Examining virtual reality for pro-social attitude change

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Virtual reality (VR) has become a more common medium both in professional and in personal consumer use in recent years. Broadly, hardware has continued to decline in price and increase in portability. Building on this work, scholarly inquiry has expanded from traditional VR to cinematic virtual reality (CVR), augmented reality (AR), and mixed reality (MR), which combines several types of reality in one medium. The term XR refers to all aforementioned real-and-virtual combined environments. As a parallel development, the cost of producing and publishing VR content has become easier with new platforms such as YouTube Virtual Reality and Facebook 360°. Consequently, VR is being produced, published, and consumed more than ever, and as a result, VR has permeated numerous domains (Aitamurto, 2019). The increased availability of consumer VR has also broadened the field of researchers and designers using these platforms (Bevan et al., 2019).

While entertainment and gaming remain the dominant contexts, VR has been increasingly deployed in a multitude of civic applications, including education, healthcare, journalism, enhancing mutual understanding, reducing gender and racial biases, and promoting altruistic behaviors. One common theme of these applications is using VR for pro-social attitude change. This potential is supported by decades of research showing that the traditional game-engine-based VR may be a powerful tool for affecting people's attitudes (Bailenson, 2018). With its immersive features, VR can—perhaps—help users to understand other people's perspectives better compared with other media. Many of the discussions about VR center around its ability to change behavior, for good or ill. Such applications of VR may change or enhance users' attitudes, leading them to contribute to society positively. Therefore, this special issue focuses on examining VR as a platform and technology, which can contribute to social change by affecting people's attitudes, behaviors, and understanding of others' perspectives. Particularly relevant it is to explore whether, how, and under what circumstances VR contributes to pro-social attitude changes and their theoretical, methodological, and practical implications.

These questions became particularly timely during the COVID-19 pandemic, which swept across the world in 2020 and has no end in sight at the end of the year. The rapidly spreading coronavirus caused a severe public health crisis, disproportionately affecting vulnerable populations and causing large numbers of people to be isolated in their homes for long periods of time. Both work and school moved online for large chunks of the population, making previous face-to-face relationships "virtual" and prompting a boom in the purchase of XR equipment.

As a parallel development in the United States, the disruption caused by the coronavirus was accompanied by unprecedented and ongoing protests in support of the Black Lives Matter movement prompted by a succession of well-publicized instances of police brutality. At the same time, the US government tightened restrictions on immigrants and international visitors, raising suspicions of political exploitation of xenophobia. Many countries created policies excluding travelers from different parts of the world. In the United States, the presidential elections made stark opinion differences between the citizens surface very clearly. These developments created even deeper ideological ruptures between citizens, pushing them apart based on their ideological stances and alienating them from others' perspectives.

As of writing this editorial at the end of 2020, how these crises will be resolved remain open questions. Therefore, the question of how we understand each other's perspectives, react constructively, and behave with empathy and reduced bias toward each other is now more important than ever. VR as a platform for immersive storytelling and a medium for instigating empathetic reactions has the potential to contribute to social change, but it must be critically considered in the context of our current situation.

Considering VR simply as an "empathy machine" has already been much critiqued by communication scholars (Barreda-Ángeles et al., 2020; Bollmer, 2017; Nakamura, 2020). There is an urgent need to have a more in-depth and thorough understanding of the affordances of VR and how they influence people's cognition, emotions, and behaviors.

In addition, there has been a huge increase in "virtual versions" of a variety of previously face-to-face social interactions. VR headsets such as the Oculus Quest are backordered, and development of platforms that allow virtual meetings continues to accelerate. Interest in the potential of XR continues to grow, and empirical research is one way to contribute to its pro-social use.

This special issue includes six articles with both theoretical and empirical inquiries into the use of VR for pro-social attitude and behavioral change toward others. We believe these six articles represent careful work that aims to add to the conversation of what each of us can do, as researchers and as citizens, to build a better world in an empathetic, open, and pro-social way.

Foxman, Markowitz, and Davis begin by examining empathy, a buzzword proliferating in both popular and academic publications about VR. The authors examine the use of empathy as a concept in popular and academic press, making sense of the complexity and meaning of empathy as a key concept connected to VR. Drawing on qualitative and quantitative analysis of publications about VR in academic and popular press corpora, Foxman, Markowitz, and Davis show that empathy is not a consistently defined, stable term in academic or in popular press but its attributes change over time. Empathy is often framed with aspirational language of potentiality, which can be realized through VR. The authors also show with descriptive statistics how the number of publications about VR increased dramatically since 2015 when the VR hype began. As a result of their analysis, Foxman, Markowitz, and Davis offer a definition for empathy, which integrates approaches from cognitive and affective psychology, acknowledging the roles of social dynamics and immersive media in assisting a psychosocial process. The authors also call for collaboration between academics and journalists to better communicate the complexities of empathy to the public.

Hasler and colleagues present an alternative view of VR as an empathy machine. In this series of studies, they create a 360° video to present participants with a scenario showing in-group actors threatening out-group actors. Their results present an alternative path to conflict resolution, one that challenges "the common assumption of empathy-enhancing capacity of virtual reality," finding that a VR experience led to a more negative view of the in-group's actions rather than greater empathy for the out-group.

Pimentel et al. approach the issue of attitude change from an empathy-forward perspective, working with the goal of increasing empathy through leveraging the presence-inducing qualities of XR. These concepts are difficult to operationalize: Pimentel and colleagues investigate social presence and interactivity in an experiment on the effects of climate change, taking participants on a visit to the Arctic. Pimentel and colleagues investigate how social presence through "being with" members of the at-risk group drives pro-social behaviors. This aligns with other research proposing that feelings of agency or the ability to act are key to the experience of presence (Riva et al., 2011). This highlights the question of what the broad concept of empathy is meant to do: is it meant to inspire action, or merely "feeling with" the empathized-with other.

Li and Kim focused on VR's capability of allowing users to embody an avatar in virtual environments and take perspectives of another person. They compared the effects and mechanisms of embodying a self-avatar (themselves as a patient needing a kidney donation) versus other-avatar (a typical renal-failure patient) in promoting kidney donation in Singapore. They distinguished three kinds of pro-social behaviors based on the tension between social values and egoistic concerns in the context of organ donation—(1) intention to donate a kidney, (2) intention to volunteer, and (3) monetary donation to a kidney donation organization. Findings suggest that self-embodiment triggered personal distress and egoistic motivations, which promoted monetary donation and volunteer work, whereas other-embodiment triggered empathy and altruistic motivations, which resulted in higher intentions to donate a kidney.

Herrera and Bailenson extended the research of avatar embodiment in VR by examining the effects of representing users with only a pair of virtual hands rather than full-bodied representation, enabling users to choose their own skin tone, and head movements on pro-social behaviors after an immersive experience of homeless people's hardship. People had the virtual-hand representation and chose their own skin tone reported greater social presence and were more likely to sign a petition in support of affordable housing compared with those who had no choice. Regardless of the condition, the more participants rotated their heads side to side, the more likely they were to support homeless people. This study indicates that VR allows people to physically react to virtual experiences, facilitating the understanding of other people's perspectives and promoting pro-social behaviors. It should be noted that different from conventional VR studies, this research took place in a mobile lab unit outside of the lab and was able to collect data from more than 900 participants in more naturalistic settings.

VR is increasingly used as a therapeutic method to alleviate stress, trauma, and other psychological issues as a part of exposure therapy. Building on the line of work on VR as a treatment modality, Melissa Teng and Eric Gordon document and analyze the design process of a prototype for a VR re-entry program for incarcerated women in a state prison. The goal of the VR exposure in their prototype program is to help incarcerated

women practice responding to high-stress situations prior to their release and thus decrease the barriers and challenges upon re-entry. Teng and Gordon deploy a participatory design approach and situate the incarcerated women as agents instead of users and designers as facilitators instead of experts. The study documents the difficulties and opportunities of adopting a co-created, participatory process in prison and discusses the risks and possibilities of deploying VR as a part of a re-entry program.

Teng and Gordon's study shows one way how VR can be used for helping people at micro level, in this case, incarcerated women facing challenges upon re-entry, and at the macro level, addressing vexing societal issues such as recidivism. As Teng and Gordon point out, the future deployment of VR as a part of a re-entry program is not only dependent on the technology's capacities but perhaps more so on cultural and institutional tensions, which create constraints for adopting VR as a part of re-entry programs.

Areas for future research

While scholarly work on VR is proliferating in parallel with the popularity of the technology, a lot of ground in this domain still remains unexplored. There is also room for methodological innovation and creativity in the study of VR. Currently, a large body of work on VR is based on experiments conducted in research labs. We encourage scholars to extend their methodological approaches to a broader range of approaches, such as field experiments, focus groups, and participatory design studies. Studies are also encouraged to examine the long-term effects of VR programs on pro-social attitude and behavior changes. Moreover, now that the VR technology is more mature and accessible for broader audiences, it would be timely to study VR embedded in people's everyday lives with methods such as ethnographies and diary studies. One challenge of VR applications is their potential to scale to large populations. Studies should explore methods to increase dissemination of VR programs and examine their cost-effectiveness compared with other forms of technology or media platforms. Future studies should continue to strive for diversity among the studied populations to better understand the feasibility of equitably implementing VR interventions including socioeconomically disadvantaged populations. As the authors' work in this special issue indicates, the effects of VR should be studied from young and the old in a broad range of settings, using a variety of methods, to improve our ability to understand the impact of VR on all audiences.

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