Chapter 1
Assessing the Application of 3D Collaborative Interfaces within an Immersive Virtual University

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ABSTRACT
The need to stimulate and engage students is of paramount importance within any learning scenario. Despite this, recent developments in online learning have failed to take this requirement into account. As a result e-learning courses which utilise traditional online learning management systems have a higher dropout rate than their classroom based counterparts. The attrition rate is attributed to boredom with the interfaces used to deliver learning material and also to the lack of opportunities to interact socially with others. Furthermore, being in a virtual environment imposes a whole new set of challenges onto users due to the distinct lack of stimuli provided, compared to the real world. Technological advances now permit the development of multi-user, networked, virtual reality environments which can address these issues. Such environments provide an immersive desktop 3D interface which is used to deliver learning material. Real-time communication and collaboration tools permit interaction between students and tutors. This chapter describes one such environment called CLEV-R (Collaborative Learning Environments with Virtual Reality) which fosters collaboration and social interaction via specialised tools. Although there are systems which offer similar functionality to CLEV-R, these have not been adequately evaluated. This chapter describes two studies which were conducted using the CLEV-R interface. The first study assesses the usability of this paradigm for e-learning while the second determines which factors influence performance in the Virtual Reality environment in order to ensure that some students are not
unfairly advantaged by this means of e-learning. The studies have shown that several factors, such as age and experience in Virtual Reality games influence a user’s success in Virtual Reality environments. Furthermore, the study shows that students enjoy and benefit from the opportunity to interact with each other.

INTRODUCTION

Recent years have seen an increase in the use of computers as a form of e-learning. The primary focus in this area has been on providing tools to deliver course material using web pages, while also providing techniques to manage both the material and users within such systems. These systems are often referred to as Learning Management Systems (LMSs) and predominantly support asynchronous interaction between their users. While the penetration of such approaches is vast and their popularity continues to grow, research indicates that courses which rely solely on these mainstream e-learning applications have a higher dropout rate than their face-to-face counterparts (Martinez, 2003). Studies indicate boredom, ennui and a lack of motivation are contributing factors to the high attrition rates within online courses (Serwatka, 2005). Research in this area is ongoing with techniques to resolve the problems of the lack stimulation and interaction being explored (Mowlds, Roche & Mangina, 2005; Sun & Cheng, 2007). One major concern with conventional e-learning techniques is the absence of mechanisms for instant communication. This leads to a lack of timely interaction between learner and instructor, hinders social interaction among learners and is one of the major drawbacks of standard online learning techniques. Ultimately, it has been shown that this absence of interaction and social connection with peers, and the tutor, can lead to feelings of isolation and loneliness for students (Kamel et al., 2005). Similarly the traditional approach relies on text-based web-pages which involve students reading large passages of text which they may find boring and unappealing (Anaraki, 2004). Figure 1 highlights the main issue with conventional LMSs.

Collaborating with peers is an important element of learning in the real world (Kitchen & McDougall, 1998; Vass, 2002). It teaches students about cooperation and teamwork. The asynchronous communication techniques provided by mainstream e-learning applications are not entirely suitable for organising group projects and consequently such tasks are generally absent from e-learning courses. Social interaction and the sense of a social presence among students are also

Figure 1. Issues with existing e-learning techniques
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