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Chapter II

Web-Based Teaching Systems and Technologies

Introduction

In Chapter I, we give a brief overview about Web-based teaching and technology-based courses. The discussion in Chapter I indicates that Web-based teaching is heavily dependent on technologies, especially for technology-based courses and extra effort is needed to implement Web-based teaching for technology-based courses. As technology advances, even those technology-based courses that depend on a computer lab can be taught 100% online. Students are able to access the computers specially designed for their courses via the Internet. Technology tools have been assisting us in achieving this goal. It will be beneficial for the development of an online computer lab if we can better understand the functionalities of the technologies involved and the role played by these technologies. In this chapter, we will discuss the issues related to the technology tools that are commonly used to create online teaching materials, manage Web-based teaching (WBT) systems, and develop online computer labs. An overview will be given about what the technologies can do and how we can use them in creating online teaching materials. After those technologies are introduced, we will exam the types of Web-based teaching systems that require online computer labs to support hands-on practice.

Background

The early Internet-based teaching was based on main frame computers, and monochrome and text-only monitors. A main frame computer was used as a server, and a monochrome and text-only monitor served as a server-accessing interface. Due to lack of interactivity, and lack of audio and video functionalities, the Internet was used by educational institutions only as a knowledge distribution tool. Such a system is a text-only computer-based training system (Perry, 2000).

With the advance of personal computers, a computer-based training system was able to deliver a course with a graphical user interface (GUI) for interactivity and multimedia functionalities. Course materials could be burned on a CD and installed on a personal computer. This type of computer-based training system could be used to teach various subjects, from children's books to technology-related training (Kruse & Keil, 2000). Nowadays, many of the computer professional development related books include the trial version of the software and some computer-based training materials such as programming code for the examples included in the books. Some books even include virtual labs for hands-on practice. For example, some of the books that prepare readers for taking the Cisco Certified Network Associate exam often include a simulator that simulates a virtual network (Lammle & Tedder, 2003). As another example, the virtual lab included in some of the books used for preparing Microsoft Certified Systems Engineer and Systems Administrator exam allows readers to perform some essential administration and management tasks (Sheltz & Chellis, 2002).

The creation of the World Wide Web has extended computer-based training to students anywhere at anytime. Many new technologies such as digital audio and video equipment, Web conferencing tools, high volume portable storage devices, much faster and more powerful personal computers, and various learning management software packages are now available to support Web-based teaching. The advance of these technologies pushes Web-based teaching to reach out to more students. In the field of employee training, WBT supports online conferencing, virtual reality, and live information.

For teaching technology-based courses online, a Web-based teaching system is the desired platform. It can support multiple courses simultaneously. Multiple users can log on to the same WBT system at the same time. This allows group activities even though the group members may be thousands of miles apart (Dara-Abrams, 2002). A Web-based teaching system is also good to support multiple software packages for hands-on practice. For many technology-based courses, hands-on practice may require multiple software packages. For example, a database system development course may need software for the front-end, mid-tier, and back-end. These software packages can all be installed in an online computer lab and can be accessed by students through the Internet. Therefore, an online computer lab that