

Implementing Low-cost Immersive 360° Video Technology to Promote Core Skills in Journalism Courses

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Empathy

Higher Education

360° Video

Journalism

Perspective Taking



Intentional training in storytelling is fundamental in journalism education, and effective storytelling requires empathy and perspective taking. Emerging media technologies, such as virtual reality and 360° video, are noteworthy for their ability to enhance user sense of presence and to build empathy. Using cardboard virtual reality viewers, this qualitative study explored how immersive 360° videos are relevant to journalism students' core (i.e., emotional) skill acquisition in a classroom on crisis and trauma coverage. In this pilot study on applied instructional design, twenty-three student journal entries were analyzed, supported by the Cognitive and Affective Model of Immersive Learning (CAMIL). Key emerging themes included emotional impact, sense of presence, appeal of immersive experiences, and novelty. Pedagogical recommendations are presented to educators, instructional designers, and other audiences interested in integrating usable, existing, and affordable immersive content in journalism education.

Introduction

While immersive media, such as Virtual Reality (VR) and related 360° video technology, have existed for decades, their distribution to consumers has grown considerably since 2016. The increased availability of immersive technology tools, ranging from low-cost VR viewer headsets to higher end, more expensive devices such as the Oculus and HTC Vive, has accelerated VR use in education (Hayes et al., 2021; Kaplan-Rakowski & Meseberg, 2019, Lindgren et.al., 2016). The most proliferated of these immersive experiences are 360° videos that can be viewed in a low-cost VR viewer headset, with Google distributing over 15 million of these devices alone (Chen, 2019). These 360° experiences afford spatial realism and the ability to “look around” in the virtual space. This affordance is closely associated with the sense of presence or “being there” in the virtual place, which is associated with embodiment and immersion. This sensation

empowers users to virtually engage with spaces that may be typically difficult to access (e.g., inside a prison), dangerous (e.g., war zones), or remote (e.g., deserted island) (Bailenson, 2018). These affordances align with 21st century core journalism skills including critical thinking (Ferrucci, 2018), empathy, and perspective taking (Eekhof et al., 2021). Additionally, 360° technology offers users the ability to naturalistically observe individuals or settings that might otherwise be impossible to observe, aligning with the development of the core journalism skills—empathy and perspective taking (Glück, 2016). Glück specifically identifies empathy as an overlooked skill for journalists. Given prevalent claims that VR is the “ultimate empathy machine”, it is an important tool to explore for journalism education.

Journalism Education and Immersive 360° Video

Unlike traditional 2D videos, 360° videos do not limit users to a single perspective, allowing them to look in any direction within the experience — a feature associated with increased agency and empathy with the subjects depicted in the experience (de la Peña, 2017; de la Peña et al., 2010; Shin, 2017). 360° videos offer powerful storytelling experiences (Shin, 2018), which are attractive to the field of journalism, where storytelling is critical. Immersive media producers aim to generate first-hand VR experiences that enhance empathy (de la Peña et al., 2010) and have the potential to change attitudes and behaviors (de la Peña, 2017).

Existing research has explored how immersive journalism impacts the sense of presence and credibility of its experiences (Kang et al., 2019), user perceptions (Sundar et al., 2017), and emotional engagement (Kukkakorpi & Pantti, 2020; Uskali & Ikonen, 2020). Likewise, studies have suggested immersive journalism can successfully engage users in an immersive, empathetic experience (Archer & Finger, 2018; Soler-Adillon & Sora, 2018). However, these studies are largely limited to ‘in the field’ use, outside of higher education. Pedagogical insights into the implementation of immersive media for journalism pedagogy are limited to largely theoretical conceptualizations (Pavlik, 2020; Sissons & Cochrane, 2019). The goal of this study is to address some of these limitations and to contribute to the literature by showing how journalism students engage with immersive technology to further their emotional learning. Similarly, barriers to effective instructional design often include, for instance, a lack of training in how to use immersive media equipment, much less training in how to design instructional content around it (Alfalah, 2018; Khukalenko et al., 2022). The project described in this pilot study also aimed to help train faculty about the implementation of the immersive technology.

The natural fit of immersive media to journalism and journalism education continues to be made more apparent as mainstream news organizations and developers, ranging from CNN to Google, invest resources in the medium. The legitimacy of immersive media as an outlet for journalistic content can be further highlighted by the School of the New York Times offering an online VR certificate. The suitability of VR for journalistic uses is related to how VR can facilitate immersive storytelling that engages viewers more deeply than traditional 2D media (Gynnild et al., 2020).

Pedagogy and Immersive Media Usability

As of 2022, certain VR tools that can be used to view 360° videos and engage in highly interactive experiences cost upwards of \$2000 per device (e.g., HTC Vive and high-end computer). Meanwhile, for this pilot study we used an affordable VR viewer (i.e., Google Cardboard), which costs approximately \$10 per piece. These less expensive viewers function by inserting the users’ smartphones into the headset to immerse themselves in the 360° experiences. Given their status as both affordable *and* as immersive media devices, a primary goal of the present research is to explore the reactions of journalism students to these 360° experiences. Many instructional design choices must be made with the specific usability features of the device in mind, such as the availability, and ease of use of the cardboard viewers allow instructors with even marginal support to outfit modestly sized classes with the tools. Furthermore, public platforms such as YouTube offer free 360° videos which instructors may integrate into their existing course content, or design new tasks and educational experiences.

CAMIL, 360° Video, and Journalistic Learning Outcomes

While there are many models and frameworks that address integration of media into curricula, such as multimedia learning theory (Mayer, 2002), most models do not address the unique affordances and pedagogical requirements involved with the integration of immersive technologies. While immersive media afford users medium-specific features that are designed to suit certain types of learning, much of the foundations of learning from, and implementing it into classrooms can be generalized from traditional media (Makransky & Petersen, 2021). Specific factors of immersive media (e.g., 360° video) influence how students interact with, and ultimately learn from, the experiences. The Cognitive Affective Model of Immersive Learning (CAMIL) by Makransky and Petersen (2021) posits that enhanced presence and agency in an immersive experience are related to mental factors that ultimately influence successful learning, including interest, motivation, self-efficacy, embodiment, cognitive load, and self-regulation. Immersive 360° videos in journalism are not intended to replace traditional instructional approaches (e.g., lectures), which are typically more effective for teaching declarative knowledge (Bailenson, 2018; Hayes et al., 2013; Herrera et al., 2018; Van Loon et al., 2018). Instead, such videos can contribute to practicing the emotion-driven interpersonal skills necessary in a well-rounded journalism education.

CAMIL guides instructional designers to structure immersive VR lessons in ways that leverage the unique affordances of the technology. The model leads designers to plan how the sense of presence and agency can be used to increase student embodiment which is believed to develop factual and conceptual knowledge. Instructional design teams should meet with subject matter experts (SMEs) to identify the target learning outcomes and immersive content. This approach helps the instructor scaffold lessons, pre-select immersive content, and reduce the cognitive load. CAMIL also highlights the importance of reflection to increase metacognition and to deepen learning outcomes (Makransky & Petersen, 2021).

In the CAMIL model, Makransky and Peterson (2021) define immersive VR as experiences that are accessed through a VR headset. This distinction is important to note, as the levels of immersion vary between 360° videos and higher levels of immersive VR reality. 360° video technology provides relatively little interaction because it is typically limited to pre-recorded visual and audio content that users are unable to manipulate. The distinct advantage of 360° video that outweighs the limited interactivity is the flexibility of 360° video viewing modes. That is, a 360° video can be viewed in a low-cost headset or using a traditional flat screen display based on students' preferences and access to VR technology.

Purpose of Study

The purpose of this study was to investigate the impact of immersive, 360° video on the instructional design of a journalism course, and how the integration of 360° video experiences influenced key journalism skill development, such as empathy and perspective taking. Our research questions (RQs) were:

RQ1: How does the use of affordable 360° video content influence development of journalism human skills, such as empathy and perspective taking?

RQ2: What are the instructional design implications of 360° video content for a journalism course?

Methods

Participants

Participants were 10 students enrolled in an undergraduate journalism course: *Covering Crisis, Trauma, and Recovery* offered at a large public university in the Southern United States. The sample primarily consisted of journalism majors whose ages ranged from 19 to 27 and whose gender distribution was equal. Students were given informed consent at the beginning of the course with the option to opt out of participation at no penalty.

Procedure

Before the semester commenced, researchers worked together with a subject matter expert (SME), an experienced journalism instructor, to explore how immersive technology might contribute to the learning objectives of journalism classes. We identified one class that the SME thought would benefit from immersive experiences, “Covering Crisis, Trauma, and Recovery” for our pilot study. After reviewing the existing course, its learning objectives, and the learning affordances of immersive learning experiences, we identified the target journalism skills: empathy and perspective taking. We then reviewed a series of existing 360° videos and presented them to the instructor to identify the most appropriate videos to implement into the overall course design. Exploring different databases of experiences freely available to educators, three 360° videos were selected for their potential to inspire emotional connection in students.

As the instructor and students were novices to VR, the first video (a simulation of swimming with sharks) served as a training exercise to get students used to using 360° video technology. The second experience was *Send Me Home*, the story of Rickey Jackson, a Black man wrongfully imprisoned for 40 years for a crime he did not commit. Walking through the actual prison he inhabited, the 15-minute experience follows Jackson as he reflects on his life and his future. The third video, *The Art of Healing*, depicts a glimpse of Miriam Cortez, an artist born to undocumented immigrants who uses art to express herself and heal from a traumatic past. Interestingly, Cortez developed art pieces that were purposefully meant to be viewed in 360°, as a method of connecting the viewer to herself. Our instructor selected these experiences citing their appeal to viewers to empathize with the past trauma (a theme of the course) of their subjects in an immersive, sensory-engaging way.

Each student used a low-cost 360° video viewer *Google Cardboard*. The experiences were delivered as part of two different units approximately two weeks apart. A trained research assistant exposed students to the experiences by demonstrating how to use the headsets and helped facilitate discussion after the experiences. To avoid possible motion sickness, the students had an option to view 360° videos using a flat screen monitor, instead of using the VR viewers. However, all students chose to use VR viewers. As prescribed by the CAMIL model, the students were given the opportunity to discuss both the mechanics and the content of the video as a group, as the reflection is critical to metacognition and deeper learning. For their take-home assignments during the target weeks, students wrote an expressive journal entry that discussed what they learned, and how they experienced the 360° videos in relation to that learning.

Data Analysis

A thematic analysis was used to analyze students’ journal reflections on viewing the immersive 360° experiences. Using the students’ 23 reflective journal entries, we reviewed and coded all entries using a thematic analysis approach, a qualitative data analysis technique that seeks to identify patterns, meaning, and overarching themes across open-ended data to answer research questions (Braun & Clarke, 2006).

In performing thematic analysis, at least two coders reviewed every journal entry. This thematic analysis was grounded in the CAMIL framework (presence, novelty) and the learning objectives (empathy and perspective taking). During the analysis, the team also coded factors including general emotional impact, usefulness, perspective taking, novelty, and interfacing with VR, and VR usefulness. This process was completed in NVivo, with coders round-tabling results until an adequate ($k > .80$) interrater reliability was achieved.

Findings

Four major themes were identified: (1) emotional impact, (2) presence as an affordance of an immersive pedagogical tool, (3) appeal of immersion in VR experiences, and (4) novelty. To ensure confidentiality, given the small, pilot study sample size, no identifiers were given for students’ quotes.

Theme 1: Emotional Impact

The first theme to emerge, with the most frequent codes, was emotional impact. This theme consisted of the codes for general emotional impact of VR (30), empathy (33), and perspective taking (45). Students specifically cited the immersive nature of 360° experiences as key to their emotional engagement with the content. One student commented on *Send Me Home*:

Being thrown directly into the caged environment he was imprisoned in for 29 [sic!] years shocked me... what's refreshing is that we, the viewers, are allowed to be with Ricky [sic] Jackson in nature [and] in his home. It felt so personal that I couldn't help but be overwhelmingly moved.

Another student found a similar connection to *The Art of Healing*:

[The 360° video] allowed us to see how art saved Miriam from her past... the video was mainly in her room where she paints and draws. It felt as if that was her safe place... the video allowed me to feel her pain but also see how much she has grown...

Students' reflections highlighted how effective the 360° experiences were for allowing students to 'jump into' the heads and perspectives of the video subjects. Throughout their open-ended responses, students showcased an ability to connect with the subjects of the experiences on a deeper level, beyond solely learning about their lives. A display of empathy was evident, as in what one student said of Miriam:

Maybe she saw herself as a bird in another life and saw herself just flying away when life got too tough... I'm glad art can be that outlet for her.

Within this theme, students sought an amiable, social perspective toward the subjects in the videos. Focusing beyond the 'facts' to understand and relate to their virtual tour guides on a more personal level might be considered as an application of a student's intrinsic motivation. Within the CAMIL framework, intrinsic motivation refers to engaging in an activity with the goal of completing it. These activities trigger a social response in the learner based on the presence of someone that the viewer wishes to learn from (such as our video subjects relaying their life stories).

Students showcased motivation to engage emotionally without being told to do so. This motivation was visible, for example, in their statements about the ability to 'jump into the heads' and relay feelings that they believed the video subjects had, but never verbally expressed. Regarding the application and pedagogical design, the social and emotional element of these immersive experiences may be fundamental for a successful integration of immersive experiences into journalism courses.

Theme 2: Presence as an Affordance of an Immersive Pedagogical Tool

Presence as an affordance of an immersive pedagogical tool emerged as a theme with the second most common frequency, consisting of the codes interfacing with immersive content. Although some students admitted that they were unsure how exactly the VR viewers were conducive to learning outcomes, they were surprised to see how easy it was to find learning value in immersion. Students noted that viewing 360° videos, as opposed to viewing 2D traditional videos, increased their sense of presence (i.e., "being there", inside the immersive videos). Many student reflections were coded as 'differences between immersive and traditional [2D] video', the immersive experience's 'useful applications in journalism education', alongside acknowledging how the VR viewers were 'affordable and accessible' and therefore something worthwhile further exploration. One student directly compared VR to traditional 2D media:

Being a VR experience rather than just a normal 2D video engaged me on a different level... If I didn't look around, I would have missed text or other information.

Students extrapolated that this 'forced engagement' was useful for educating them on a variety of topics in journalism and beyond, calling out that even these low-fidelity (by high-end VR standards) experiences were "easy to see where the

implications” where, and that they were exploring ways of how one might apply these new experiences to other topic areas. In one student’s view:

Imagine being able to place readers in the site of a disaster. Imagine instead of just reading about something you can... actually see what’s going on. Getting an accurate sense of space can go a long way in creating... engagement for the [viewer].

In relation to the CAMIL framework, we see students reference how being “boots on the ground” with immersive video, as opposed to 2D, is important to the quick dissemination of information. This ‘embodiment’, the sense of controlling a self that formed a connection between how students moved and what they saw, was picked up by students and by their commentary that embodiment appears to have aided the way they viewed video subjects.

Theme 3: Appeal of Immersive Experiences

Our next theme reflected the unexpected ‘realness’ that the students reported after viewing the 360° videos. Many students described this ‘realness’ as positive, outside of how it engaged them emotionally, and were surprised how even the most mundane of spaces became relatable in the immersive 360° experience. Students valued ‘being on scene’ which made them appreciate 360° experiences because they enabled them to be the ‘closest I [they] will ever come to this’ and offered them ‘user direction and control’ of the experience. The comment of another student revealed her understanding of the prisoner’s experience:

We got to see what life was like on the inside: the bed he slept on, where he used the bathroom, where he ate food, and where he worked out. It was very dull, heartbreaking, and uncomfortable...

Of *Send Me Home*, students explained how exposure to intimate shots of what should have been something uninteresting, such as prison hallways or courtyards, still became striking because of the highly immersive nature of the 360° videos. The inherently controllable elements of the experiences (i.e., the ability to move one’s head and self-select what to watch) was also noted by multiple students to encourage engagement:

The consequence of having to look around to capture the full view... is actually a blessing in disguise... it forced me to be even more engaged with the story. I didn’t just watch Rickey Jackson, I turned and looked at the man.

While both of the 360° videos were made primarily using slow-moving, narrated shots of building interiors, students still focused on how true-to-life the experience felt, finding emotionally strong reactions to the settings that were ultimately mundane. Though they could only navigate the space by pivoting their heads, students still reported they found the experience engaging. Higher-fidelity VR experiences may feature additional points of contact, such as the movement of hands, yet students still appeared to display a sense of ‘embodiment’ from within the experiences; another cognitive factor the CAMIL framework suggests is the ability to learn from immersive experiences.

In applications of this principle to the further creation and implementation of 360° videos in journalism classrooms, our data suggest that students who are infrequent VR users may be able to capture a sense of embodiment and control over a 360° experience, consequently, creating an opportunity for learning. This process is possible even with very basic points of control and without the need for overly ‘fantastic’ elements. When scaffolding new immersive media users, students might be readily engaged with simple contexts, such as backyards or studio apartments, that they are afforded the opportunity to control their attention in. One recommendation of a conservative instructional approach with a strong learning potential is to focus on 360° video content rather than on 360° video technology. That approach allows to give students a chance to explore the content with unprecedented point of agency instead of trying to impress them with technology.

As Makransky and Peterson (2021) discuss in the CAMIL model, novelty cannot replace instructional support, so it is important to consider this in future research. Students’ responses to the novelty of the VR viewers might imply an over-reliance on what is ‘new’ in immersive experiences and not necessarily on what is ‘novel’. Although 360° technology is not new, students’ interest was still piqued.

Students' comments indicate that the integration of immersive media in a journalism course is appealing. The pedagogical implication is that implementing immersive technologies can be useful because students find immersive experiences attractive and engaging. Instructional designers and instructors are encouraged to expose their students to immersive media to enrich traditional classes.

Theme 4: Novelty

The theme of novelty was salient throughout the reflections and supported by additional emergent codes related to fun and a "wow factor." The majority (7 out of 10) of students explicitly indicated the newness and 'coolness' of the technology which made them feel excited. As a result, the researchers identified the codes theme directly referred to as the 'Novelty/Newness' of the experience, the 'ease of use for new users', and how students shared a common sentiment of 'new experiences are fun'. Soon after our training session in which students experienced the simulation of swimming with sharks, one student said:

I was honestly impressed, instantly, I was transported to a forbidden underwater world... when I looked left, the video looked left, and when I looked right, I saw a huge shark swim by!!

Students were especially impressed with how easy it was for them as new users to work with the experiences:

One of my favorite parts was the simplicity! Slap my phone into a cardboard box and it works as a VR viewer? AMAZING!!!

Discussion

This pilot study supports the use of the immersive 360° content to influence development of journalism soft skills, such as empathy and perspective taking (RQ1). Two themes emerged from students' reflections that demonstrate student perspective taking: emotional impact and presence as an affordance of an immersive pedagogical tool. Twenty-three student reflections were coded 33 times for expressions that indicated empathy. Likewise, the reflections were coded 45 times for indications of perspective taking. Despite 360° video often being compared unfavorably to more advanced VR, the journalism students in this study extolled these 360° experiences as enticing, worthwhile, and interesting, based on little more than how they deviated from traditional journalism pedagogy. Given students' quick acclimation to this new way of engaging with topics relevant to crisis reporting in journalism, we see what might be labeled as a 'novelty effect', or immediate increase in engagement/interest for a pedagogical technique (often associated with gamification techniques) (Hamari et al., 2014). This initial spike in interest that our students displayed aligns well with the CAMIL principle of 'situational interest', with this interest acting as a key method for the development of procedural knowledge through immersive learning (Makransky & Petersen, 2021). Students, who are interested by the novelty of the 360° journalism-relevant media, might then be primed to pay more attention than they otherwise would to something comparatively bland and be willing to engage with the skill-building content.

This pilot study also provided insights into RQ2, "What are the instructional design implications of 360° video content for a journalism course?" First, aligned with CAMIL, the researchers facilitated the instruction by pre-selecting the 360° content for the students and by training them about immersive technology tools before they engaged with the learning immersive content. Next, our research team employed reflection to deepen student engagement with the research content.

This pilot study also demonstrated an effective process for educators and designers to integrate access to freely available databases and repositories of existing 360° video documentaries (e.g., YouTube, Vimeo, PBS 360° Films). Educators and instructional designers can also offer students the flexibility and the agency to co-select curricular content from these freely available repositories, individually or collaboratively. Giving students the opportunity to co-design part of the content in a course enables them to take ownership of their own learning and makes their voices heard (Elkhoury & Usman, 2021).

Recommendations and Conclusions

This pilot study was limited in its sample size, and we specifically focused on journalism students. Follow-up research should extend the sample size and should test the effectiveness of immersive technologies in other educational settings. Implementing quantitative or mixed research paradigms can further enrich findings on the implementation of immersive media into the classrooms. Instructional approaches can extend to constructionism where students can engage in building immersive experiences using 360° cameras. Additional research spanning multiple semesters and delivery modes (online, hybrid, and/or in person), different class sizes (high vs. low enrollment), curriculum level (undergraduate vs. graduate), could shed further light on the uses and utility of integrating 360° videos in courses to educate the next generation of learners.

As 360° video technology evolves and immersive content becomes increasingly realistic, the boundaries between one's experience of perceiving real versus virtual scenes become increasingly blurred. For example, immersive technology can lead to change real-life behaviors (Tajadura-Jiménez et al., 2017). Educators and designers should consider briefing students about the characteristics of the technology and introduce it in the course by discussing both the opportunities and risks associated with immersive experiences (Pan & Hamilton, 2018).

The main purpose of this study was to explore the impact of immersive 360° video on students' development of core interpersonal skills needed by effective journalists, such as empathy and perspective taking. Using thematic analysis grounded in the CAMIL framework and in the learning objectives of the course, we explored the students' reflections and utterances about VR for journalism education. The analysis of these reflections resulted in themes, such as emotional engagement, embodiment, excitement about novelty, and mechanical as well as aesthetic appeal of immersive experiences.

When integrating 360° video experiences into curricula, educators and instructional designers should note that inexperienced users may find it challenging to comfortably engage in immersive media on their own. Such difficulties may be reduced thanks to the pre-training session early in the course, during which a knowledgeable user offers a session when students practice using 360° technology. Our pilot study implemented a pre-training session, which allowed students who were first time or infrequent VR users to quickly acclimate and successfully engage with the immersive 360° experiences.

The thematic analysis indicated that strategic integration of low-cost immersive technology in a journalism course can advance students' empathy and perspective taking. The students acknowledged how 360° video technology engaged them, and they showed evidence of applying their perspective-taking skills to other emotionally stressful situations, beyond the situation depicted in the 360° video activity, including covering other crises typically unavailable to them. The flexibility of choosing experiences that allow students to view immersive 360° video experiences using a VR viewer, a smartphone display, or a laptop monitor, enables students to explore the levels of immersion most available and accessible to them. Overall, this pilot study provided some initial evidence that implementing 360° video technology into the classrooms can be pedagogically valuable but further research is necessary to provide enriched guidelines of how that implementation should be done in the most effective ways.

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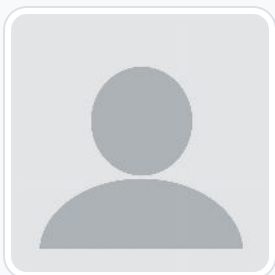
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