

Moving in 3D: The X, Y, Z of learning through doing in immersive, virtual environments

It seems ironic that given the promise of 3D virtual worlds such as Second Life and Twinity, that movement is mediated through a keyboard or mouse moving in two dimensions. These movements to direct activities in faux-Cartesian space do not replicate movement in real-life environments that require more tactile precision in three dimensions. Yet in some educational contexts, it would seem more appropriate that movement in virtual environments should more closely mimic real-life movement in order for participants to learn by doing; something not always practical in the real world for financial, ethical or accessibility reasons.

In this paper, we review past empirical research studies on the use of tactile precision in three dimensional immersive learning environments. A number of questions guided our review 1) What is the potential for tactile precision in 3D multimodal environments (drawing on literature from range of disciplines including IT, gaming, engineering, health sciences and education); 2) How is this being imagined and explored for education-related purposes in different disciplines; 4) How have learners responded to the potential for more tactile/kinaesthetic learning and 5) What are the gaps in the research?

Research relevant to these questions was identified through a systematic search and selection process. A constant comparative method or grounded approach (Lincoln and Guba, 1985) was applied to generate categories that enabled a thorough exploration of the research landscape. This approach was complemented by the use of Leximancer™, a program that mines text documents to produce a concept map that illustrates the visual-conceptual structure of the documents.

Further, this paper explores the potential of technologies that may be recruited to overcome difficulties associated with replicating human movement in virtual environments, proposing some promising avenues of research. Potential technologies include Nintendo Wii consoles, Wiimotes and balance boards, and the development of software such as CamSpace – which turns any object into a 3D controller.