Chapter II
Learning and Teaching with Computer Games in Higher Education

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ABSTRACT
This chapter examines the rationale for the use of computer games in learning, teaching, and assessment in Higher Education. It considers their pedagogic potential in respect to a number of theories of learning, as well as some of the practical issues associated with using computer games in real teaching situations, both face-to-face and online. The first part of the chapter focuses on the theory underpinning the use of computer game-based learning with HE students, examining motivation and engagement, constructivism, collaborative and problem-based learning. The second part of this chapter considers the practical issues of using computer games in actual teaching contexts and presents twelve principles for the design and evaluation of computer games to support learning.

INTRODUCTION
In recent years there has been increased awareness of the potential of computer games in education, including growing interest in their application in Higher Education. An increasingly diverse student population, with different backgrounds and abilities, has contributed to a rethink about effective ways of teaching and learning, and games-based learning offers many pedagogic benefits over traditional methods of teaching and learning.

Play is a powerful learning tool, which is essential to the development of both adults and children (Rieber, 1996), promoting engagement in learning and mastery of tasks (Colarusso, 1993). Games are a fundamental part of the human experience and the way in which learning takes place, providing the opportunity to practise and
explore in a safe environment, and providing a forum for learning basic human skills like aiming, timing, hunting, strategy and manipulation of power (Koster, 2005).

There are many examples of innovative ways in which computer gaming has been used to enhance learning and teaching, both with children and adults. Research with school children includes the use of science games (Magnussen, 2005), historical games designed for entertainment (Squire & Barab, 2004), and multi-user gaming environments (Barab et al, 2005). Research in Higher Education includes the use of computer games to support the learning and practice of civil engineering concepts (Ebner & Holzinger, 2007), competitive games to teach programming (Lawrence, 2004), and virtual reality games to teach geography students (Virvou & Katsionis, 2006).

This chapter examines the rationale for the use of computer games in learning, teaching and assessment, with a particular focus on adult learners in Higher Education. It considers their pedagogic potential in respect to theories of learning, and discusses some of the practical issues associated with using computer games in real teaching situations. This chapter is based upon the author’s doctoral research into the use of collaborative game-based learning in Higher Education (Whitton, 2007).

The initial section of this chapter examines the pedagogic benefits of computer games for learning, exploring first issues of motivation and secondly examining the potential of games in relation to different theoretical perspectives. The next section of the chapter examines practical issues associated with using computer game-based learning in Higher Education, presenting a number of principles for effective educational game design and discussing implementation issues such as the framing of the games within a learning package, and the assessment of computer game-based learning. Finally, the chapter closes with some concluding remarks on the advantages and disadvantages of computer game-based learning.

COMPUTER GAMES FOR LEARNING

One reason often put forward for using computer games in education is their motivational benefits. This section will argue, however, that the motivational aspects of games are often over-stated and secondary to the pedagogic benefits inherent in the design of certain types of computer game. First, issues associated with the motivational aspects of games are discussed, drawing on a small-scale study into motivations for adults playing games, and secondly, a number of theories of teaching and learning are explored in relation to their applicability to computer game-based learning.

Motivational Aspects of Computer Game-Based Learning

A reason commonly put forward for using game-based learning is that it brings benefits in terms of student motivation for learning. While this may be a more realistic assumption for children, this supposition is less compelling when applied to adult learners. Adult motivation to learn with games is explored here, and evidence presented that the motivational aspects of games should not be a primary reason for their use in Higher Education.

There is an assumption often made in the literature on game-based learning that the majority of people – if not all – find games intrinsically motivating (e.g. Alessi & Trollip, 2001; Prensky, 2001; McFarlane et al, 2002; Oblinger, 2004), and that this is a good reason for using them to teach. In order to investigate how true this assumption is for adult learners, and to explore motivations for using games, a small scale study was undertaken in 2004 to explore these issues. This study also aimed to provide evidence as to whether computer game-based learning would be perceived as an acceptable, if not intrinsically motivational, way to learn by students in Higher Education.
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