Chapter 7.11

Mitigating Negative Learning in Immersive Spaces and Simulations

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ABSTRACT

The growing popularization of immersive virtual spaces and simulations has enhanced the ability to "model" various environments, scenarios, decision-making contexts, and experiential learning for a variety of fields. With these subliminal semi-experiential affordances have also come some challenges. Foremost is the challenge of designing virtual experiential learning that does not result in "negative learning." Negative learning involves unintended messages which lead to learners with illogical or inaccurate perceptions about reality. Negative learning may be subtle; it may exist at an unconscious or subconscious level; it may be biasing even without learner awareness. This chapter addresses some of the risks of negative learning in immersive spaces and simulations and proposes some pedagogical design, facilitation, and learner empowerment strategies to address negative learning—to increase confidence and assurance in the immersions.

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"This is to say that perceptions are not confined to stimuli, just as science is not limited to signals or available data; neither, of course, is confined to fact." -- R.L. Gregory

"*You create the world of the dream. We bring the subject into that dream, and they fill it with their subconscious." -- Cobb, from Inception (2010)*

INTRODUCTION

Immersive spaces and simulations (also known as "goal-based scenarios" that enable problem-based learning) offer fresh ways to enhance e-learning. Persistent virtual worlds offer continuous learning in three dimensions (Mihal, Kirkley, Christenberry, & Vidali, 2003) and longitudinal academic research possibilities; various learning contexts may be evoked—for cross-cultural interactions, foreign language learning and practices, digital "wetlabs," co-design, and problem-solving. Designed simulations may be deployed on a variety of systems and in different learning contexts. Artificial life (a-life) evokes evolutionary and complex systems and the interrelationships between living creatures. Mobile environments that offer ubiquitous learning may allow "anytime, anywhere" immersions, with location-sensitive delivery of digital information to enhance the embodied experiences of learners. Augmented reality and ambient intelligence spaces combine physical spaces and "smart" manual objects and wearable computers for real-space immersions, where manual objects may offer "state dependent feedback during manual interactions" (LI, Patoglu, & O'Malley, 2009, p. 3:3). These experiences tap into the physical situatedness of the learning while drawing value from digital effects.

Simulations may offer large cost savings at less risk in situations where live, physical simulations would be prohibitively expensive and physically risky, such as in military and first-responder scenarios. These may also be scalable for large-scale (numbers of participants) and wide-scale (geographical dispersion) interactions. While these technologies have become more popular, there have not been sufficient discussions about how to maximize the learning. In what Dovey and Kennedy label "permanent upgrade culture," the perpetual technological innovation will not settle into stabilization, and the "polygons and mesh," math and light, will continue to embellish reality (Dovey & Kennedy, 2006, pp. 53 – 54).

Digital-based educational games (also termed "serious games" or "intelligent learning games") are another type of immersion with a focus on "hard fun" (Prensky, 2002, p. 5) vs. aimless play ("ludic" play). These games were built for particular educational goals (Burgos, Tattersall, & Koper, 2005). The concept here is that learners engage more deeply and for longer periods of learning when they're enjoying the game experience. Games involve defined and undefined rules of play based on its design, game theory, and the particular learning domain's principles. The design of games relies on game studies—about what people learn, how they interact with each other and the game, and various types of strategies in competitive situations (often involving political science, economics, and military planning).

One commonality between virtual learning is the importance of the experiential element. Experiential learning involves the use of human perception (five senses), translated through human cognition, for the interpretation of these signals in a meaningful learning context. Kolb's experiential learning cycle (1994) is often evoked to describe this transformative experience. This cycle begins with a concrete experience. The learner then observes and reflects on the experience. The learner formulates abstract concepts and generalizations from that experience, and then he / she tests the implications of these concepts in new situations (Schönwald, Euler, Angehrn, & Seufert, 2006, p. 17).

Risks from the Environment, Other People, and the Self: However, there are concerns about whether immersions and simulations may lead to some unintended residual consequences. The "security" of a learning experience suggests that there is freedom from risk. Risks may come from the environment; they may come from other people; they may come from inside the self. Environmental risks in simulations may involve embedded inaccurate messages or experiences for learners; they may involve data compromises or user authentication problems. Risks from other people may come

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