

Chapter XXIII

Enhancing Learning Through 3-D Virtual Environments

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ABSTRACT

We cannot begrudge students their envy in looking at popular films and computer games as major contenders for their spare time. While we as teachers could attempt to fight the popularity of games, I suggest a more useful endeavor would be to attempt to understand both the temptation of games, and to explore whether we could learn from them, in order to engage students and to educate them at the same time. There are still few applicable theories and successful case studies on how we could do this using virtual environments and associated technology (referred to by some as virtual reality, or VR). To help answer the question of “but what can we do about it,” I will outline several simplified theories of cultural learning based on interaction, and the experience I gained from employing them in two different virtual environment projects.

INTRODUCTION

Today’s computer games are vast, powerful, and engaging digital environments. Students buy them, play them, and modify them. With no prompting from teachers, they tear through tutorials and manuals, test new hardware and software, and spend thousands of hours engaged in “hard fun,” as well as being immersed in creating characters, animation, sound, and 3-D environments.

Yet in academic research institutes, we see a huge outpouring on the advantages of virtual reality, but little significant educational content. While recent academic literature has criticized the content-poor output of traditional virtual reality research, it has so far been reticent in developing guidelines and practically applicable theories for creating virtual environments that succeed as an engaging medium for entertainment and education.

There are many difficult issues in creating virtual environments: not least is the problem of wrestling with cutting-edge technology. However, I propose the major problem that educators should concentrate on, and help virtual reality researchers with, is understanding how virtual environments, as digital media, relate to how people learn.

To explain that relationship, we need some history on the development of virtual environments, and why, despite being developed in research institutes, they do not immediately lend themselves to teaching. I am going to suggest that a major issue has not been technological constraint, but meaningful content. We lack extensive exploration in choosing and creating interaction that is meaningfully related to specific content, and, for various reasons, we lack impartial evaluation of the projects. Once we can understand that relationship, we can develop an appropriate strategy. That strategy must address the issue of how digital media simulates, augments, or replaces traditional learning through appropriate interaction with meaningful content.

Secondly, we need to ascertain whether entertainment technology, that is, games, offers us more accessible ways of developing virtual learning environments than commercial virtual reality packages. I will suggest that they often do, but that there are several major issues to consider when evaluating and using them. Thirdly, no matter what type of technology we choose, we must have a clear idea of the learning-based goals we hope the participants will reach. Fourthly, once we know the learning-based goals, we will need to scope a different type of interaction that through digital media, simulates, augments, or makes possible those goals. Finally, we need to know if, when, and how these goals are achieved; we have to have an evaluation plan in place.

MISSIONS AND CONCERNS

Until recently, virtual environments have been single-user, with limited ability to interact with

the environment. In the rare case where they were multiuser, the interaction possible between participants was limited not just by technical constraints or the desktop personal computer (PC) interface, but also by a lack of thematic relationship between the content and the perceived learning experience. As noted by Johnson (1997), participants often feel they are looking at a computer screen, rather than existing in a real place. Weckström (2004) noted that even when there was a feeling of spatial immersion, of “3-D-ness,” the environments were still empty and devoid of apparent purpose.

This thesis began from the fact that, when a group of students were exploring and researching other ‘virtual worlds’ in order to begin developing Marinetta, they reported that all the worlds seemed empty and hollow, like stage sets. There were neat buildings in these spaces but no sense that these buildings had been built for any real purpose. The students noted that these so called virtual worlds did not seem to be worlds at all, but just architectural spaces that did not give them any feeling of worldliness. (Weckström, 2004, p. 9)

Why this separation of “world” from “architectural space?” In order to visualize spaces, architects have not been worried about social agency, about how participants can relate to each other in virtual environments. They have been concerned about presenting the environment in the best possible light, in order to create impressive fly-throughs.

Even though architecture is about the inhabitation of space, virtual reality, to architects, has been seen as a tool to sell the idea of inhabitation in order to be commissioned to build real buildings. Hence, we should not look to them for the best way on interacting with a virtual interactive world, for they are not interested in building them. I have spoken to several architectural visualization experts about this issue and they agree with me: architects see the technology as an extension

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