spend using a headset is limited due to weight. Current headsets available weigh around 500g, with some weighing as much as 700g. Attaching these headsets to the users' heads securely enough to stop them moving independently requires applying pressure to either the bridge of the nose or around the circumference of the head, both of which cause significant discomfort after a brief period of time.

Another potential issue with VR is that it is still a new and developing field with different VR platforms appearing and disappearing rapidly. Without the use of dedicated educational VR applications, there is a significant risk that educators may purchase VR hardware or software that will no longer be supported within only a few years. *Facebook* has recently shut down a number of its PC services including 360° videos and live streaming services in favor of focusing on mobile VR (oculus.com/blog/the-next-chapter-of-creative-development-in-vr/), while online community hosting app *AltspaceVR* announced it was ending its services in 2017 (altvr.com/good-bye/) before suddenly being rescued by *Microsoft* (altvr.com/altspacevr-is-back/).

CONCLUSION

Despite these significant hurdles to classroom adoption, the future of VR in education is not as bleak as it may appear. The technology is continuing to get cheaper as mobile processors become more powerful and cost efficient, lowering the threshold for devices capable of displaying the low latency, high resolution images necessary for VR. Headset comfort continues to be a major area of development too, with each new headset making gradual improvements to weight reduction and distribution. Educational VR software platforms will also stabilize over time as the most successful software establishes itself in the market and starts to generate a steady income stream. This will allow for less uncertainty in lesson material creation by teachers that depends on specific VR environments.

Though there are some obstacles to applying VR in Japanese distance education for language learning, VR is a valuable tool for educators to adopt. Accordingly, as new technologies emerge, it is imperative that research is done to assess their possible contributions to the educational field. By applying VR to distance education, and conducting further research into the effectiveness of the technology, VR could fill a gap to provide equal education opportunities on a new accessible distance education platform.

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