Chapter 2.4
Communicability in Educational Simulations

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ABSTRACT

Simulation and game-based learning are powerful modes of learning that are used in many fields including subjects as diverse as medicine and aviation. While institutes of further and higher education are making increasing use of VLEs to deliver teaching and learning, there are currently few examples of simulated environments for learning. The SIMPLE (Simulated Professional Learning Environment) and Cyberdam environments are two of the few dedicated simulation environments. This chapter will look at both of these environments and the results of user evaluations to determine what makes a simulation environment successful and what aspects of a simulation

environment would have to be evaluated in order to establish its communicability.

INTRODUCTION

Higher education has been undergoing radical change in recent times with regard to ever increasing student numbers, decreasing funding, and staffing and other resource issues. In response to these increasing pressures, higher education institutions are turning increasingly to the use of digital technology to facilitate the teaching and administration of undergraduate and postgraduate courses. Rather than relying solely on VLEs, which are in many cases acting as little more than repositories for course information and other resources, currently there is a small but growing number of

institutions throughout the UK, and increasingly, beyond, that are having great success in employing dedicated simulation technology to facilitate teaching and learning on their courses, and it is with these dedicated simulation engines with which this chapter concerns itself. The chapter will begin by looking at the historical use of simulation in learning and will review the research that has accompanied this. What then follows is a discussion of the current use of dedicated simulation environments in higher education with reference to a few successful examples of their deployment in a number of institutions and countries, in a variety of subject disciplines and at various different levels of education. There will be a discussion of the factors that have combined to produce successful simulations in these environments, in particular the design of the simulation itself and the usability and communicability aspects of the software on which the simulations run. The chapter continues by making recommendations for the successful design, development and use of digital simulations in higher education with reference to communicability, and with regard also to the human interaction requirements of the user groups involved. It concludes by considering possible future directions for simulation in higher education.

WHAT WE MEAN BY SIMULATION

In recent years the term simulation has become associated with a wide range of different types of instructional exercises and experiences. It is important to distinguish between *symbolic* simulations and *experiental* simulations (Jonassen, 2003). Symbolic simulations are those simulations that 'depict the characteristics of a particular population, system or process through symbols; and the user performs experiments with variables that are a part of the program's population' (Encyclopedia of Educational Technology, 2009). Symbolic

simulations are often employed in fields such as economics, management, and the sciences (Windschitl & Andre, 1998). The use of flight and other simulations in the teaching of engineering sciences for example has been commonplace for many decades, and Monte Carlo type simulations are often to be found on the curriculum of management degree courses. *Experiential* simulations by contrast are generally based on case studies or scenarios and include role-play and activity in an environment that reconstructs aspects of real life (Maharg, 2006a). The use of experiential simulations is most common in social science subjects and in professional learning. Increasingly, the distinctions between the two types of simulation are lessening in part because of the recent advances in the technology that can be used to support them (Barton & Maharg, 2006).

SIMULATION IN EDUCATION

There is a long history of the use of simulation in education in a variety of disciplines, with the tools required often being little more than the humble paper and pen. There are many recorded instances from throughout the 20th century, for example, of mock courts being used to teach legal procedures to law students, a practice that continues in countless higher education institutions to this day. In recent times, much of the pioneering work on educational simulations has been carried out in the field of medical education. Patients are now routinely simulated to allow trainee doctors and nurses to gain experience in how to interact with potential future patients by responding appropriately to the needs and requirements of the simulated patient. The nature of the knowledge and skills gained from taking part in such simulation activities is often more complex than might be imagined. In a study by Stedeford (2003), a simulation approach was used to assess not only the patienthandling skills of the students, but also

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