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Qualitative Study of Interprofessional Communication through Immersive Virtual Reality 360 Video among Healthcare Students

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Abstract

Background: Virtual Reality 360 video (VR 360)-based education can immerse healthcare students in clinical and curricular experiential learning.

Purpose: The purpose of this study was to explore Inter Professional (IP) healthcare students' perceived experience specific to the competency of communication through a virtual reality scenario.

Method: Qualitative focus groups with an exploratory design approach were used to examine the attitudes and lived experiences of 39 students following a VR 360 experience assuming the role of a patient with macular degeneration and high frequency hearing loss.

Discussion: Thematic analysis revealed empathy with subsets of: sentiment, realism and communication. Sentiment was expressed through emotions allowing patient perspective. Realism was expressed as being the patient and feeling presence. Communication was experienced as barriers related to hearing and sight.

Conclusion: Immersive 360degree video as a delivery method for Interprofessional healthcare students studying and practicing communication skills is worthwhile.

Keywords: Communication; Immersion experience; Interprofessional education; Nursing students; Perceptions; Qualitative; Research, Virtual reality; Virtual reality 360 video

Introduction

Virtual reality experiences used for Inter Professional (IP) education of healthcare students can impact learning by bringing to life course topics, content and team experiences. Gaining understanding of how students experience communication and practice communication techniques in IP experiences through select Virtual Reality 360 (VR 360) video scenarios could enhance patient safety, assist with recruitment and retention into IP healthcare professions, and lead to a better prepared healthcare professional who will enter the workforce. Better prepared health care professionals, prepared to work in IP teams, could lead to safer patient experiences.

Literature Review

The healthcare and patient safety literature details the importance of communication competence and discusses endeavors to train healthcare disciplines to achieve this competence. The Interprofessional Education Collaborative (IPEC) has been recognized for development of four core competencies for [1], with communication being one of the four core competencies. A recommendation for an Interprofessional approach to learning is represented in the literature [2-5]. The lack of communication among healthcare professionals has been identified as one of the top four threats to patient safety [3]. Coupling patient safety concerns with competency development of communication could be important to IP teams in efforts to improve patient outcomes. The literature supports that when students learn in IP teams, they not only learn about content important to their discipline, they

learn from a broader shared experience across disciplines, and from each other while collaborating to positively impact patient outcomes [1,6-8].

According to Strekalova and team, communication is scientifically focused among health care providers and communication from the patient perspective is based on their life experiences [9]. They further explain that it has historically been the nurse who provides the bridge for the communication gap between the health care provider and patient. Arthur identified four basic strategies of communication that can apply: attending, listening, empathy and probing. Perceptions are a vital component of communication and are considered a vital component [10]. Virtual Reality (VR) affords Interprofessional healthcare students an effective, realistic, and inexpensive means of education [11]. Virtual reality has been defined as a computer-generated digital environment and VR can be interacted with as if that environment was real [11]. Multiple professions report having used VR specifically through use of gaming and haptics [12]. Learning in a VR environment is not the same as working on a computerized virtual site or a digitally created clinical patient.

According to [13], the feeling of being present in a virtual situation is a precondition for emotion to occur. Other authors have studied presence through the immersion that occurred [14]. A newer form of VR immersion is embodied first person experiences. These experiences created in 360-degree video provide an immersive safe learning environment [15]. The commercial products aim to provide empathy training, patient/provider communication training and disease presentation of situations that would be difficult for health professionals to gain perspective or insight on such as experiencing vision loss and hearing loss in first person through Alfred© [15]. Virtual reality can enhance communication in IP teams and possibly improve patient safety outcomes. Creation of VR learning experiences in Interprofessional communication competency development and assessments in the healthcare professions have not been reported in the literature.

Framework

The approach to this study was informed by the IPEC Framework and the Communication Accommodation Theory (CAT). The IPEC, [1] has four distinct categories for Interprofessional education: values/ethics; roles/responsibilities; Interprofessional communication and teams and teamwork. This study focuses on the Interprofessional communication domain. The CAT has been used in healthcare studies to look at communication across members of different generations [16,17]. This theory developed by Howard Giles, identifies the accommodations that people make in their communication patterns to fit in with the person they are conversing with at a given time. Patient safety and improved patient outcomes are at the forefront for healthcare providers, therefore, communication is central.

Aim/Purpose

The purpose of this study was to explore healthcare students' perceived experience specific to the competency of communication as experienced through VR 360. Students from seven healthcare disciplines participated in a VR 360 video immersion experience where they interacted with the same patient in an environment that was virtually created.

Methods

Design

A qualitative research study with an exploratory design was utilized to assess the attitudes and lived experiences of students from seven healthcare disciplines following a VR 360 video experience. The VR 360 video experience immersed thirty-nine students in the role of a patient with macular degeneration and high frequency hearing loss. The data was collected directly following the immersive VR 360 experience through focus groups.

Participants and Context

Interprofessional healthcare students were selected for this study as a means of gaining insight from multiple health care professions regarding competency of communication. A combined group of undergraduate and graduate student participants (Table 1). were invited to participate over one of two available semesters. The participants were enrolled in one of two Interprofessional courses at a large Midwestern public university. The participants were placed into Interprofessional teams to "Learn about, from and with each other" [8].

The participants were not provided with any details regarding the content of the VR 360 video prior to the experience. All participants experienced individual VR 360 immersions into the scenario of experiencing macular degeneration and hearing loss by wearing both a hearing headset and visual ocular set to become immersed from the patient perspective. The VR 360 immersion lasted for seven minutes and had six mini scenarios that merged into the one simulation VR 360 experience.

Professions	Undergraduate/ Graduate	Semester One	Semester Two
Audiology	Graduate	2	1
Dietetics	Undergraduate	3	0
Osteopathic Medicine	Graduate	4	2
Nursing	Undergraduate	4	5

Speech/Language Pathologist	Graduate	3	5
Social Work	Graduate	2	2
Physical Therapy	Graduate	2	4
Total		20	19

Table 1: IPE Participant Distribution.

Data Collection

The participants (P= participant number) reported to the University virtual reality laboratory on one of five arranged dates. Immediately following each VR 360 video immersive experience, a focus group was held by the researchers utilizing a semi-structured format. A total of five focus groups were held over the two-semester period. The focus groups were audio recorded and transcribed word for word. Each focus group lasted approximately 60 minutes. The transcription of the fifth focus group showed little variation in the answers leading to a belief that saturation had occurred. No incentives were provided to any of the research participants.

Analysis

A qualitative approach was used to analyze the data. Thematic analysis (Figure 1) was used to process the data set. Transcription was completed after each of the five focus groups. The transcription was reviewed for accuracy [18]. Data analysis was conducted utilizing line by line narrative coding of the transcription with indexing codes assigned [19]. Next, the codes were grouped together based on familiarity to form descriptive themes. The overarching analytical theme of empathy emerged as a result of the VR 360 immersion experience with three subsets: sentiment, realism and communication barriers.

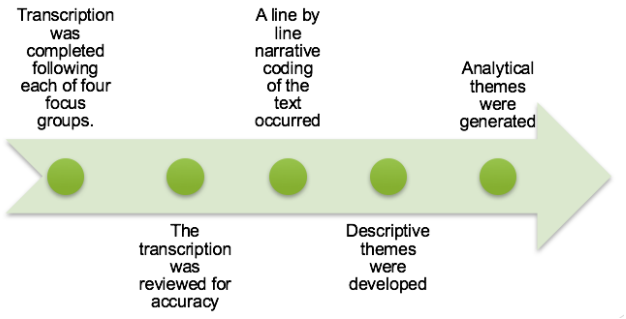

Figure 1: Thematic Analysis Process.

Results

A total of 39 Interprofessional healthcare students participated, age 19 to 50 years old with a median age of 23.6 years. The sample was 75.4% female (n=29) and 25.6% male (n=10). A total of 33% (n=13) reported having previous health care related work experience. A convenience sample was selected based on enrollment in a combined undergraduate/graduate Interprofessional course (n=40). Students were invited to participate, in the optional experience outside of the regular course timeframe. A total of 20 students volunteered to participate in semester one and 19 in semester two.

All students reported value in learning through this VR 360 method and stated that communication among the Interprofessional healthcare team to be of the highest importance. While they stated understanding that communication among the Interprofessional team was priority, this VR 360 experience was seen by the participants as an individual learning experience that they each experienced as a part of the virtual team in the VR 360 video. In response to our purpose to explore healthcare students' perceived experience specific to the competency of communication as experienced through VR 360, our results yielded one overarching theme of empathy with three subsets: sentiment, realism and communication barriers. The analytic theme of sentiment was classified by emotions brought forth from participants allowing them to feel for the patient. Participants frequently remarked about feeling what it would be like to experience the patient's moods and thinking from the patient's point of view.

One medical student reflected on the experience by explaining "It would be really frustrating to be them (patient) and live with that (the disorders represented in the VR 360 video). ...I think actually being able to be that person (patient) is more eye opening and brings understanding to the patient [P6]." This sentiment of feeling frustration was echoed by other participants in the focus group. An audiology student said "It is really bad when you just can't hear someone. And it makes you feel bad about it [P2]."This type of sentiment of expressing emotion related to what the patient experienced was repeated by multiple participants. A nursing student voiced "I am really trying to put myself in that position and see what I would have to go through each day and see why they (patient) are frustrated [P24]". One social worker student voiced "I felt like the family was find of frustrated and didn't understand what he (the patient) was going through so that was kind of hard [P18]." A speech and language pathology student remarked that following the VR 360 video immersion experience, that when working with nonverbal patients in the future, they plan to say "I know that you can understand me, I am going to take the time to listen to what you have to say however it is that you can say that to me [P30]."

The second analytic theme of realism threaded throughout the participant responses. Realism was inclusive of participants feeling like the real patient. While like sentiment, related to the emotions brought forth, the researchers considered realism to differ in that participants described feeling as if they were in the patient's shoes or actively the patient in the VR360 video. One speech and language pathology student expressed, "Just being able to experience this made it easier for me to put myself in their shoes (patients) and always keep that in mind [P28]." An audiology student remarked "We deal with a lot of people that can't hear. I was getting frustrated that I couldn't hear. So, I kind of stepped into our patient's shoes where we really did understand it. It was very frustrating [P1]." A nursing student stated "I liked that it (VR 360 Video) put you in the patient's shoes. For me, it gave me a better understanding of what a patient is actually going through, and maybe can help me have more empathy for their situation [P25]." One speech and language pathology student summed up the experience by saying "We are used to being on the other side. We are never in their (the patient's) shoes [P31]."

A Nursing Major Stated

Putting yourself in their (patients) shoes and realizing this might be new, this might be something that they've been battling for a long time. Realizing them being frustrated like there's a reason for that. They are facing these difficulties and yeah, I may have read about it but really trying to put myself in that position and see what I would have to go through each day and see why they are frustrated [P24]. A physical therapy major stated, "You weren't in your normal setting, you were actually the patient. And you were living as that patient. It was a lot more real [P20]." A social work student summed up the experience by stating, "It was kind of humbling to be sitting there, and his family sitting with him, and the professional talking to him (the family) instead of coming up and talking to him (the patient) [P34]".

A Nutrition Major Stated

I feel like being in the setting with his family made me kind of especially in tune to his situation. Just like being with the people that you care about most, and not being able to fully experience the moment because of the vision and hearing loss, and also their attempt to console you with the situation you have going on [P4]. An audiology student expressed, "(The VR 360 video) Made the limitations of the person (patient) real [P21]". A nursing student remarked:

I don't have hearing loss, I don't have macular degeneration, so being able to see a day in the life of what Albert (the patient) went through is beneficial for me to go into a clinical setting...I will be more aware of what they are going through [P10].

The third analytic theme of communication barriers was defined by barriers related to lack of hearing and sight. One social worker student stated: maybe if somebody took the time to talk to somebody they would find out hey, I can't hear you very well, instead of talking to the family member because that empowers a person. I'm in charge of my own being [P34].

A Speech Therapy Student Stated

It's like you're trying to communicate something, but not being able to get anyone's attention. We know, as speech therapists, and maybe audiology of how to compensate for some of those things (hearing loss), and then not being able to do them effectively. I would turn my head, and I still couldn't hear them any louder. I would ask for the voices to be louder and they wouldn't change their volume, so that was frustrating [P30].

One Student Nurse Voiced

People are talking about you when you are in the room, acting like you can't understand what they are saying when you are sitting right there, and you can. It is like they are talking about you and just the perspective on that [P26].

Another Speech and Language Pathology Student Commented

I can see where a 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 are able to see it or hear it [P32].

Furthermore, A Medical Student Reflected

I felt like communication would have been a lot more difficult because you need someone to be talking at you, like right in your face in order to her them but to see them, you couldn't be necessarily looking right at them. You had to be looking off center a little bit and it might appear that you are not really paying attention [P39].

A Final Nursing Student Stated the Importance of Communication As

I think taking the time to talk to the family and educate them on their relative's disease process, so they know exactly what is going on. He (the patient) understands what is going on but he just can't hear, and he has a visual problem. Just so that they know how to deal with that instead of acting like something is cognitively wrong [P26]. Student participants' voices were heard through themes that emerged from the participant's experience.

Discussion

The purpose of this study was to explore Interprofessional healthcare students' perceived experience specific to the competency of communication as experienced through VR 360, the overarching theme was empathy with subsets of: 1) sentiment specific to emotions brought forth from participants allowing them to feel for the patient, 2) realism described by feeling as if they

were in the patient's shoes or actively the patient in the VR360 video and 3) communication barriers related to lack of hearing and sight during the VR 360 video. These findings were essential in helping us to understand the perceptions around communication of students from multiple healthcare professions. Our study showed that communication in accord with McCabe, [10] has both positive and non-positive effects on people.

Our overarching finding was that empathy was highly valued by the participants because it came through in the qualitative data with high frequency. This was represented across all professions. While empathy emerged strongly as an analytic theme it is an underpinning of communication. We believe that empathy coupled with listening verbally and nonverbally will lead to a better patient experience. Empathy corresponds to the Communication Accommodation Theory and we found Interprofessional healthcare team members valued empathy the most. One finding was that in the VR360 video experience students from all seven professions stated sentiments of having emotions that allowed them to feel for their patient. This is supported by previous researchers [20] with the understanding that sentiments related to empathy could be a key to altering students' mindsets and helping to develop understanding for their patients as a valuable educational tool. Participants reported that because of this immersive VR 360 experience, they were able to feel for their patient in real time.

Another finding in our study was that many participants stated the realism of feeling as if they were in the patient's shoes or actively the patient in the VR360 video immersion. The embodied lab scenario was successful in creating presence in the VR 360 video immersion. The participants expressed realism expressed in this immersive 360 video experience of seeing and felt the created reality of the sight and hearing impairments. This resulted in better understanding and an appreciation of how the Interprofessional healthcare team can improve patient safety and impact patient outcomes. Among participants, understanding the communication barriers of a patient were valued as one of the top three findings. This is important because communication is key to patient safety [21]. Quality communication can make all the difference in the quality of care delivered and received [22].

Strengths and Limitations

One strength of this study was that undergraduate nursing students had as much if not more clinical experience as the graduate participants in the study thus making it a balanced learning experience. The diversity of involving such a vast group of healthcare profession students was a strength to this study as it added a true Interprofessional perspective. Both researchers were able to participate in the focus groups, which increased the credibility.

Limitations included background noise that some participants reported as being a distraction. Because it was a convenience sample, we did not have equal number of participants across disciplines. Another limitation of the study was that the participants were not evenly distributed among the various healthcare professions.

Conclusion

This research suggests use of immersive 360degree video as a delivery method for Interprofessional healthcare students studying and practicing communication skills is worthwhile. Future research will explore the learning readiness in VR 360 video and development of best practices in VR 360 learning. Additional research needs to be done on developing Interprofessional communication competencies more effectively with VR 360. Researchers are encouraged to replicate for purposes of comparison globally. This further research would also allow for the discovery of nuances in participant responses that may be culturally based and would lead to even greater opportunity to assess and inform learning.

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