Learning Technologies and Learning Theories[1]

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INTRODUCTION

This article explores the relationship between traditional learning theories and technology mediated learning. 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.

BACKGROUND: LEARNING THEORIES

Learning Technologies

Learning technologies (LT) may be defined as the use of any technology that enhances learning. This broad definition of LT may range from typewriters, overhead transparencies and simple audio-visual aids to sophisticated video, DVD, audio displays and computer-aided learning (CAL), multimedia, the Internet and Web pages to virtual and managed learning environments (VLE/MLE). Cullen, Hadjivassiliou, Hamilton, Kelleher, Sommerlad and Stern (2002) widen the definition of a VLE to include any learning involving the application of telematics and information and communications technology (ICT). For practical purposes, LT will be confined to any form of digital media with particular reference to multimedia and HTML. Ellington, Percival and Race (1995) describe practical methods for the successful introduction of these technologies into higher education. Boyle (1997) and Maier and Warren (2000) discuss issues associated with teaching with a range of different types of LT. These three books were published within five years of one another. Comparison of both the type of technology discussed and the extent of the discussion demonstrates the rate of change within the computing industry, the increase in range and sophistication of LT available to academic staff. The impact of the Internet and intranets in higher education (HE) is recent and already has far-reaching effects. While the Internet is not *per se* a learning technology in that it is an unregulated mass of information of variable quality, the 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 e-mail, synchronous and asynchronous discussion, and VLEs (which are essentially a box of tools using Internet protocols) have significantly altered the learning experience for most undergraduates. Perhaps the greatest emerging opportunity offered by the Internet is that of increased communication (discussion), electronic submission, peers to review and collaboration.

There is considerable variation in the way individuals learn, and an individual may well learn in different ways at different times. A further aim of this chapter is to consider whether learning technologies promote different types of learning from conventional didactic teaching and to account for these differences.

Learning Theories

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 1), 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 ap-

Figure 1(a). Bloom's taxonomic hierarchy showing higher and lower order cognitive skill
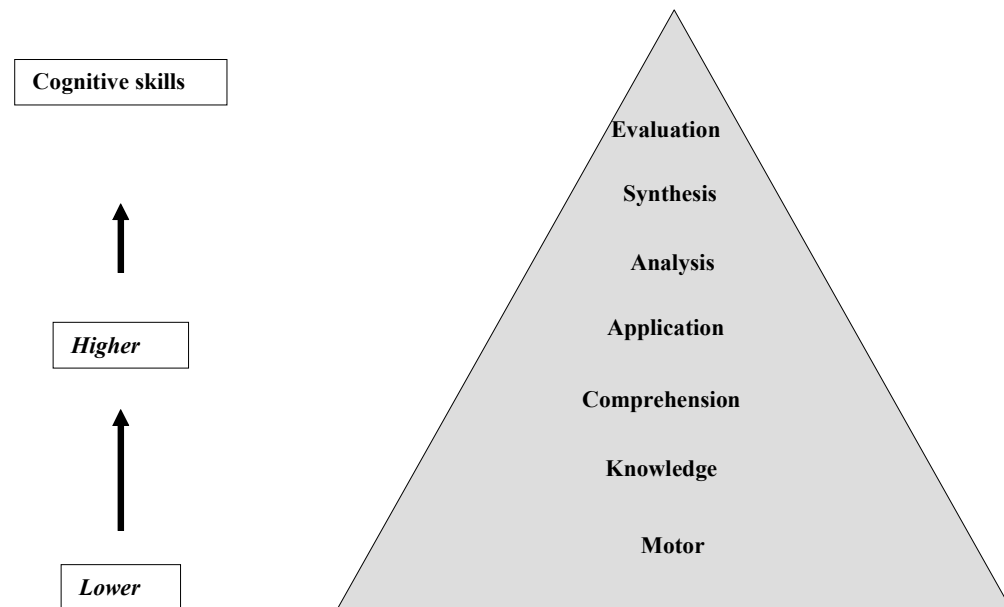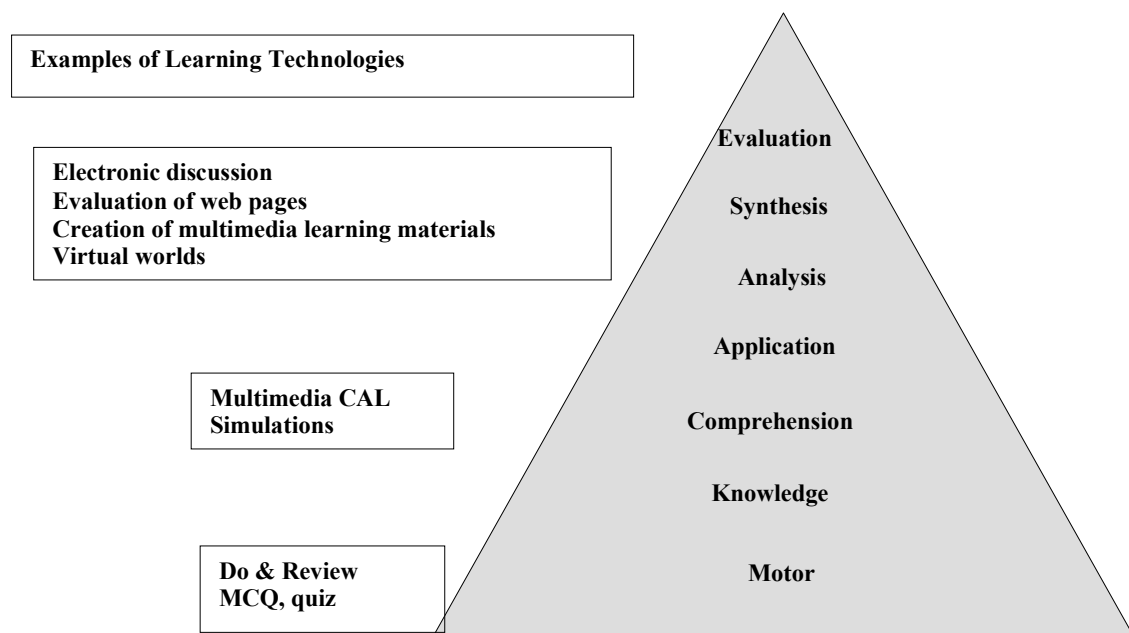
| Cognitive skills |

↑

| *Higher* |

↑

| *Lower* |

Evaluation

Synthesis

Analysis

Application

Comprehension

Knowledge

Motor

Figure 1(b). Types of learning technology which might be associated with stages in Bloom's taxonomic hierarchy

| Examples of Learning Technologies |

| Electronic discussion
Evaluation of web pages
Creation of multimedia learning materials
Virtual worlds |

| Multimedia CAL
Simulations |

| Do & Review
MCQ, quiz |

Evaluation

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Chia-Wen Tsai (2011). *International Journal of Information and Communication Technology Education (pp. 1-10).*
www.irma-international.org/article/online-learning-community-integrated-web/55503

Universal Design for Online Education: Access for All
Rosangela K. Boydand Bonnie Moulton (2004). *The Distance Education Evolution: Issues and Case Studies (pp. 67-115).*
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Interaction in Distance Learning
Mary Bold (2009). *Encyclopedia of Distance Learning, Second Edition (pp. 1244-1249).*
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Teaching Medical Statistics over the Internet
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