Diffusion of Web-Based Education in Singapore and Australia

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INTRODUCTION

The Internet has transformed the way education is delivered in the 21st Century. Web-based education has been developed on the basis of the capability and potential of the Internet. The idea of Web-based education was first developed about 15 years ago from a simple form of online learning, using mainly e-mail as a form of communication and consisting of mainly text, with no multimedia. Soon after, a variety of new software and services were developed to support Web-based Education. In late 1990s, the development of new technologies for this purpose accelerated. They gradually transformed the way by which distance education was delivered. Today, it is common for both private and public educational institutions to offer Web-based courses. However, only a few virtual universities exist today with all of their courses and activities Web-based.

Books discussing the different aspects of Web-based Education have also mushroomed. Khan (1997), Tan, Corbett, and Wong (1998), Aggarwal (2000), and Moore and Cozine (2000) provide a good understanding of the major aspects in Web-based Education, such as Web-based instructions, Web-based communications, Web-based Education technology, and Web-based Education diffusion. Taylor (2001), working in the Australian higher education context, has described Distance Learning now as having reached the fifth generation, involving Web capabilities. In his report entitled the "Fifth Generation Distance Education," he described the fifth generation of Distance Learning as the intelligent flexible learning model. Here, he provides a comprehensive basis for considering Web-based Education as a distinctive form of distance education that possesses a variety of characteristics of delivery technologies. According to Taylor (2001), the key elements of Web-based Education are:

1. offering interactive multimedia online from the institution;
2. offering Internet-based access to other World Wide Web resources;
3. providing computer-mediated communications using automated response systems to control costs; and
4. having campus portal access to institutional processes and resources.

What is distinctive about these elements is that they are delineated according to the following differing characteristics of delivery technologies. Each element offers flexibility in terms of time, place, and the pace at which people can learn using the materials. The materials that are developed for Web-based Education are highly refined and involve advanced interactive delivery. Through this approach it is possible to reduce the institutional variable costs to a low figure (Taylor, Kemp, & Burgess, 1993), thus making the Web-based Education very cost effective. As the system matures, sufficient materials are available; the access to the materials via the World Wide Web, especially, saves costs in creating one's own materials. Therefore, when compared to other forms of distance education, Web-based Education is likely to: be less expensive; provide students with better quality learning experiences; be more effective in pedagogic

terms; and allow for more efficient administrative services. Such a form of learning allows institutions to become "fast, flexible and fluid" (Taylor, 2001). It provides the opportunity for students from any global location to engage in a highly personalized educational experience at a relatively modest cost.

Taylor (2001) categorizes the five stages of the development of distance education. They are: the Correspondence model that is based on print technology; the Multimedia model that is based on print, audio, and video technologies; the Telelearning model that is based on the applications of telecommunications technologies to promote synchronous communication; the Flexible Learning model that is based on online delivery via the Internet; and the emerging Intelligent Flexible Learning model that extends the fourth model by focusing on selected features of the Internet and the World Wide Web. He declares that for the first four models variable costs tended to increase or decrease directly with the variations in the volume of the activity. However, the final model is one that can actually decrease costs by providing access to institutional processes and online tuition. The distinctive feature of the fifth generation model is that it is Web-based, and therefore cost effective. Compared to classroom learning, Web-based learning saves the costs of employing classroom teachers. Learners access the Web-based materials themselves, at their own time, and they deal with them at their own pace. The learners may access teaching staff via the e-mail or chat rooms to discuss any issues relevant to the materials. This results in much lower costs for Web-based learning. Perhaps, this is the direction in which education should be moving, especially for adult learners.

This model shows clearly that there are some applications of Web-based Education in Generation 4, but it increases in Generation 5. Traditional methods of correspondence are generally used in Generations 1 to 3. Taylor (2001) does not suggest that Web-based Education is perfect. The power of Web-based Education to transform the educational experience is tremendous, but there are also risks (Web-based Education Commission, 2000). Most countries have realized the need to develop new policies to ensure that Web-based Education will enhance and not frustrate learning. However, it needs to be developed and used properly. It is not a means by which to sell and buy education with increased profits, but it is a means to promote more efficient and effective education for all, irrespective of nationality, age, or gender. In the United States, the Congress has established the Web-based Education Commission to address this important issue. The Commission is aware of the tremendous power of the Internet to empower individual learners and teachers, as well as the barriers that frustrate learning in this new environment. It was given the task of addressing these challenges of a rapidly changing educational landscape. In Singapore and Australia, similar bodies have also been established to consider the issues of the development of Web-based Education in their respective countries. These establishments are important to ensure that the benefits of Web-based Education are being harnessed and that the risks are being minimized.

METHOD OF COMPARATIVE STUDY

This study is based on the categories used in Taylor's (2001) report. It differs by comparing Web-based information from Australia and Singapore through a review of relevant literature, and with some contacts with the institutions in the study.

There were two steps in this study. First, the stages in education are seen as they occur in the school, the polytechnics (equivalent to colleges of Technical and Further Education in Australia), and the university. Web-based Education (WBE) diffusion in Singapore and Australia are compared at these three levels. A meta-analysis is conducted using a modified Taylor's model, and the results are represented in the achievement table (Table 1). Second, the National University of Singapore and the University of Southern Queensland are compared in their attainment of using Web-based Education for distance education as well as for on-campus programs. They are chosen because they represent more advanced universities in Web-based Education in their respective countries. A detailed comparison is done in this way in order to focus on the differences and similarities as experienced by the particular university in each country (See Table 2).