Chapter 7

Survey of Educational Multi–User Virtual Environments and Agents

Arda Tezcan
Macquarie University, Australia

Debbie Richards
Macquarie University, Australia

ABSTRACT

The potential value of Multi-User Virtual Environments (MUVEs) is increasing amongst educationalists. A key issue with MUVE for education is the need to provide system intelligence and believable characters so that the learning goals may be monitored and achieved. Agent-technology offers solutions towards achieving these needs. In this chapter, the authors explore numerous existing educational MUVE and the use of agents for pedagogy in general, as they pave the way forward for delivering intelligent educational MUVE.

INTRODUCTION

In the late 1970s, Richard Bartle and Roy Trubshaw of the University of Essex generated the first Multi-User Dungeon (MUD) to provide a platform for multi-player role-playing games to operate on computer networks (Bartle, 1999; Dourish, 1998), enabling people to create virtual realities cooperatively. Improvements in computer technology enabled further development of MUDs, continuing

with various human computer interfaces such as object-oriented MUDs (MOOs), MUVEs, and massively multiplayer online role-playing games (MMORPGs) (Dieterle and Clarke, 2008).

Multi-User Virtual Environments enable multiple simultaneous participants to access virtual contexts, to interact with digital artifacts, to represent themselves through "avatars," to communicate with other participants and with computer-based agents, and to enact collaborative learning activities of various type (Dede et al., 2005, p.1).

Multi-User Virtual Environments (MUVEs), sometimes referred to as virtual worlds, is the description of a concept used to define an environment providing an audiovisual, graphical interface in order to connect a large number of simultaneous individuals over a network by combining computer graphics, audibility and networks, creating a life-like virtual world by simulating the experience of real-time interaction. These worlds can provide realistic illustrations of real-life structures such as humans, animals, terrains with natural land covers (grass, asphalt, trees, bare ground, water, etc), constructions (building, rooms, etc) along with animated objects. Users utilising these virtual worlds can get acquainted with each other, develop friendships, engage in a contest, work together, co-produce new systems, or socialize by representing themselves through using characters called avatars. Users fundamentally look at the virtual worlds from a first-person view, in other words, what the avatar sees within the environment is what is reflected on to the computer screen (Robbins and Butler, 2009). The avatars are generally 3D and can take the form of any object depending on the imagination of its creator. Through the use of avatars, users of the same MUVE can communicate to each other via various ways such as text chat, audio chat and video conferencing.

Today, MUVEs are widely used in different aspects such as for business solutions, educational purposes, trainings, simulations, etc. In the following section we look at current uses of MUVEs beyond entertainment, particularly focusing on their use for training and education. In the next section, we consider briefly some issues to be addressed in order for MUVE to reach their potential. Following that, taking up the issue of intelligence, we look further at the role that agent technology can play in providing more intelligent MUVEs. Conclusions appear at the end.

CURRENT USE OF MUVES: FOCUSING ON TRAINING AND EDUCATION

MUVEs are currently being used for a large variety of purposes ranging from business solutions, military exercises, healthcare, gaming, teleoperation, simulations and educational purposes. A complete review of current MUVE use is beyond the scope of this chapter, yet, common uses of them are presented in this section. To get a feel for the scope of potential use of MUVE we first begin with a few different examples of non-education based MUVE in the next subsection. Then we consider MUVE for training and rehabilitation as types of non-school-based education. In the final subsection, we focus on MUVE for use in educational institutions such as schools and universities.

Non-Educational Uses of MUVE

Messinger et al. (2009) indicates that there are many real world organisations such as Reuters, IBM, Toyota, Nissan, Dell, Vodafone, etc utilising MUVEs to address their business goals. For instance, these organisations consider Second Life, which is one of the most known MUVE available on the market, as a laboratory for market research, a test market, a large market for advertising, a retailing center, and a way to generate traffic to ecommerce sites on the Internet (p.210). Moreover, because MUVEs provide real-time virtual meeting spaces, real world organisations choose MUVEs to execute their conferences in order to reduce company expenses whilst saving time. A case study in Intel reveals that cancelling the physical conference and having a virtual meeting instead saved the company $265,000, not including saved travel expenses (Linden Research, 2009). Another case study shows that IBM held a virtual meeting space for the company's annual meeting, and executing the virtual conference cost the company one-fifth the total expense of

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