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Delivering Enterprise Resource Planning (SAP R/3) Curriculum using eLearning Resources.

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Abstract

Enterprise Resource Planning (ERP) systems offer a software-based system that handles an enterprise's total information system needs in an integrated fashion. Such systems have seen a phenomenal growth in the last decade in the US, Europe and Australian markets. With the recent upturn in South-East Asian economies, an increase in demand for ERP systems is expected and opportunities clearly exist for provision of high-quality ERP education programs in this region. This paper describes the issues and barriers associated with integrating ERP systems into university curricula. It outlines the experiences of Victoria University in offering ERP education through a strategic alliance with SAP. The University is extending its offshore programs by incorporating ERP education to take advantage of the current increase in demand of ERP employment opportunities in the South East Asian region.

The proposed ERP eLearning Model incorporates four different technologies for the delivery of ERP education via the Internet. Each technological solution is discussed and advantages identified with possible future research developments put forward.

Keywords: Enterprise Resource Planning Systems, eLearning, Application Service Provider, Computer Education

1. Introduction

Enterprise Resource Planning (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.

AMR Research valued the ERP market at \$16.6 billion in 1998 but has predicted it to hit \$66.6 billion by 2003 (Busse, 1999). The main vendors in the ERP software market are SAP AG, Oracle, Baan, PeopleSoft, JD Edwards, McDonnell Information Systems, QAD, and Pivotpoint. SAP is the leading vendor with 30 percent of the market. Oracle and PeopleSoft follow with 14 and 7 percent respectively. JD Edwards has the number four spot with 3 percent, and the Dutch vendor Baan has 3 percent (Gilbert, 2000).

SAP is the largest client/server and mainframe ERP software vendor with approximately 22,300 employees and 12,500 customers in 110 countries (SAP, 2000). SAP's current version ERP system is referred to as SAP R/3. In Australia there are approximately 400 companies using SAP R/3.

SAP R/3 is based on an overall business model that makes possible a uniform view of all data and business processes in a business. SAP R/3's integration allows information to be entered into the system only once, then this information becomes part of the entire business's information system. SAP maintains a presence in all kinds of organizations such as: automotive, consumer products, chemical, manufacturing, oil and gas, high-tech pharmaceutical, and communications.

A major issue with ERP systems is the expense of their implementation. Depending upon the size of the business and the number of modules being implemented, the full implementation process can extend to five years and cost hundreds of millions of dollars. A major contributing factor to these high costs is the expenses associated with implementation consultants who are in short supply world-wide. This clearly presents an opportunity for university graduates who have knowledge of ERP systems to gain on-going employment with high remuneration.

2. Barriers To Teaching ERP Systems In Universities

Many universities have identified the value of incorporating ERP systems into university curriculum. ERP systems can be used to reinforce many of the concepts covered in the business discipline (Becerra-Fernandez et al, 2000). The systems incorporate "state of the art" technology providing a comprehensive teaching tool for computer science and information systems subjects (Hawking et al, 1999, Watson et al, 1999). Universities that have successfully incorporated an ERP system into their curricula find unprecedented student demand for those subjects. Academics are also discovering the increasing demand for ERP related research due to its scarcity.

Even though the value of including ERP systems into the curriculum has been identified, there are a number of barriers preventing this from happening. One significant hurdle is the limited knowledge and experience of academic staff charged with the responsibility of integrating ERP curriculum into their courses. ERP systems are complex and the time required for developing curriculum is far in excess to what staff have experienced for curriculum development in other areas. Those who develop the necessary understanding of a particular ERP system to develop curriculum can be lured away from the university into lucrative jobs in private industry. The shortfall of academic skills and experience is further compounded by the limited access to relevant ERP professional development activities and the continual upgrade of software.

Another significant barrier to the use of ERP systems in universities is the perceived need for students to gain “*hands-on*” experience to master the concepts inherent in these types of systems (Watson and Schneider, 1999). In the past, if a university decided to incorporate a major software product into its curricula, it would have purchased the software and set up the necessary infrastructure to support it. ERP systems themselves are expensive but there are the additional associated costs of hardware and professional development for the computer support staff together with the necessary incentives to retain these people once they are skilled. Many universities find that the barriers associated with introducing ERP systems are just too great!

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.

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 its University 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. This is reflected in the diversity and extent of curriculum activities of the universities involved in the alliance. A recent survey of these universities indicated that some were struggling to offer any ERP related subjects while others offered numerous subjects over many disciplines (Gable and Rosemann, 1999).

3. The SAP Alliance at Victoria University

The Faculty of Business and Law on behalf of Victoria University joined the University Alliance Program in 1998. Up until then university alliance members had focused SAP R/3 around one particular department rather than an overall faculty. The faculty approach was believed to be a better method to facilitate the incorporation of SAP R/3 into curriculum. ERP systems support the various business processes within an organization. The respective departments within the faculty teach these processes and therefore the faculty approach enables each department to focus on the aspects of the software which is relevant to them.

Since joining the SAP University Alliance the Victoria University has developed a Graduate Certificate, Graduate Diploma and Masters 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 600 students.

Victoria University offers a broad range of academic programs throughout the Asian region. The international programs involve over 3000 students from Malaysia, Singapore, 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 dramatic growth as these countries come out of the recent economic downturn (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 western universities in an endeavor 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.

4. ERP eLearning Model

Victoria University has developed an eLearning ERP model to facilitate the teaching of ERP systems in Asian partnering universities.

To support offshore teaching a model for ERP eLearning has been developed and will be trialed in Malaysia and Hong Kong in 2001. The model is composed of four major technologies which will provide a comprehensive medium for online learning. The technologies are:

4.1. Application Service Provision

There has been a plethora of literature in recent times about the potential of Application Service Provision (ASP). An 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 Asian universities 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.

4.2. 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 technology is Internet based and allows the two-way delivery of ERP education in real time. Students are able to log onto the Virtual Classroom based at Victoria University. They hear the lecturer's voice in real time while viewing lecturer controlled slides on their screens. 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.

The technology allows lecturers to teach the necessary concepts and then demonstrate these concepts using the ERP system via the Virtual Classroom. The lecture can also be recorded to be replayed at a later stage, however this option does not support the advantages of two-way interaction. Once students had completed the lecture they can access the ERP system via the ASP to practice concepts that were covered in the lecture.

4.3. iTutor

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

4.4. Central Point

Central Point is a web based tool developed by staff within the Faculty of Business and Law which acts a repository of learning materials to assist students with their ERP education. It also acts as a portal to the various tools used to deliver ERP education into the Asian region.

The site allows students to view and download subject outlines, assignments, past examination material and lectures in various formats. Staff can place the latest information on an electronic noticeboard for the subjects they are responsible for. Students can submit assignments via the site and then view their results once the assignments have been marked. The site provides direct email links to staff and global email facilities for staff to communicate with students in their subject.

The site has chat facilities to enable 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.

The Central Point site will be used for many of the administrative tasks associated with offshore teaching.

5. Conclusion and Future Directions

The four eLearning technologies outlined above are not unique but combining these technologies to present ERP education is unique. They provide an avenue for ERP eLearning using a variety of methods to cater for students' differing needs and learning styles. The ERP eLearning initiative could provide a model for similar ERP eLearning activities to be developed elsewhere.

We are trialling the ERP eLearning model with our partnering universities in Malaysia and Hong Kong. This is in the planning and early implementation stage. Once fully implemented we will carefully analyse the effectiveness of the model. If this trial proves successful we plan extend our ERP eLearning initiative to include our other partnering universities throughout the Asian region. Beyond this we would explore the possibility of offering ERP education to anybody who enrolls online into any of the subjects on offer. This would be true eLearning as it provides the accessibility and flexibility to overcome the geographical barriers, ideologies, work commitments and traditional course structures that have prevented people from acquiring ERP knowledge and skills. Students would have the opportunity to complete the necessary assessment requirements to gain accreditation for the subject at Victoria University and appropriate certification. The successful completion of subjects would provide accreditation into a number of courses throughout the world.

The initiative has the added advantage of developing ERP knowledge of academics in the partnering universities. This has the potential to encourage future collaboration where ERP curriculum becomes a two-way process with academics from all partnering universities contributing to curriculum development.

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