Chapter 13

A Constructivist Desktop Virtual Reality-Based Approach to Learning in a Higher Education Institution

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ABSTRACT

Virtual reality (VR) technology has recently started shaping learning, especially language learning, with the aim of immersing learners into a VR learning environment. However, because of the high system cost of fully immersive VR, desktop VR has been implemented and preferred in educational settings. Based on a constructivist approach, desktop VR has drawn attention to the need for learner autonomy and an authentic VR learning environment. Therefore, this chapter describes empirical research on desktop VR-based learning using a constructivist approach. The research examined university students’ interaction and perceptions of learning in this kind of learning environment. Based on the empirical findings gathered from observations and interviews, this chapter has aimed to discuss not only the issues observed both in previous studies and in this chapter, but also additional issues such as scaffolding, self-paced learning, collaboration, and learner differences in order for learning to occur in a well-designed desktop VR learning environment.

INTRODUCTION

The use of Information and Communication Technology (ICT) has been the target of the researchers and educators for decades to create a more efficient language-learning environment (Blake, 1998). The recent research on ICT has gone beyond regarding ‘the computer as a tool or partner’ but has focused on regarding ‘it as a virtual environment where’ (Schwienhorst, 2002, p.196) interaction can happen. The interaction in a virtual learning environment can be between students and teachers; students and
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students; and students and the learning content, tool or online materials. As language and interaction have a fundamental relationship, especially in second and foreign language learning (Loewen & Sato, 2018), various pedagogical interventions have been embedded in the learning environment to foster the relationship between language and interaction. With the incorporation of ICT into language learning, pedagogical interventions have been provided through synchronous or asynchronous computer-mediated communication (Young, 2018), Massive Open Online Courses (MOOCs) (Lambert & Hassan, 2018), mobile-assisted language learning (Botero, Questier, Cincinnati, He & Zhu, 2018) or virtual worlds (Yeh & Wan, 2019).

The advancement in language learning through the abovementioned pedagogical interventions indicates the diversity of interaction in e-learning settings. Learners are engaged with peers or their teacher in person in face-to-face learning, whereas, in online courses, they interact with others via discussion boards or forums, learning content individually and connecting with each other synchronously or asynchronously. Using mobile phones enables learners to exchange information, for instance, within an application anytime and anywhere, whereas virtual worlds create a learning environment where they can improve their learning alone or collaboratively. Despite all these pedagogical inventions, learner interaction within a virtual learning environment has been largely ignored when discussing language learning through ICT.

The gap in fostering interaction via ICT has drawn attention to Virtual Reality (VR). VR has recently been regarded as an efficient and educational tool (Lee, Wong, & Fung, 2009; Martín-Gutiérrez, Mora, Añorbe-Díaz, & González-Marrero, 2017) to teach courses, from science and engineering education (de Jong, Linn, & Zacharia, 2013) to geography (Virvou & Katsionis, 2008) to language learning (Repetto, 2014). VR is described as ‘the use of computer graphics systems in combination with various display and interface devices to provide the effect of immersion in the interactive 3D computer-generated environment’ (Pan, Cheok, Yang, Zhu & Shi, 2006, p.20). Its efficiency is related to its availability and mobility on desktops (Madathil, Frady, Hartley, Bertrand & Alfred, 2017), and the promotion of learner interaction (Fernandes, Raja, & Eyre, 2003; Madathil et al., 2017). Interaction is an essential component in language learning (Loewen & Sato, 2018), and VR can address this in conjunction with learner engagement. On the one hand, VR has been widely used for adult education in universities (Ott & Freina, 2015), particularly in research on language processes (Repetto, 2014). On the other hand, research has drawn attention to the drawbacks and limits of language learning in VR with regard to the pedagogical and diversity-related concerns in a language-learning environment (Prensky, 2016).

Therefore, this chapter addresses the research gap in interaction and learning through virtual reality based programs in higher education. It sets out to answer two research questions:

1. How do learners interact with a desktop-VR based learning environment?
2. What do learners think about their learning in a desktop-VR based learning environment?

This chapter describes desktop VR for language learning and discusses a constructivist approach in VR learning before presenting previous studies on learners’ experience and perception of learning in desktop VR. Next, it introduces empirical findings from Turkish students’ use of VR software and ultimately provides suggestions for improving VR for language learning.
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