

# The E-Learning Revolution: Opportunities for Higher Education in the 21<sup>st</sup> Century

Brendan McCarthy  
School of Information Systems Victoria University  
PO Box 14428  
Melbourne City MC Victoria Australia  
Phone: +61 3 9919 5079 Fax: +61 3 9919 5024  
Email: [brendan.mccarthy@vu.edu.au](mailto:brendan.mccarthy@vu.edu.au)

**Abstract:** The expansion of education beyond national boundaries has created a new market for the education industry. Many universities have formed partnerships with organisations in other countries in order to expand their programs. Several implementation models have been identified including distance education via E-Learning, study abroad programs, the establishment of a university campus in a foreign country and the travel of faculty lecturers to foreign countries for full or partial curriculum delivery. There has been dramatic growth in the development of electronic interactive learning systems and their application via E-Learning to higher education in the international market. The curriculum associated with Information Systems and in particular the teaching of Enterprise Resource Planning (ERP) systems is particularly suited to the application of E-Learning technologies. Victoria University has extended its offshore programs by offering ERP education in the Asian region and has applied E-learning technologies blending synchronous and asynchronous content to assist this expansion. A number of technologies facilitate teaching: application service provision (ASP), web-CT, computer-based training and virtual classroom technology. This approach provides an innovative and efficient means to deliver higher education internationally in terms of flexibility in subject delivery and increased learning outcomes.

**Keywords:** E-learning, Innovations in Teaching, Synchronous E-learning, Asynchronous E-learning, E-Learning Technology.

## I. Introduction

The expansion of global education has created a new market for the education industry. Aoki (2004) has identified four trading service modes defined within the framework of the General Agreement on Trade in Services (GATS) and applied these to the education market:

Mode 1 – Cross-over supply: E-Learning in which the education provider and student do not relocate.

Mode 2 – Consumption Abroad: Study programs where the student travels to a foreign country.

Mode 3 – Commercial Presence: The establishment of

programs in another country.

Mode 4 – Presence of Natural Persons: Educators travel to another country to present program.

Aoki (2004) asserts that E-Learning allows educational services to cross over national boundaries. Demand for education is particularly strong in developing countries where education is seen as an important ingredient to economic prosperity. Many universities have introduced distance learning programs and are trialling E-Learning tools to support their expansion into the international education market. Several have formed partnerships with other institutions to enter the international education market taking advantages of new developments in E-Learning technologies. Aoki (2004) describes four well-known international consortia: U21global, Global University Alliance (GUA), World Alliance in Distance Education (WADE), and Cardean University.

Many studies have been carried out on the effects of E-Learning on a university's education strategy. Chan and Welebir (2003) describe the effects of the Internet and online distance education on a university's overall strategy. They present a strategic agenda that traditional universities can follow to develop E-Learning programs including the suggestion of forming a strategic alliance to enter the e-education market and expand globally. Gibson (2001) suggests that the virtual classroom will eventually replace the traditional classroom. His study explores methods to enhance the distance learning experience and create a competitive advantage.

## II. ERP Curriculum

Curriculum associated with the teaching of Enterprise Resource Planning (ERP) systems is more suited to the use of E-Learning tools than many other areas especially where the curriculum is expanded beyond the traditional boundaries of universities (Hawking and McCarthy, 2001). ERP systems are modular application software that helps businesses increase the productivity of such mission-critical components as human resources, finance, parts purchasing, inventory control, supply chain and customer relationship management. ERP systems are enterprise-wide and claim to incorporate best business practice that replaces legacy systems and current business processes. The leading ERP vendor is SAP. SAP maintains about 35% of the worldwide ERP market (Gilbert, 2000) and its ERP product is called

SAP R/3.

An increasing number of universities are investigating strategic alliances with ERP system vendors to provide the support for incorporating ERP knowledge into their curriculum (Hawking, 1998). The ERP vendor benefits from these alliances by increasing the supply of skilled graduates that can support their product thereby enhancing its marketability. Chan and Welebir (2003) highlight the competitive advantages universities can gain by forming alliances, particularly their benefit in leveraging into the global e-education market.

The SAP University Alliance Program in Australia is an example of a strategic alliance between a number of universities and an ERP vendor. As part of the alliance, SAP provides approximately \$2.5 million worth of its product and technical and professional support for the integration of SAP R/3 into the curriculum. However it is still the responsibility of individual academics to develop the necessary curriculum and the university to provide the necessary infrastructure to support the system.

### III. International Education

The Faculty of Business and Law on behalf of Victoria University joined the University Alliance Program in 1998 and has developed a Graduate Certificate, Graduate Diploma and Master of Business in Enterprise Resource Planning Systems as well as incorporating SAP R/3 into several undergraduate subjects. Currently we have 15 staff teaching more than 20 subjects at both the undergraduate and postgraduate levels to approximately 700 students.

Many higher education institutions are making plans to globalise their courses. Victoria University is no exception and offers a broad range of academic programs throughout the Asian region. The international programs involve over 3500 students from Malaysia, Singapore, Thailand, People's Republic of China and Bangladesh. Many of these universities have indicated that they wish to include ERP related subjects in their courses. While there have been indications that the high growth rates in the ERP market of recent years have somewhat dwindled, good growth has been maintained in many Asian markets with the expectation of continued growth in the foreseeable future (Pinaroc, 2000). SAP has established a University Alliance Program in many Asian countries to assist with provision of appropriately educated consultants to support this increased market. However even though these alliances have been established many of the universities have had difficulties in developing curriculum due to lack of skilled staff and available resources. Increasingly Asian universities are forming partnerships with foreign universities in an endeavour to broaden their curriculum offerings and add value to their students. Clearly there are advantages to be gained by both parties in setting up a partnership to teach different aspects of ERP systems. The provider is able to derive income to recoup some of the cost of developing curricula and maintaining systems while the receiver obtains

the benefits of their students acquiring ERP education without the need to invest in hardware, staff training and curriculum development.

In 2002 Victoria University commenced the Master of Business in ERP Systems at Summershore Business School, Singapore. In February 2005 the ERP masters program commenced at the Beijing Jiaotong University, P.R. of China. We are currently negotiating the introduction of ERP studies with institutions in Malaysia, Thailand and Tanzania.

### IV. The Application of E-Learning Technology

Many E-Learning models have been developed and trials conducted in recent years. Neubauer and Lobel (Neubauer and Lobel, 2003) describe a highly structured synchronous model for teaching and doing research on medium to large sized groups over the Internet. Arnone (2002) reports on the technical standards being developed to allow colleges in the US to customise distance-learning programs by blending online-learning software from several vendors. Ehrmann and Collins (Ehrmann and Collins, 2001) describe examples of virtual classrooms that use the Internet to create new kinds of collaboration and learning. Tansley and Bryson (2000) evaluate the implications of replacing traditional modes of small group teaching with "virtual seminars".

Victoria University uses E-Learning technologies to facilitate the teaching of ERP systems in our offshore programs. The E-Learning technologies blend synchronous and asynchronous content. Asynchronous E-Learning does not involve the presence of the teacher. Typically the learning content is located on a web server that students can access using the Internet. The content can be interactive but the presence of the teacher is not required. Typically asynchronous E-Learning is implemented by Web-based training (WBT) and may include online forums, threaded discussions and download materials. Synchronous E-Learning requires the learner and teacher to be present in the event at the same time. It is a real-time, instructor-led online learning event in which all participants are available at the same time and can communicate directly with each other.

To support offshore teaching a model for ERP E-Learning has been developed and has been applied in Singapore since 2002 and China in 2005. It is also used in a limited way in an offshore program in Hong Kong. The model blends synchronous and asynchronous content and integrates four major technologies which provide a comprehensive medium for online learning.

The technologies are:

#### Application Service Provision

Application Service Provision (ASP) is responsible for providing the necessary technological infrastructure and support to host a particular software product. This enables the clients of the ASP to remotely access the software via the Internet. One of the barriers to ERP education mentioned earlier was gaining access to the ERP system and providing the necessary infrastructure. The ASP model provides a

solution to overcoming this barrier.

Victoria University has configured one of its SAP servers to support the role of an ASP to its partnering universities in Asia. Students from these universities can access the SAP software at Victoria University via the Internet once they have installed the SAPgui software on their local PC's. Students can access the SAP software from anywhere in the world as if they were sitting in front of a PC at Victoria University.

The control and administration of the ERP system is still the responsibility of Victoria University and allows our Asian partners to access SAP R/3 without the need to purchase an expensive computer server and employ the necessary support staff. Through the use of clients in the SAP R/3 the system can be individually configured to suit the learning objectives of each offshore institution.

### **Web-CT**

Web-CT is a web based tool which acts a repository of learning materials to assist students with their ERP education. Web-CT has tools for storing and delivering course materials including text, graphics, audio and video. Material can be released according to various criteria, such as date and student name.

Web-CT also has tools for organising and enhancing course material, communication tools so that chat, "internal" mail, discussion groups and whiteboards can be made available for use by students and instructors and tools for monitoring student progress and providing feedback.

In terms of ERP delivery the Web-CT site allows students to view and download subject outlines, assignments, past examination material and lectures in various formats. Students can submit assignments via the site and then view their results once the assignments have been marked. Chat facilities can be enabled to allow students to discuss set tutorial questions and discuss issues they have encountered. This interaction may occur between students within their tutorial, university, other Asian universities, or Victoria University.

Web-CT is used as the foundation to deliver the asynchronous E-Learning content in the ERP offshore program.

### **SAPTutor**

This tool is used for developing interactive tutorials in a simulated SAP environment. It enables the lecturer to record an action or transaction within the SAP environment and capture the screens involved to form the basis of a tutorial. After recording the tutorial, the SAPtutor Editor is used to edit the structure of the tutorial, define alternative paths (branching), edit instructional texts and create additional supplementary descriptive texts. This facility allows educational concepts to be inserted into tutorials using tools such as PowerPoint. The computer-based tutorials enable students to combine ERP theoretical concepts with the appropriate SAP screens and actions. Students can replay the tutorial as many times as necessary to understand the

concepts.

The SAPtutor tool enables staff in the Asian location to have access to a repository of ERP educational materials overcoming the lack of resources barrier identified earlier. The Virtual Classroom technology is used for plenary sessions to reinforce the concepts covered and answer any questions coming out of the SAPtutor tutorials.

This tool has the added benefit of capturing and storing a lecturer's knowledge that can then be reused by others at a later stage either in a different subject or to assist if the lecturer is no longer available.

### **Virtual Classroom**

There is a growing trend amongst academics to use the Internet to increase access to educational materials in a variety of ways to support the learning process (Pather and Erwin, 2000). The ASP enables access to the ERP system while the Virtual Classroom technology provides access to the curriculum.

The virtual classroom tool enables synchronous E-Learning whereby the learner and teacher are present in the event at the same time. It is a real-time, instructor-led online learning event in which all participants are available at the same time and can communicate directly with each other. This virtual classroom capability is facilitated by the Centra Corporation virtual classroom software, Central Symposium, which provides the capability to deliver live, instructor-led classes direct to student desktops using fully integrated voice-over-IP technology. This is used to present theoretic concepts related to ERP Systems and practical demonstrations related to SAP software. Lesson delivery includes integrated full-duplex audio, interactive whiteboards, application sharing, breakout rooms and online surveys and evaluations. The technology allows lessons to be recorded for editing and playback. Centra Symposium is very powerful as it integrates many interactive tools that can be used in the live delivery. Of particular note is the "Application Sharing" tool that allows an application stored on the presenter's PC to be viewed on the students PCs. The presenter can demonstrate features of the application to students in the session and also give control of the application to individual students and allow them to utilise and manipulate the application. This is a very powerful feature and quite unique.

If a student has a query, they can "summon" the lecturer via the Virtual Classroom and the lecturer can then appropriately respond to the query. This two-way communication facilitates the interaction between the lecturer and student thus enhancing the learning process. This has been lacking in many of the online solutions up-to-date.

## **V. Conclusion**

The application of E-Learning technology can provide opportunities for universities to expand their education services beyond national borders. Many universities have

formed partnerships with other institutions to expand their programs offshore; many of these are using E-Learning technology. The four E-Learning technologies used to deliver ERP education in the Asian region provide an efficient means to deliver higher education internationally in terms of flexibility in subject delivery and increased learning outcomes. The application of E-Learning technology will become increasingly relevant in the light of the growing demand for education services by developing countries.

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