A Proposed Theory Seeded Methodology for Design Based Research into Effective use of MUVEs in Vocational Education Contexts

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ABSTRACT

A methodology for design based research (DBR) into effective development and use of Multi-User Virtual Environments (MUVE) in vocational education is proposed. It blends software development with DBR with two theories selected to inform the methodology. Legitimate peripheral participation LPP (Lave & Wenger, 1991) provides a filter when thinking about vocational education because moving towards being work ready increases the student’s legitimate practices within the vocation. Technological Pedagogical Content Knowledge TPACK (Mishra & Koehler, 2006) provides framework to link content and pedagogy with the MUVE technology. Software development techniques necessary in the development of simulation based MUVEs are shown to have characteristics compatible with development research. A design based methodological process that introduces software development within phases is described. The authors reflect on the methodology after the first phase of research into a MUVE that simulates the hazardous situation of temporary traffic management.

Keywords: Design Based Research (DBR), Legitimate peripheral participation (LPP), Multi-User Virtual Environments (MUVE), Software Development, Technological Pedagogical Content Knowledge (TPACK), Vocational Education

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INTRODUCTION

Multi-user virtual environments (MUVEs) or virtual worlds have been shown to be valuable for use in education. For example, in her scoping study on the use of virtual worlds to support learning and training, de Freitas (2008) identifies 80 MUVE applications available for education at that time. De Freitas (2008) asserts that MUVEs “in the future may provide a ‘wrapper’ for sets of educational services including e-portfolios, e-learning materials, assignments and class sessions, course module materials, learning games, tracking and monitoring assignments, communications between tutors and learners and e-assessment.” De Freitas is supported by Kirriemuir’s (2009) report of virtual world activities in UK universities and colleges. The growth of this approach in New Zealand is described by Hearns’ et al (2011) review of teaching and learning through virtual worlds within seven New Zealand higher education institutions.

MUVEs are successful in vocational education and these include a number of simulations. For example, Hudson and Degast-Kennedy (2009) describe a Canadian border simulation in the Second Life® MUVE that was created when post-9/11 security restrictions led to limitations on access to the border. This simulation is used by students preparing to apply to become border security officers. The students practice interviewing travelers crossing the border using the MUVE. The student outcomes were above expectations when compared to previous classes that had not used the MUVE. The students’ grades improved and they “left the project with a sense of accomplishment and one of … participating in a real world experience”. They also gained confidence in their capacity to interview travelers and saw themselves as having “an advantage in a competitive workplace screening process”. The Australian Flexible Learning Framework (2006) provides a resource that describes how to use virtual worlds in competency based learning. Experiences of teachers and students from three trails are presented. Two trials were undertaken by teachers and students studying towards a Victorian Certificate in Applied Learning (VCAL) in tourism courses. The other trial was undertaken by students and their teacher in a painting and decorating course. The tourism courses allowed students to practice with “real tourists” represented by avatars. The reported highlight of the painting and decorating trial is the potential for the whole of the interior decorating course to be undertaken using the MUVE. White (2010) presents the final report from the Second Life Education New Zealand (SLENZ) project that developed and trailed resources in two vocational education contexts. The Birthing Unit provides a resource for midwifery educators and midwives teaching and learning the normal birth process. In this MUVE midwifery educators and training midwives, role-play the normal birth process through avatars. The MUVE allows junior trainee midwives to participate in a birth earlier than they would in real life. A second MUVE developed by the SLENZ project “was created to support teaching and learning of job search skills”, in a Foundation Studies context. In this MUVE students practice different types of job interviews, for example a job interview at a bank. A Foundation Studies student who was very nervous about a practicing an interview “in the real” found that practicing the job interview in the MUVE allowed her to gain confidence for the real interview. Vergara et al (2009) describe the Mr Toma medical simulation, a virtual patient implemented in a MUVE, that they conclude effectively replaces the physical experience with the virtual experience. Gerald and Antonacci (2009) and Hewitt et al (2009) take the perspective that MUVEs should be used for the development of simulations of authentic situations rather than for constructivist learning experiences.

Reeves (2006) describes “exemplary” design based research projects, two develop MUVEs: the River City Learning environment and Quest Atlantis. The River City Learning environment (Ketelhut & Dede et al., 2007; Ketelhut et al., 2010) is used as a “pedagogical vehicle, ... exploring how a technology-intensive learning experience that immerses participants in a virtual ‘world’ … can help middle school students learn both deep inquiry
Planning and Implementing Online Programs: A Case Study in the Graduate School of Education at the State University of New York at Buffalo
Kay Bishop and Christine Kroll (2011). *Teaching Cases Collection* (pp. 44-58).
www.igi-global.com/chapter/planning-实施ing-online-programs/51419?camid=4v1a