Chapter 14
Mobile VR in Education:
From the Fringe to the Mainstream

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ABSTRACT

This paper explores the development of virtual reality (VR) use in education and the emergence of mobile VR based content creation and sharing as a platform for enabling learner-generated content and learner-generated contexts. The author argues that an ecology of resources that maps the user content creation and sharing affordances of mobile devices, social media, mobile head mounted displays and mobile VR cameras, provides an opportunity to design authentic VR learning experiences. The design of these VR learning experiences are informed by networked student-centred pedagogies. Based upon this background the paper provides a conceptual framework for implementing student-generated mobile VR embedded within a design based research methodology across three discipline contexts: paramedicine, journalism, and new media production.

INTRODUCTION

Mobile device ownership is ubiquitous (International Telecommunication Union, 2015), leading many primary, secondary, and tertiary institutions to explore a bring-your-own-device (BYOD) approach to mobile learning (mlearning). However, the default design and implementation of these BYOD mlearning projects are predominantly device centric, focusing upon repurposing content for delivery to small screens and substitution of pre-existing pedagogical strategies. Traxler (Traxler, 2016) recently lamented the death of the mlearning dream, explaining that mlearning has generally resulted in the reproduction of the LMS (online Learning Management System) on a small screen. However the potential of mlearning is to enable authentic learning environments through new collaborative connected pedagogies (Cook & Santos, 2016). A rapidly developing use of mobile devices is in the domain of augmented and virtual reality, with the ability to add context and authenticity to user experience. 2016 is widely seen as a year of exponential development of virtual and augmented reality: "Virtual and Augmented Reality are projected to be a $100 billion dollar industry within 10 years" (Khoo, Falloon, & Nguyen, 2016). In response,

the author presents a framework that explicitly explores the intersection of mlearning, new pedagogies, SOTEL (Scholarship Of Technology Enhanced Learning), EDR (Educational Design Research, often used synonymously with Design Based Research), and authentic learning enabled by mobile VR. The framework specifically explores the unique affordances of mobile devices for student-generated content and student-generated contexts via augmented reality (AR) and virtual reality (VR). Three example discipline contexts are outlined as potential scenarios, including: Paramedicine, Journalism and New Media Production. These discipline contexts are chosen due to the recent impact of mobile VR on these professions, leading to rapid changes in these three professions and the need for a research informed response within tertiary education to prepare graduates for this changing environment.

Virtual Reality (VR) exists on an experiential continuum from direct real world environments to experiencing an immersive simulated environment. Fitzgerald et al., (2013) represent this continuum in a diagram shown in Figure 1.

Virtual reality involves the use of a computer to create an interactive immersive experience via some form of head mounted display (HMD) unit, such that the user feels part of the virtual or simulated environment. The development of virtual reality within education is not a new phenomena, but part of a relatively long history of educational technology development from desktop computing to mobile computing. VR encompasses educational games, simulation and virtual worlds, and has been shown to be "effective in improving learning outcome gains" (Merchant, Goetz, Cifuentes, Keeney-Kennicutt, & Davis, 2014, p. 29). However, VR content has been costly and difficult to develop and deliver (Merchant, et al., 2014). One of the early enablers of user-generated VR was the development of QuickTime Authoring Studio. Apple developed QuickTime as an extensible multimedia container platform, beginning with digital video in 1990, QuickTime grew to encompass interactive 3D models and user-generated virtual reality with the introduction of the QuickTime VR Authoring Studio in 1994 (Chen, 1995). QuickTime helped establish the Macintosh computing platform as a tool for the creative arts industries, and was designed to run on Windows OS computers as a cross-platform multimedia solution providing the engine behind much of the interactive CDROM development of the 1990's. Interactive QuickTime and Flash animation also powered a lot of the pre social media multimedia web (Cochrane, 2005, 2007). The rapid development of desktop-based online gaming environments in the late 1990's led to the emergence of computer-based educational virtual reality environments such as Second Life. Educational interest in Second Life peaked around 2008 to 2009 (Bruns, 2008; Warburton, 2009) just as mobile computing began to have a significant impact. Second Life development required a relatively large investment in time and funding, and tended to be used as an alternative medium for teacher-delivered content. Second Life also required a high level of investment by students in learning the user interface. While there is continued niche interest in Second Life it is no longer the poster child of VR in education.

Figure 1. Continuum from reality to virtual reality (based upon (FitzGerald, et al., 2013))
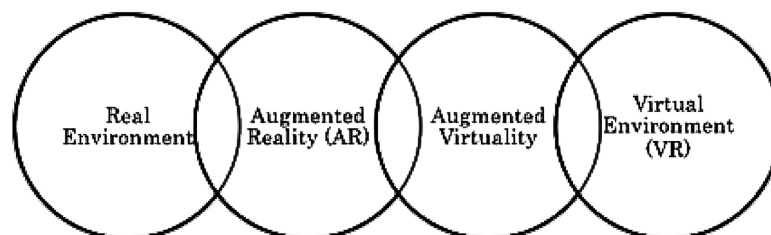
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