ALISE ‘18 The Expanding LIS Education Universe, February 6-9, Denver, Colorado

Evaluating Virtual Reality Use in Academic Library-Supported Course Integrations: Methodology and Initial Findings

Zack Lischer-Katz, CLIR Postdoctoral Fellow in Data Curation & Matt Cook, Head of Emerging Technologies

The UNIVERSITY of OKLAHOMA UNIVERSITY LIBRARIES

This poster presents the methodology and initial findings of a mixed-methods research project underway at the University of Oklahoma, which evaluates how immersive virtual reality (VR) technology impacts student learning in the context of library-supported course integrations. It uses a combination of pre/post surveys, semi-structured interviews, and review sessions to look at impact on student self-efficacy and their practices of knowledge production with VR. Initial findings suggest that VR classroom activities should be designed keeping in mind how VR technology can enhance spatial cognitive tasks.

RESEARCH OBJECTIVES

RO1: To understand how VR used in course learning activities impacts students as learners; in particular, the dimensions of self-efficacy impacted.

RO2: Explore how students engage their eyes, bodies, and minds in making judgments, solving problems, and constructing knowledge within VR environments.

BACKGROUND

Research suggests the potential benefits of immersive VR technology, including its ability to support exploratory data analysis (Donalek, et al., 2014) and spatial cognition (Pober and Cook, 2016), and enhance efficiency and accuracy for spatial tasks (Seth, et al., 2011; Ragan, et al., 2013).

Demonstrated Benefits of VR for Enhancing Analysis in a Variety of Fields: Scientific Specimens (Boyer, 2016); Archaeological Data (Limp, et al., 2011); Scientific Visualization (Van Dam, et al., 2002); Anatomical Instruction (Silverstein, et al., 2006; Jang, et al., 2017); and Architectural models (Angulo, 2013).

Research projects that study the impact of VR on learning have typically focused on **particular tasks conducted in VR**, studied in **lab contexts** (Mizell, et al., 2000; Ragan, et al., 2013; Laha, et al., 2014).

THEORETICAL FRAMEWORK

Self-Efficacy: Bandura (1977); “Self-efficacy theory suggests that the beliefs concerning one’s ability to affect a desired outcome influences both thought and action” (Abbitt, 2011).

Interpretive Phenomenological Analysis (IPA): Applies a phenomenological attitude to the generation of qualitative data, with the analysis of that data guided by the assumptions of hermeneutics. Supports the interpretation of the lived experiences of participants (Smith, et al., 2009; Van Scoy and Evenstad, 2015).

METHODOLOGY

Participant Recruitment

Course instructors helped to recruit a total of 34 undergraduate students: 28 from an introductory level Anthropology class (out of 70 students enrolled); 6 from an upper-level Biochemistry class (7 students enrolled), in order to generate data that will support cross-disciplinary analysis of the impact of VR on student learning.

Pre/Post Survey

The survey was designed to measure change across different dimensions of students’ self-efficacy: general (Qs 1, 2, 7), educational (Qs 3-5), spatial skills (Qs 6, 8, 9), and VR technology (Qs 10-12). Developed from Schwarzer and Jerusalem’s (1995) General Self-Efficacy Scale; Brinkerhoff’s (2006) Computer Self-Efficacy Scale; Sam, Othman, & Nordin’s (2005) Computer Self-Efficacy Scale; and Wang, Ertmer, & Newby’s (2004) scale for technology integration.

Data Collection Steps (Nov. 2017 - Dec. 2017)

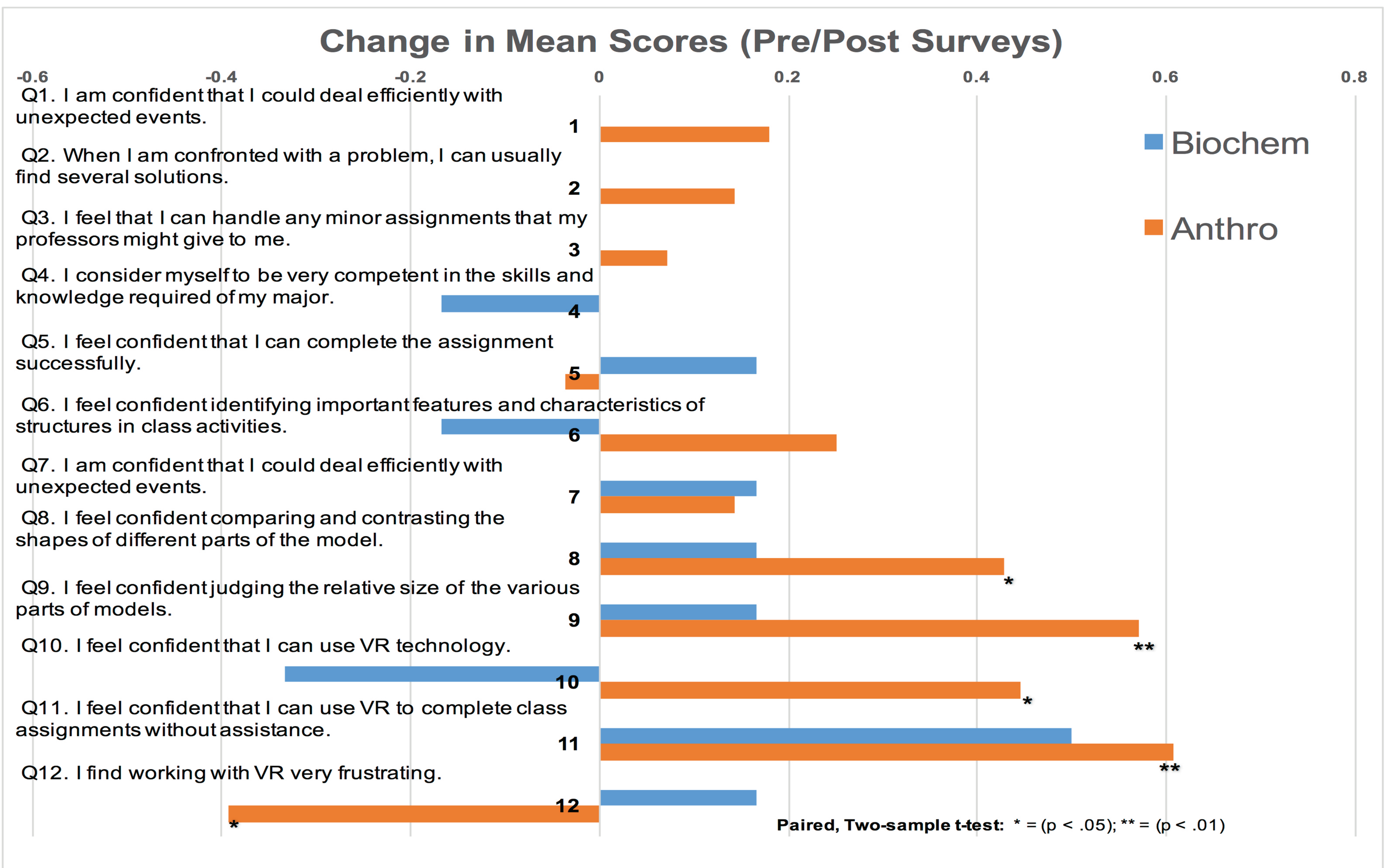
1. Recruitment and Informed Consent
2. VR Orientation Session
3. Pre-Test Survey
4. VR Activity (with screen capture video recording of session)
5. Post-Test Survey
6. Semi-structured Interviews
7. Review Session (Reflecting on videos of Student’s VR session)

Next Steps (January - April 2018)

Qualitative Data Analysis
Refine Survey Instrument for Future Studies

FINDINGS

Findings suggest positive changes to self-efficacy along task-specific (Q8&Q9) and VR-specific (Q10, Q11&Q12) dimensions for Anthro Students only.



Emergent Themes from Interview Data (Biochem)

Enhancing Interactivity and Control
“It's better than seeing the flat computer screen, using the program, using like literally just three fingers to move around. I get to like move around and see every different angle. Because with the computer, like with the laptop, it's hard to see, and it's hard to fine tune, or finely make movements” (P2_B).

Travelling Along the Model
“I didn't really manipulate it that much. I kind of travelled around, instead of actually manipulating it” (P5_B).

VR Obstructing Analysis
“And I wasn't sure because like, I could be miscounting each different time, because the shadow, the shading might be off a little bit or, or something would be obscured by something else. But that's just like, that's because it's 3D, like you could always just miss that. ” (P6_B).

Solving Problems in VR Through Trial and Error
“If it was a question that wasn't technical about the, like the hardware or the software even, then I would ask [the investigator] but, if I thought it was something I could figure out on my own, I would just try something and if it didn't work, try it again or try something else.” (P2_B).

Implications for Considering VR in the Classroom

- Importance of taking into account the documented benefits of VR when designing course activities.
- Video recorded VR sessions aid students’ retrospective self-reflections.
- Using a pre/post-test survey with the collection of qualitative data generates insights about the impact on students that go beyond what is possible in a controlled lab setting; integrating analysis of survey and interview data helps to identify which aspects of VR are impacting student self-efficacy and their lived experiences of using VR in the classroom.