Using Virtual Reality 360 Video for Interprofessional Simulation Education

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 School of Nursing
 Ohio University
Where is Ohio University?

- Athens, OH
- Population: 23,832
  - ~6,000 without students
- 32.2% poverty rate
  - Highest in the state
- Undergrad - Athens: 17,375
- Graduate - Athens: 4,743
- Medical - Athens: 539
- e-Learning: 6,129
- Regional campuses: 10,071
- Total enrollment, all campuses: 38,857
OHIO Health Sciences

College of Health Sciences and Professions (CHSP)
- Athletic Training
- Audiology
- Child and Family Studies
- Community Health
- Health Services Administration
- Long-Term Care Administration

Heritage College of Osteopathic Medicine (HCOM)
- Only DO program in Ohio
- Campuses opening in Columbus and Cleveland
- Case-based learning modules
- Large simulation lab space

- Nursing – RN-BSN, BSN, MSN, DNP
- Nutrition
- Physician Assistant
- Physical Therapy
- Social Work
- Speech-Language Pathology
Core Interprofessional Competencies

- Work in Interprofessional Teams
- Employ Evidence-Based Practice
- Provide Patient Centered Care
- Utilize Informatics
- Apply Quality Improvement

(IOM, 2001)
OHIO Nursing and Interprofessional Education

- OHIO Nursing students are provided multiple opportunity to learn from, with, and about other professions. Some examples are:
  - BSN nursing student learn about other professions within the core nursing classes.
  - Additional Interprofessional opportunities are available through designated elective courses (such as the one this research occurred).
  - The College of Health Sciences and Professions hosts multiple events throughout the year including a student interprofessional conference.
Background

- Communication breakdown is among the top 4 threats to patient safety (AHRQ 2017).
- Patient care has grown more complex.
  - A need for novel solutions from nursing educators to prepare students for practice.
- Understanding how students are immersed in technology and experience being in the psychological presence of learning through VR 360.
  - Opportunities to improve teaching and learning in an interactive and meaningful manner.
VR 360 Video

- Virtual Reality (VR): The digital creation of scenarios that are interactive visually and aurally, as well as immersive (Jerald, 2015).

- Mimics the real world through the use of “high-resolution, high refresh rate head-mounted displays, stereo headphones and motion-tracking systems” (Moro et al, 2017).

- Coupling the VR 360 experience with the embodiment of the patient places the learner in the situation of the patient during the scenario.

- The body interacts with the world and the brain believes that the interactions are a true cognitive experience (Wilson, 2002).

- Allows students to become better involved in patient care as well as increases student’s engagements with patients (Weiner et al, 2016).
VR 360 Video

- Allows future healthcare professionals to experience high-risk clinical situations without being in a life-threatening environment (Bai et al., 2012).
  - Reduced levels of student anxiety.
- Utilized in many different fields of study (Butt et al., 2018).
  - Engages and motivates students
  - Decreases time required to achieve mastery
  - Lower usage of materials
  - Increased and improved performance outcomes
- Opportunities to increase professional networking and support between professionals (Ferguson et al., 2015).
  - Reduce isolation of healthcare professions
Simulation improvement opportunity

- Multi user consistency
  - All participants will have same embodiment experience.
  - All participants see, hear and experience the same conditions.
- Increased realism of the experience
  - An embodiment of a virtual patient experience.
  - A realistic environment for the learning experience.
Interprofessional communication and team building

- Debriefing
  - Brings various professional viewpoints into the learning (Rutherford-Hemming et al, 2016)
  - Develops an appreciation for and experience in teamwork

- Educating students in an interprofessional team on interprofessional competencies important to future practice (IPEC, 2016; Gaba, 2006)
  - Enhanced communication
  - Enhanced value of teams and teamwork
Virtual Reality 360 Video

- Cost efficiency
  - Availability
  - Equipment costs decreased
  - Faculty and simulation space resources costs decreased

- Effectiveness
  - As or more effective than traditional simulation
  - Can be as effective at computer stations as in a simulation lab
Alfred ©: A virtual, immersive 360Video case study

Topics: Advanced macular degeneration, high-frequency hearing loss, affect of family relationships on health status, navigating the healthcare system with impairments, role of the doctor, cognitive assessments.

Summary: The learner will embody Alfred, a 74-year old African-American man with macular degeneration and high frequency hearing loss, as he spends time with family, visits the doctor, and receives a diagnosis.

- Seven minute total duration;
Alfred ©: A virtual, immersive 360Video case study

- Pilot study
  - Healthcare students arranged in interprofessional teams
  - All of the participants learners heard, saw and experienced the same conditions
  - Transitioning simulation to a virtual reality experience holds promise for learning improvement, student success and student satisfaction
Alfred ©: Learning Outcomes

- Recognize that communication is affected by the two most common aging processes - hearing and vision loss.
- Describe insights about the perspective and feelings of an aging adult.
- Identify ways that the learner's role in communication and teamwork between the patient, their families, healthcare personnel and systems contribute to the quality of life of a person with macular degeneration and hearing loss.
Alfred ©: The reality of VR 360 Video
The Research Study: Participants

Current students were recruited from the Interprofessional class for voluntary participation.

Ohio University IRB approved research.
4 Focus Group Sessions

39 Total Participants Total 2 Semesters

- Spring 2017
  - Dietetics 3 students
  - Nursing 4 students
  - Audiology 2 students
  - Social Work 2 students
  - Physical Therapy 2 students
  - Medicine 4 students
  - Speech Language Pathology 3 Students
  - Total (20)

- Summer 2017
  - Nursing 6 students
  - Audiology 1 student
  - Social Work 2 students
  - Physical Therapy 4 students
  - Medicine 1 students
  - Speech Language Pathology 5 Students
  - Total (19)
Transcription and Thematic Synthesis

Transcription was completed following each of four focus groups. The transcription was reviewed for accuracy.

A line by line narrative coding of the text occurred.

Descriptive themes were developed.

Analytical themes were generated.
Emerging Themes
Emerging Themes

- Empathy (emotions brought forth from participants allowing them to feel for the patient)
- Realism (Feeling like the patient)
- Reality (being present in the scenario but not as the patient)
- Communication (barriers related to lack of hearing and sight)
“I like the daydream sequence of being able to pick up the flowers and throw them up”.

“It would be so frustrating if my hearing was really this poor and it would be that distracting all the time”.
“Someone had mentioned putting yourself in the patient's shoes, knowing what they're going through with a disease process whether it's the macular degeneration or hearing loss or if it's something more than that that would be good for assessment purposes”.
“We know what these diagnoses come with. Your vision's low or you feel dizzy, or whatever but to actually experience what the patient is going through, that definitely gives you a whole new perspective on what you need to do to help them. What they are experiencing day to day and the difficulties that could come with that disease process”.

“Putting yourself in their shoes and realizing this might be new, or this might be something that they've been battling for a long time. Realizing them being frustrated, there's a reason for that. They're facing these difficulties and yeah, I read about it or whatever, but really trying to put myself in that position and see what I would have to go through each day and see why they're frustrated”.
‘I felt like communication would have been a lot more difficult because you need someone to be talking at you, like right at your face in order to hear them but to see them you couldn't necessarily looking right at them, you had to be looking off center a little bit and it might appear that you're not really paying attention to them’.
‘We learn about macular degeneration and we know what to expect when someone says, "Yeah, I have macular degeneration," or, "I have very poor hearing," but actually experiencing that was like, I don't know how people cope with that. I mean, it's definitely like a different lifestyle. You can't live a normal life necessarily’.
“I wanted to hear more. I didn't really care about the vision that much. I didn't care to see their face but, if I can't hear what they're trying to tell me to do and if I know I'm perfectly capable of doing whatever they want me to do. I can't tell them, I don't know ... I feel like with vision you can tell them, "Okay, I can do that but I can't see," but with hearing you don't know what you want them to do. I didn't realize how much hearing had an effect on things until this. I thought I was a more vision person and this kind of showed me that, "Maybe I am more with hearing".
“I liked being able to feel like a patient would, a lot of times we were like, "Okay, we're gonna test your cognition," which they were fine cognitively and I felt myself being frustrated. I know what's going on I just can't hear you and I can't see this paper, so I could see where that patient could come off as agitated most of the time simply because they would know what you want from them if you could just communicate it in a way that they're able to see it or hear it”.
“To me, it was the vision that made it feel the most real, the hearing wasn't as big of a deal for me, but actually having to kind of position yourself so that the lack in screen was off, so that you could at least see the person talking to you or whatever or what was going on. It made it more real to me”.
Limitations

- Small sample size
- Several participants reported distraction due to background noise in the lab.
Debriefing: Tell me how you could or could not see virtual reality as a learning tool.

"If we are able to really put ourselves in their position we can really think how we can accommodate or we could be more accommodating to them and do whatever we're supposed to do to make it a little more specific to them, so it's more comfortable to them”.

“I would say, just like assessments in general because you can diagnose someone with something and it could just be that their vision is impaired or they can't hear. Nothing to do with cognition. If you give someone a wrong diagnosis that can stay with them for a long time, it's hard to get rid of that”.

“What is important to consider, maybe this patient just can't hear me or maybe they can't even see me though they're looking to the side, they're listening to me, they just have to turn their head so that they can see me. Just because they're looking that way it doesn't mean that they're not paying any attention to me. Just getting that different perspective”.
Debriefing question: Would you find value in virtual reality interaction with another professional?

- “I would find value in it because we all go to years of school, but we don't actually train with other professions, so then when you get out in the work force you're learning on the job of how each profession can help you or what they might need help with, and if we already had some idea of that going in, we'd know how to better effectively use it and it would lead to better patient care”.

- “I feel like if I didn't have friends in other professions like physical therapy or SLP or anything that I would have no idea what they do. When I get out in the real world I need to know why do I send a patient over to this place”?
Future Implications

- Virtual reality embodiment may be as, or more, effective than traditional simulation methods. If so, we should be able to measure positive outcomes.
  - Improving nursing simulation education and practice
- Multiple students will be able to experience a given scenario in a synchronous, or possibly asynchronous environment, while maintaining consistency in the simulation learning opportunity.
Conclusions

- The pilot arranged interprofessional health care students in an embodied patient scenario via virtual reality 360 video experiences.
- This approach facilitated a realistic patient experience through virtual reality 360 Alfred © embodiment.
- The findings will guide the development of future research for health related virtual reality 360 video experiences.
- Further research is needed involving virtual reality 360 video efficiency and effectiveness for interprofessional healthcare simulation experiences.
- Future analysis will include the evaluation of immersion and presence from pre- to post experience.
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Acknowledgement: Carrie Shaw at Embodied Labs www.embodiedlabs.com and the Scripps College of Communication, Ohio University.
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