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Chapter XI

Learning Technologies and Learning Theories

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ABSTRACT

Learning technologies can provide a rich learning environment; this chapter explores the relationship between traditional learning theories and technology-mediated learning. Two examples are presented where technologies are used as tools (a) to evaluate and create Web pages and (b) to create learning technology teaching materials. The range of learning outcomes resulting from these projects are discussed in terms of Gardner's (1993) theory of multiple intelligences.

INTRODUCTION

Appropriate use of learning technologies can promote effective learning, in particular by providing an environment that fosters independent, learner-centred experiences. The intention of this chapter is to identify those aspects of learning technologies that promote effective learning and discuss them in relation to learning theory. Case studies are used to illustrate the complex array of learning outcomes that can follow teaching with learning technologies.

BACKGROUND—LEARNING THEORIES

Leaning technologies (LT) may be defined as the use of any technology that enhances the learning experience. Using this definition LT may be considered to range from typewriters, overhead transparencies, and simple audiovisual aids to sophisticated video, DVD, audio displays and computer-aided learning (CAL), multimedia, the Internet and Web pages, or virtual and managed learning environments (VLEs/MLEs). Cullen et al. (2002) widen the definition of a VLE to include any learning involving the application of telematics, information and communications technology (ICT). For practical purposes, during the present discussion LT will be confined to any form of digital media, with particular reference to multimedia and HTML. Ellington, Percival, and Race (1995) detail practical approaches for the successful introduction of these technologies into higher education. More recently, Boyle (1997) and Maier and Warren (2000) provide overviews of learning and teaching for the range of different types of LT. These three books were published within five years of one another, and comparison of both the type of technology discussed and the extent of the discussion demonstrates the rate of change within the computing industry and the increased range and sophistication of the types of LT available to academic staff, with subsequent changes in learning and teaching. The impact of the Internet and intranets in higher education (HE) is recent and already has far-reaching effects. Whilst the Internet is not per se a learning technology, in that it is an unregulated mass of information of variable quality, the World Wide Web does provide opportunities for learning. The mass expansion of materials available from the Internet and the opportunities offered by electronic communication, in the form of email, synchronous and asynchronous discussion, VLEs, etc., have altered the learning experience for most undergraduates. Perhaps the greatest emerging opportunity offered by the Internet is that of increased communication via email, bulletin boards, and discussion groups and the possibilities for peers to comment on work in progress.

There is considerable variation between individuals in the way they learn, and an individual may well learn in different ways at different times. A further aim of this chapter is to consider whether or not learning technologies promote different types of learning from conventional didactic teaching and to account for these differences. The case studies presented are examples of projects where students use LT as creative tools and show that engagement with the subject matter is deep and occurs over a wider range of levels than normally follow traditional didactic teaching, in that students use and demonstrate multiple intelligences (Gardner, 1983, 1993).

Educationalists frequently attempt to use hierarchies to describe the learning process, for example, the taxonomic hierarchy of Bloom (1972) and Bloom, Krathwohl, and Maisa (1979)(Figure 1A), where skills are divided into lower cognitive skills (comprehension, application) and higher cognitive skills (analysis, synthesis, evaluation). Biggs (1999) relates higher learning outcomes to “deep” and “surface” approaches to study, arguing that students must undertake appropriate