

# **Does Culture Impact Learning For Students Who Use Virtual Reality (VR) Tools? A Review of Literature.**

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## **Abstract**

As learners and educators embrace VR as an educational technology tool, and as this technology is anticipated to become ubiquitous in education and training, it is important to understand how culture affects learners' interacting with it. Educational technology is generally not free of cultural values; intentional or not. These cultural values affect how learners, instructors and content creators interact with educational technology. This present research reviews studies on the impact of culture on the deployment of VR as an educational tool. Culture influences content design, acceptance and use by instructors and learners who interact with this technology. This review suggests that VR content creators be conscious of cultural biases when creating content.

Keywords: Culture, diversity, Virtual Reality, educational technology, accessibility.

Virtual Reality (VR) has been used in education and training because it stimulates and immerses learners in content so that they can grasp content faster and participate in their own learning. This immersion increases engagement with content, increasing opportunities for learning. As Freina and Ott (2015) have pointed out, VR hardware, including eyeglasses and other Head Mounted Displays (HMD), produce in the user a visceral feeling of being in the simulated world. This immersion appeals to the basic human senses, especially sight and sound, which may enhance learning.

This immersion in content often leads to an understanding of and grappling with content. In preparing this content, the VR content creators may unwittingly transmit their cultural values and beliefs to the learners. This may be in the form of the learning objects and artifacts contained in the structure of the VR program. It could also be in the form of the references in the virtual world that the user interacts with, or the prerequisite cultural knowledge a user is expected to have so as to successfully interpret and respond to stimulus from the virtual world.

## **Understanding Culture**

Baldwin, Faulkner and Hecht (2006) identified culture as consisting of a set of elements such as ideas, behavior and others that are shared by people in a social structure. For this review, Garcia and Dominguez' (1997) definition of the characteristics of culture is used. They note that culture provides the lens through which we view the world. It is shared by members of a group, it considers cultural values that persist, even though people who adhere to them may not express them consistently. They note also that culture is a dynamic process, likely to change over time; and it provides the basis for childhood experiences through which children are socialized to the norms, values, and traditions of the cultural group. Culture, therefore affects how people think and do things; it can determine whether technologies are accepted or rejected by learners and instructors. Learners' culture can therefore determine whether these learning technologies are successfully integrated in schools. Further, culture can also influence peoples' persistence in interacting with technology. Often, too, content creators may, whether knowingly or unknowingly, transmit their preferred cultural values through educational technologies. Additionally, the learning medium (in this case, VR) also enables users to create their own culture within the medium. Learners become part of the virtual learning experience, and like a tribe, they adopt new cultural norms with which they interact. This paper reviews research that examines the impact of culture on VR as an educational technology.

## **Research question and methodology**

This research is guided by the research questions: To what extent does culture impact learners who use VR technology? To what extent do educational VR content creators consider the effects of culture when users interact with their content?

This research used a review of literature to identify studies on culture and educational technology, especially VR educational technology. This research used a variety of articles sourced from the major educational databases including ERIC, EBSCO, ProQuest, PsycINFO, among others. Research was also sourced from AECT's *TechTrends* and Google Scholar.

## **Culture in VR content**

Virtual Reality, as a technological tool, by itself does not possess any cultural or social attributes. It is a tool employed by users and its creators to achieve certain objectives – including entertainment, education, training, creating a virtual experience for safety, mining, tourism, among others. Instead, as Lanier and Biocca (1992) have shown, VR's cultural potential can be realized by cultural developments that spring up alongside it. These include cultural symbols, meanings, and objects with which content creators imbue VR technology. Additionally, users of VR technology can also alter and re-purpose VR content so that it aligns with their cultural preferences. Lanier and Biocca point out that, like all technology, VR can be used as a route to access a community, to influence their experiences and it can also be a means of social communion, just like the TV and radio before it.

Often the tools with which we interact, can alter our behavior. VR educational tools, like other tools, have influenced the way we interact with learning content. Rosenfeld (2015) notes that the affordances of the technological tools enables and inhibits individual agency which often push or pull us into uncharted ways of behaving. She finds that computers contain identity embedded within their database design, their user interface design and their functionality. This is also true for VR educational technology where artefacts, identities and realia are constructed to represent and mimic real-life. Learners' interactions with these technologies are linked to cultural experiences that hold a powerful appeal to their psyche (Rosenfeld, 2015).

McLoughlin and Oliver (2000) note that culture pervades learning, and in designing instructional environments, that there needs to be serious debate about issues concerning the social and cultural dimension of task design. These would be important in structuring learning goals that meet the needs of culturally diverse learners. McLoughlin and Oliver note that educational technology is imbued with cultural values and assumptions and that as a 'cultural amplifier' it can quantitatively change the processes of cognition of the users.

Additionally, the users' cultural background may affect how they interact with VR. In an experiment to investigate the role played by culture in the emotional responses to VR, Gorini et al (2009) selected two samples of Mexican participants undergoing ambulatory surgery to interact with VR. One group consisted of inhabitants of a rural isolated Mexican village, with elemental cultures, while the other second group were inhabitants of civilized culture of Mexico City. The research found that, depending on the users' cultural and technological backgrounds, users have different emotional responses to interaction with VR. This research suggested that users' cultures can fundamentally influence how they interact with VR. Morgan (2002) points out the importance of VR content designers in matching the content to the culture of the intended target audience. He underlines previous research that has suggested that previous exposure to technology resulted in learners being able to quickly adopt learning via VR technologies. To lessen the impact of cross-cultural differences in interacting with digital content, Morgan suggests the introduction of cross-cultural design teams and debriefing sessions to determine some of the cross-cultural learning needs of the target population.

## **Positive effects of culture in VR technology**

Other researchers have shown how the culturally-infused aspects of VR have led to accelerated gains by learners. O'Brien and Levy (2008) note that in a language learning class, the affordances of VR to include cultural paraphernalia of the language that learners intend to learn provides a conducive setting for foreign language learners. Therefore, by learning a language in a virtual reality context that is infused with the culture of the language that they want to learn, greatly assists in faster language acquisition. This cultural experience through VR affords language learners contextualized practice with everyday language as experienced by the native speakers. O'Brien and Levy note that VR, unlike other multimedia, affords language learners the advantage to physically experience culture and interact with language in a virtually authentic environment that enhances cognition and retention of language. They

report that by using VR in learning language, students were successful in learning because VR enabled them to experience the target culture in a new, involving and meaningful way.

Additionally, on the affordances of VR to boost language acquisition, Schwienhorst (2002) notes that VR can contribute toward language and linguistic awareness, while providing a more stress-reduced and egalitarian learning environment or collaboration and interaction between peers. In this way, learners who are still developing some degree of learner autonomy can benefit more from a VR environment where they are encouraged to communicate, collaborate and participate in the learning process. This process encourages them to communicate, collaborate, and participate in the learning process which encourages and sometimes forces them to take control of their own learning (Schwienhorst).

Other researchers (for example; Noh, Sunar and Pan, 2009) have suggested that VR learning systems that can transmit cultural artefacts and symbols have been instrumental in reconstructing cultural architectural structures. The ability of VR to transmit cultural values has also been invaluable in spreading religious practices (Wagner, 2012). Due to the ability of VR to recreate realistic circumstances, religious scholars can reconstruct scenes from the holy books that represent key religious tenets. VR is thus able to recreate religious rituals, stories and rich interactivity that invite immersion in experiences that enrich religious cultural practices.

Since most educators, learners, and users of VR have neither the technical skill nor the time to create their own VR content, they rely on content created by third parties. It is important therefore that these third-party content creators ensure that content is flexible so that the final users can customize it to suit their local conditions and cultures. VR content designers should also be aware of their cultural biases as they design content.

### **VR technologies altering user perspectives**

Other researchers have noted that the recreated worlds afforded by VR alter the way a user perceives herself as she interacts with these virtual environments. Hillis (1999) suggested that virtual environments afforded by VR technology, fragment peoples' identities and cultures, even as they promote a new form of determinism and mystical thinking. This researcher suggested that the creators of VR technology often promote it as superior to the cultural restrictions that constrain users in their regular lives and that VR environments free them from these constraints. VR environments change the way users perceive their world; the users can regulate this world to their liking, they alter their perception of relationships with objects and how to interact with them.

Additionally, VR learning environments attempt to create a co-presence with users to achieve believability. Although, as for now, VR learning environments cannot replace the co-presence of a face-to-face instructor, VR creators try to create an ambiance that mimics real-life interaction. This attempt to create a co-presence requires that the user and the digital environment share a common culture. VR may not offer physical co-presence, but it can offer linguistic co-presence that requires the user to be attuned to the culture of the instructor's co-presence. In this way, VR virtual environments fundamentally contribute to an alteration of the user's culture to align it with the content creator's culture, even if temporarily. Schwienhorst (2002) notes that this need for co-presence often results in language and linguistic awareness that provides a more egalitarian learning environment which is conducive for collaboration. VR learning environments seek to homogenize the learning environment so that as many users as possible may interact with it. Often, this means that the specific cultures of individual learners are thus subsumed to reflect the general cultural environment of the co-learners and to match the co-presence of the learning environment. This learning environment promotes common linguistic reference points (Schwienhorst) that may adhere to the culture of the content creator. Yee, Bailenson, Urbanek, Chang, & Merget (2007) reiterate this point when they note that social interactions in online virtual environments, including VR environments, are governed by the same social norms as social interactions in the physical world. The way users interact with and manipulate their VR avatars could also point to how they physically interact with similar objects in real life.

### **Discussion: Why is this important?**

As this review suggests, several researchers have shown that VR is impacted by culture in several ways. The content of the VR system, its learning environments, and learners who interact with it are influenced by culture and they in turn also assert some cultural effect on these systems and environments. However, technologies and learning advantages afforded by VR systems remain powerful and provide an alternative means to traditional forms of learning. Some researchers even caution administrators and others not to be overly concerned by the cultural impact of VR on learners. Gayol and Schied (1997), for example, note that often cultures look for an abstract 'enemy' outside the boundaries of cultural values and those who embrace such ideologies fear that their cultures will be polluted, and that such 'cultural contamination' should be avoided. However, they note, the introduction of VR in

society and other modern digital media, serves to break down the attempt to enclose people and societies in fixed clusters.

Ultimately, cultural values seep into VR technology and affect users' interaction with it. One of the main effects of culture on VR include the use of audio which contains language. Language is a definitive expression of culture; it governs how groups interact and communicate with each other. The language in VR technologies is determined by the content creators and it is an expression of culture. VR technologies are also affected by symbols which can be interpreted differently by users depending on their cultures. Some words, phrases, idioms and other language expressions, are also subject to misinterpretation across VR learning cultures. Additionally, the images and symbols employed in VR content could also impact learners depending on their cultures. Religious symbols, symbols of warfare and violence, politics, clothing, gestures, handedness, and colors (Morgan, 2002) largely affect users and they way they interact with VR technologies.

### Future projections

There is no denying that technology, including VR technology, will continue to be integrated in education and training. More and more learners are continuously being exposed to digital media and are developing a greater preference for digital technologies and social media than previous generations (Oh and Reeves, 2014). Technology, including VR, will in the future continue to play a central role in the lives of learners, transforming the way they learn. Apart from being used for entertainment and amusement, VR will be used by learners of all ages and in varying fields.

### Conclusion

VR, as a learning technology, is slowly achieving acceptability and an increase in usage. Consumer demand for VR headsets are expected to reach 37 million by 2020 (Wong, Kong, and Hui, 2017) and revenues from the VR industry are projected to reach more than US\$ 40 billion by 2020. There is certainly a rise in the use and acceptance of VR technology, especially with the increasing investment in these technologies from major technology corporations like Facebook, Microsoft, Sony, HTC and Google, among others. It is apparent that VR technologies will continue to be used for learning and training. However, it is important that as these technologies become ubiquitous, VR content creators remain cognizant of the significant impact of culture on VR technologies and mitigate against these effects on the users.

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