Chapter 11
Learning through Immersive Virtual Environments:
An Organizational Context

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ABSTRACT

Changes on how the workforce is learning/training today are evident in many organizations. Discussions about how Immersive Virtual Learning (IVL) is a part of the skill development process and outcomes in the workplace have increased (Salmon, 2009). There is an abundance of literature on the application of virtual and other learning technologies within learning institutions (Hew & Cheung, 2010); however, there is a paucity of literature on IVL organization learning. This chapter discusses the existing research and understanding of IVL and the application within an organizational setting. Further, this chapter explores the connection between knowledge transfer and the impact IVL has on the workforce. This exploration attempts to create a link between global connectivity, changing cultures, and changing technologies. In addition, this chapter examines the benefits of IVL in a workplace setting and offers suggestions for future research and practice.

INTRODUCTION

Albert Einstein once lamented that technology has exceeded our humanity. Even though this sounds farfetched, evidence suggests technology has become a part of our daily lives. Immersive Virtual Learning (IVL) has revolutionized how learning is conducted from educational institutions, to organizations, and more specifically within healthcare operations and different areas of environmental sustainability. With no consistent agreement on the term IVL, for the purpose of this chapter we have developed a working definition. IVL is the use of advanced computer interfaces to interact in a simulated real-world environment while conveying knowledge to users. Ultimately, the interaction

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provided by immersive virtual platforms creates active participation and engagement, which enhances learning (Ndinguri, Machtmes, Hatala, & Coco, 2012). Consider the evolution of the smart phone from its early stages of development in the 90's with simple applications, such as a calculator and email, to today with more sophisticated applications that can affect learning, personal lives, even an individual's health. These technologies have transformed economies, cultures and how people communicate and do business (Merriam, Caffarella, & Baumgartner, 2007). Learning is one of the many areas in which IVL plays a major role.

As technology changes, so has the shift in which learning is presented to the workforce. Today, with the emphasis on a knowledge-based economy, how human capital is developed ties into the strategic aspects of organizational success (Chinowsky & Carrillo, 2007; Merriam et al., 2007; Sveiby, 2001). Specifically, the increase in IVL environments has eliminated borders and created a global learning environment that improves resource utilization and flexibility for information access (Symons & Stenzel, 2007). Unlike other forms of learning technology, IVL has been credited with its ability to offer the user relatable interfaces and a simulated telepresence learning environment (Nah, Eschenbrenner, & DeWester, 2011). Research demonstrates that by using game-like devices in a simulated environment, it provides resources for increasing the knowledge transfer of the material for the learners in training (Coco, 2011; Dittmer, 2010). In this case, as each participant interacts with IVL, his or her repetitive behavior of actions through the technology helps to signify the mastery of content (Coco, 2011). In addition, studies indicate that participants who have trained through the IVL environment were able to transfer their learning to a real world environmental scenario (Dede, 2009; Coco, 2011).

Computer skills among participants are not factors deterring use of the IVL environment because trainees can use game-like controllers that mimic simulated scenarios. It is documented that IVLs, through simulated realism, help create different levels of complexity for better conceptualization of ideas, on-line measurement during training, control participant exposure to the environment, and type of landmarks and their positions (Dede, 2009; Coco, 2011). Therefore, IVL environments are capable of recording and measuring every move of the trainee and highlight areas of development. For example, in the healthcare industry, physicians immersed in an IVL environment have used the technology to understand how to conduct debridement of a gunshot wound, act as simulator for temporal bone dissection, orthoscopic knee surgery and provide a simulated training environment for the palpation of subsurface breast tumors (Mantovani, Castelnuovo, Gaggioli & Riva, 2003). In addition, the technology is used in simulation training especially for sensitive or dangerous areas, such as the military, nuclear plants, accident preparations and chemical testing where realism is critical but either unsafe or not possible (Coco, 2011; Johnson & Levine, 2008).

However, organizations still have a long way to go before fully understanding how learning and knowledge transfer occurs when new learning technology is used (Geng, Lin, & Whinston, 2009). One particular study examined IVL by developing a conceptual roadmap for organizations. The roadmap highlights the technological processes and levels that the organizations' technology-based training must consider when using IVL. The model is not intended to provide a simplistic input-output process but rather highlight the various levels that capture training in an organization using established IVL environments. Therefore, the immersive virtual roadmap is intended to provide IVL established organizations a step-based structure that guides learning using an immersive virtual platform. Leveraging previous research and the work done from the collaborative effort among state agencies, this chapter will provide practical ways in which an organization can incorporate the proposed roadmap IVL levels.