

Using an E-Book for Learning

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BACKGROUND

The vocational education system in Hong Kong is seen as changing in step with the development in industry (O & Chu, 2003). At the beginning of the '50s until the late '60s, Hong Kong was an entrepôt trade economy. However, skills and technology transferred from Shanghai, a steady immigration came from Guangdong, and increasing amounts of local investment had promoted Hong Kong's industrial foundation. By the early '50s, the Education Department of Hong Kong began to recognize "the increasing importance of Hong Kong as a manufacturing and industrial center," and time and effort were being devoted to the development of technical education. During this period of time, we witnessed the building of a vocational school (1953) and technical college (1957); they had aimed at providing vocational education and training for post-Form 3 and -Form 5 leavers. Successful textile manufacturing, followed by new international investments in other infant industries including electronics through the 1960s and 1970s contributed to the socialization of the workforce. By the early 1960s, there was a widely recognized link between industry and technical education. By the mid-1970s, education discourse and documents professed the need to increase the proportion of the curriculum devoted to "practical education" in general secondary schools (*White Paper: Secondary Education in Hong Kong over the Next Decade*, 1974).

Government land sales, efficient infrastructure planning, and the setting up of the economic zones in China all had contributed to a growth rate averaging 10% each year throughout the 1980s and the early 1990s; these achievements had further improved the investment climate. During this period of time, Hong Kong further expanded technical education at the tertiary level. The link between vocational education and training, and the newer infrastructure and high-technology-related forms of industrialization were clearly outlined in the *Report of the Advisory Committee on Diversification of the Economy* in 1979. All these changes in the economic environment had been well served by the corresponding changes in the

vocational education system as evidenced by the rapid and high economic growth in the '70s, '80s, and the early '90s.

The VTC (Vocational Training Council) was established in 1982 under the Vocational Training Council Ordinance to provide and promote a cost-effective and comprehensive system of vocational education and training to meet the needs of the economy. Under VTC, preemployment and in-service education and training are provided by the Hong Kong Institute of Vocational Education (IVE), VTC School of Business and Information Systems (SBI) and its training and development centers. The mission of VTC is to provide cost-effective alternative routes and flexible pathways for school leavers and adult learners to acquire skills and knowledge for lifelong learning and enhanced employability (VTC, 2004).

Since the late '90s, the volatile employment market, declining industry, and desire to become a knowledge-based society have triggered yet another education reform. Two important documents have been published by the Hong Kong government to paint out the education reform and the blueprint for the education system in Hong Kong for the 21st century: *Reform Proposals for the Education System in Hong Kong* by the Education Commission (2000), and the *Report on Higher Education in Hong Kong* by Chairman Lord S. R. Sutherland (2002) of the University Grant Committee.

In response to the Sutherland report (2002), the Vocational Training Council formulated a strategic plan for the change. The plan is to increase e-learning within the VTC to

- promote an e-learning culture and to identify teaching staff who make effective use of the Web for teaching,
- encourage staffs to build a learning community on their Web sites,
- encourage staffs to provide students with an active Web site, and
- encourage staffs to conduct virtual (online) tutorials and virtual help desks.

USING E-LEARNING SYSTEMS

Textbooks may not fulfill all the requirements of fast-changing syllabi in this information era. This statement is especially true for those needing computer or IT knowledge for which information written in a textbook can be quickly outdated. Further drawbacks of textbooks are that they do not provide interactive learning but rather one-way knowledge transfer without any feedback that would train students to think in a deeper way. This learning approach does not fit the current student-centered learning model and does not meet the future career requirements (“Cathay Employees,” 2004).

Decision makers also need to understand the fundamental differences in teaching approaches that are required in order to implement online training successfully. Otherwise, they risk implementing a high-content system that does not engage and retain students, and will make their organizations uncompetitive in the global educational market. The successful use of online learning is probably the biggest opportunity and challenge that universities are currently facing (Prendergast, 2004).

However, most distance learning development programs are focused on online lectures, tutorials, and assessment. Practical training systems that allow instruments to be monitored and controlled over the Internet leaves a lot to be studied. This type of training system can easily be turned into an online experiment that allows students at remote locations to control and obtain real-time measurements or experimental data (Tan & Soh, 2001).

Actually, some students like to read books to gain knowledge while others prefer to understand theories deeper through experiment (Chu, 1999; Whelan, 1997). Both of these knowledge-based and investigative types of learning styles have profound and different effects on the delivery and acceptance of engineering education. A virtual laboratory developed by using a simple matrix-assembly Java applet provides instrument simulators that form a powerful auxiliary, didactic tool to give students a basic idea of the instruments, control, and operation (Cabell, Rencis, & Grandin, 1997). Another laboratory running remotely via a Web interface allows users to conduct experiments in the Control Engineering Laboratory at Oregon State University (Shor & Bhandari, 1998). The Bytronic Process Control unit at Case Western Reserve University can also be accessed remotely via the Internet (Shaheen, Loparo, & Buchner, 1998).

The teaching of engineering subjects is bound to include a variety of rules, theorems, and devices, which involve primarily knowledge-based learning and must be understood by the students. But at the same time, students must also learn how to apply the learned knowledge through problem-solving and design exercises (Ericksen

& Kim, 1998). This provides another good reason to support remote-access practical work for virtual learning.

A study at East Carolina University also finds that virtual laboratories help students to understand the concept and theory of those online courses (Yang, 1999). Compared with the traditional laboratory, a virtual laboratory is particular useful when an experiment involves equipment that may cause harmful effects to human beings. The laser virtual laboratory developed by the physics department of Dalhousie University (Paton, 1999) shows how to perform in real time with dangerous lasers, experienced by commanding equipment through the Internet.

E-BOOK SYSTEM

This e-book system provides a self-learning environment for students to learn an automation programming language called LabVIEW through the Internet. The main body of the e-book is produced by Flash. It looks like a book and contains dynamic actions on the final Web page (Figure 1). Animation, graphics, and videos for interactive learning are linked to the content of this e-book. If students cannot understand the explanation by means of text, they can learn clearly by watching those video demos, downloading data sheets, and trying the virtual laboratory.

The content of this e-book is shown in Figure 2. This content page contains links for pointing to the corresponding page of each topic. Visitors can choose any items that they find interesting and want to study deeper.

There are seven topics inside this e-book.

- **Syllabus:** Describes the details of the syllabus and assessment scheme
- **Introduction:** Introduces different automation applications in our daily life
- **Programming Technology Fundamental:** Introduces different types of programming techniques
- **Graphical Programming:** This section is the core knowledge of the e-book. Students can learn from this section how to build up a LabVIEW program
- **Industrial Communication and Control:** Describes the applications of the LabVIEW program in industrial communication and control
- **Web and Mobile Programming in Control:** Describes how LabVIEW can be applied in Web and mobile control
- **Reference:** Provides reference books to this subject

If this e-book was just constructed like a common Web page, it would not attract students to continue to read. Additional educational techniques are added to keep

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