Chapter XVII

Using Scenario-Based Learning for E-Learning in Vocational Education

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Abstract

A multimedia Web-based scenario-learning package is prepared for the students of an engineering course. This learning package is to simulate a scenario, which is close to the students' learning or future working environment. Using up-to-date information and multimedia technology, it can simulate issues and conditions similar to those encountered in the real world. Students can virtually experience how the actual working environment should be. They can also take this opportunity to study how different equipment are interconnected together and signals flowing between different units. Students can use this virtual environment to understand deeper about the operation and the theory behind. Further explanation will be displayed in a hierarchical way to suit different backgrounds of students. This online scenario-based learning package is to let all students have a chance to virtually immerse in a scenario to enhance their learning and knowledge. Preliminary study shows that this scenario-based learning is well accepted by students and is worth further study.
Introduction

Multimedia technology can make a transformation of the nature of teaching/learning from reception to engagement, from classroom to real world, from isolation to interconnection, and from exclusive access to a global campus. Online teaching or learning can provide a variety of interactions that include interactive techniques used to present each concept; interactive exercises that help learners integrate multiple concepts; interactive simulations that challenge learners with decision-making situations encountered in the real world; and interactive games to increase retention and provide motivation for learning (Whelan, 1997). Web-based teaching is proved to make remote learning easier, more convenient, and encouraging interactive learning and feedback (Chu, Urbanik, Yip, & Cheung, 1999). Also, computer or Internet access is so well suited to produce a discovery learning environment, which involves a lot of interactivity, feedback, and challenge.

Professional development is now recognized as an important feature in the education of engineering. However, classroom teaching mainly provides student concepts of rules, theorems, and devices. Many employers are finding that graduates are too narrowly based and in practice need to accept wider training (Harris & Bramhall, 1999). Students should learn to apply that knowledge practically through problem solving and design exercise (Chan, 1997). With the help of advanced multimedia technology, it will make learning easier and much more attractive when those exercises are put into the computer or accessed through Internet (Ching, Poon, & McNaught, 2004; Chu, 2004).

In fact, increasing time for practical work will equip students with more useful knowledge for their future career (Ko et al., 2000). Engineering is found upon a variety of rules, theorems, and devices that must be understood by the student and which involve primarily knowledge-based learning; but students must also learn to apply that knowledge practically through problem solving and design exercise (Chu, 1999; Ericksen & Kim, 1998). This provides a good reason to support remote-access practical work for Web-based teaching systems. Another objective of the Web-based laboratory is to provide hands-on lab activities to enhance online courses. A study at East Carolina University found that virtual laboratories help students to understand the concept and theory of those online courses (Yang, 1999). Virtual laboratories are particularly useful when some experiment involves equipment that may cause harmful effects to human beings. The laser virtual laboratory developed by the physics department of Dalhousie University shows how to perform a real time dangerous laser laboratory with the help of commanding equipment through the Internet (Paton, 1999).

The aim of the Department of Engineering of Hong Kong Institute of Vocational Education (Tsing Yi) is to educate and train students with basic knowledge and useful practical skills for their future career (Leung, 1999). Many consultancy works and cooperation have been made with the industry. Such linkage with industry is very valuable to both educational institutions and the society. This can provide more chances for educational institutions to understand the needs of industry and in turn provide students more job opportunities. Virtual laboratories are good to achieve the purpose of practical knowledge transfer but much better if students can actually get involved with some jobs in an environment similar to their future career (Harris & Bramhall, 1999). However, it is impossible for all students to have a chance to engage with suitable companies and work for a short period of time. In this study, an online scenario-based learning package, which can be accessed either in the
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