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Chapter IX

Developing Online Computer Lab-Based Teaching Materials

Introduction

To get an online computer lab ready for teaching and hands-on practice, instructors should develop lab manuals and other online teaching materials. The lab teaching materials can be text, a combination of text and figures, or truly multimedia based materials including figures, sounds, animations, and video clips. By including multimedia in the instruction, the quality of the lab teaching materials can be greatly improved. The use of technology can make the tasks of developing multimedia teaching materials relatively easy. On the other hand, the use of multimedia teaching materials is limited to the type of hardware and software that are available on the server and client sides. Also, different instructions will have different requirements for multimedia materials. In this chapter, we will take a closer look at the issues related to the design of lab instructions and multimedia based teaching materials.

We will first take a look at the design of lab-based teaching materials. We will discuss how to design the teaching materials that meet the special needs of lab instructions.

Unlike other online teaching, lab-based teaching requires the illustration of hands-on activities. It also needs to give clear instruction on how to involve students in collaborative activities. Students should also be given information about security issues. The lab teaching materials should also include instructions on the use of multimedia technologies for lab activities.

After we have investigated the issues related to the design of lab-based teaching materials, we will further discuss the topics related to the development of multimedia based instructions. Demonstrations of some general approaches will be given on developing multimedia based instructions, including the software and hardware used by these approaches. We will examine how to use multimedia tools to create multimedia teaching materials. There will be some information on how to record sound and video, deploy multimedia files, present multimedia teaching materials online, develop a collaborative environment, and capture screenshots for hands-on practice.

The last part of this chapter will show a case study of developing lab-based teaching materials. To illustrate how the lab teaching materials can be used in a lab-based online teaching class, several examples will be used to demonstrate the process of developing lab-based teaching materials. Some of them have simple text-based lab manuals and some contain multimedia based demonstrations. The examples will also be used to illustrate the online teaching materials used by different courses such as network management and database system development.

Background

As e-learning is getting more prevalent in computer based training and computer based teaching, e-learning instruction has become one of the widely studied research topics. Instructors need to resolve many common problems encountered in e-learning instruction. To create better e-learning course materials, Web-based instruction must be carefully prepared. Instructors need to decide how to present course materials online, how to make the course content easier to understand, and how to properly use multimedia course content (Clark & Mayer, 2003).

To assist the design of Web-based teaching, instruction models such as the ASSIST-ME Model have been developed (Koontz, Li, & Compora, 2006). The design and implementation of Web-based teaching materials needs to use technologies. Instructors should have adequate training on using these technologies. This is particularly important for developing lab-based teaching materials of technology-based courses since the content of the teaching materials is closely related to IT products on the market. The technologies used to develop these teaching materials must be able to demonstrate the use of the IT products (Kruse & Keil, 2000).