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Chapter XIV

Web-Based Instruction Systems

Jens O. Liegle
Georgia State University

Peter N. Meso
Kent State University

INTRODUCTION

Education is expensive and takes time. Instructors from both industry and educational institutions have employed one of two methods, besides traditional classroom instruction, to deliver knowledge to learners more cost effectively. One approach has revolved around automating the education process through the use of Computers. The other has focused on using the existing instructors more efficiently by employing video conferencing technology to disseminate lectures to many more geographically dispersed learners concurrently. The advent of the Internet and the World Wide Web (WWW) provides for the merging of both approaches into what can be termed a Web-Based Instruction System (WBIS).

A WBIS allows for the delivery of knowledge to a well-defined set of learners via the WWW by enabling both instructors and learners to fulfill all the roles that they would otherwise fulfill in a conventional learning environment. With the WBIS, it is not mandatory that the instructor and the learners be in the same physical location at the same time. Neither is it necessary to use physical means of correspondence, such as postal mail, to facilitate the learning process. Further, the facilitation of the learning process need not be synchronous. Their

geographic and temporal distribution not withstanding, a WBIS allows the participants in the learning process to interact with each other and with the knowledge being delivered in such richness, it enables them to receive an equitable quality of learning to that obtainable in a conventional learning environment (Liegle and Madey 1997; McCormak and Jones, 1998).

This chapter examines the WBIS from the system's perspective. Critical issues and problems relating to WBIS are presented. The chapter proceeds to present a taxonomy for classifying the various types and technologies of WBIS currently in existence and to show how the taxonomy can guide the evaluation and selection of WBIS technologies during the development of a WBIS. It ends by assessing current technological and socioeconomic trends on the future of WBIS.

BACKGROUND OF WEB-BASED INSTRUCTION SYSTEMS

The origin of WBIS can be traced back to the early computer-based training (CBT) systems (Figure 1) that ran on mainframes and were entirely text based (Alexander, 1998).

With the advent of the personal computer and graphical user interfaces, CBT systems that supported multimedia emerged. As local area networks and later the Internet matured, systems that supported multiple users were developed. These computer-mediated instruction (CMI) systems supported multimedia and eventually hypermedia, and since multiple users were connected at the same time, collaboration among them became possible. It is at this point that the use of information technology to provide education became feasible. The emergence of the WWW made possible the provision of computer-based instruction to an even larger population of users, via more types of media. These early Web-based training (WBT) systems were then institutionalized by academic institutions to provide credential based education, hence the emergence of Web-based instruction systems (WBIS) (Szabo and Montgomery, 1992; Laffey, Tupper, Musser and Wedman, 1998; Alavi, Yoo and Vogel, 1997).

SYSTEMS VIEW OF WEB-BASED INSTRUCTION SYSTEMS

The six core components of a Web-based instruction system are the Learner, the Peers, the Instructor, the Author, the Systems Admin-