

ENTERPRISE RESOURCE PLANNING SYSTEMS: A STUDY OF THE USAGE AND CHALLENGES OF IMPLEMENTING ERP SOFTWARE INTO UNIVERSITY CURRICULUMS

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ABSTRACT

In recent years academic research has reported the value of integrating ERP software into the undergraduate and graduate business curricula and about the potential value of such initiatives in teaching cross-functional understanding of business processes (Becerra-Fernandez, et.al., 2000; Calitz and Marais, 2001; and Closs and Stank, 1999). Although universities all over the world are teaching ERP applications in their business curricula, this research examines which ERP programs and applications are taught in the United States and what challenges were encountered in doing so. From the research done for this paper, it is evident that the teaching of any ERP software, be it SAP or Oracle, can greatly enhance the marketability of students who have the knowledge of business process integration.

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Because of the increasing importance of enterprise systems in business, a number of universities are now implementing highly sophisticated Enterprise Resource Planning (ERP) software into their business school curricula in order to better equip students for jobs awaiting them after graduation. The two most popular ERP systems being taught are SAP and Oracle.

Purpose of the Research

The purpose of this research is to investigate which ERP applications are implemented and taught as part of university business curricula and what challenges are faced throughout such implementation.

Introduction

The integration of information technologies into the business school curricula in the past concentrated on imparting IT skills to students and/or using it as a technology-based aid for improving the teaching and learning effectiveness and efficiencies (Seethamraju, 2007).

The academic literature discusses that using ERP systems to teach cross-functional integration is well founded. Additionally, the importance of ERP education has been recognized by many researchers, including Watson and Schneider (1999), Joseph and George (2002), and Selen (2001). The methodology to teach ERP to undergraduate students has also been investigated by researchers, such as Becerra-Fernandez, Murphy, and Simon (2000) and Guthrie and Guthrie (2000).

This paper will address which ERP software is used for teaching concepts of business process integration, which applications are most frequently taught, and which issues were most challenging for the instructors teaching these classes.

ERP Software Taught in Universities

The trend towards ERP systems in large and mid-sized businesses has a significant impact on Information Systems career paths. Consequently, more and more universities are beginning to implement some type of ERP software into specific business degree plans. Two of the main ERP software vendors, SAP R/3 and Oracle, have developed university alliance programs to help universities incorporate ERP software into their curricula (Rosemann and Watson, 2002). Within the last few years, Oracle has acquired PeopleSoft and JD Edwards, two other major ERP vendors (Forrester Research, 2005).

According to a 2006 study by Gartner Dataquest, Oracle was ranked the #1 database program, having 47.1% market share, with \$7.5 billion in revenues (2006). Because of statistics like these, many universities have decided to integrate Oracle training and certification into certain business degree plans.

Oracle has developed a program that helps prepare students for IT careers while providing instructors with world-class training and professional development opportunities. Oracle Academy (also known as the Oracle Academic Initiative) grants colleges and universities with software, curriculum, and certification resources needed in order to complete the Oracle certification (Academy.Oracle.com, 2006).

SAP is the world’s largest business software company and the world’s third-largest independent software provider over all (SAP: The World’s Largest Business Software Company, 2007).

In order to train future employees who may work for businesses which have implemented SAP, the company created the SAP University Alliance Program. This program provides faculty members with the tools and resources necessary to teach students how technology can enable integrated business processes and strategic thinking (SAP.com, 2007). According to a recent publication, universities that form these alliances are establishing “knowledge links, a form of strategic alliance that gives organizations access to the skills and capabilities of a partner and opportunity to create new capabilities together” (Badaracco, 1991). To date, about 400 universities worldwide have incorporated SAP in their business curriculum (Hawking et. al., 2004).

Which ERP Applications Are Taught

Because most university curriculums, especially in the College of Business, are designed according to the needs of local employers, research should be conducted within the local community to determine which ERP applications should be taught. The results of a research project conducted in the summer of 2006 indicated that the petrochemical industry in Southeast Texas, the largest employer, used an extensive number of ERP applications. These applications are listed in Table 1 below (Barnes and Bandyopadhyay, 2007).

ERP Application	Percentage Who Used It
Accounting	90%
Analytics	48
Capacity Planning	37
Compliance & Governance	34
Financial Management	86
Human Resource Management	47
Information/Data Warehousing	77
Inventory Management	84
Procurement	86
Production Planning & Control	47
Sales Management	33
Service & Asset Management	45
Supplier Relationship Management	36
Supply Chain Management	42

Table 1: ERP APPLICATIONS USED

Many other ERP applications were reported being used, but those listed in Table 1 had the highest percentage of use. The respondents recommended specifically that emphasis should be put on teaching many of the Accounting and Financial applications, along with Procurement, Inventory Management, and Supply Chain Management (Barnes and Bandyopadhyay, 2007).

Before implementing the respondents' suggestions, the authors decided to research what other universities were teaching in their College of Business curriculums. The results of that research are discussed below.

In 1996, SAP selected the California State University - Chico College of Business as its first partner in the SAP University Alliance Program (SAP UAP), a program designed to provide university faculty members throughout the world with the tools and resources they need to teach students how technology can enable integrated business processes and strategic thinking.

CSU at Chico offers several ERP courses within the MIS, Supply Chain Management, and Accounting Information System majors. Some of the applications taught are ERP Systems Use and Configuration, Purchasing, ABAP Programming (MBA course), and Supply Chain Management, SAP Accounting applications, and ERP System Administration (MBA course).

CSU is one of just two mega-hosting centers that serves as a hosting center for over 100 educational facilities in the SAP UAP (<http://www.csuchico.edu/cob/theCollege/theory/sap.shtml>, 2007). Lamar University in Beaumont, TX is one of these.

At Lamar University, the applications taught at this time are Sales Order and Distribution, Purchasing, HRM, and ERP Configuration (this is both an MBA and undergraduate course.) In the future, Accounting, Financial, and Supply Chain Management applications will be taught (Barnes and Bandyopadhyay, 2007).

St. John's University is also teaching ERP in the classroom. The Tobin College of Business received a grant from SAP America, Inc. to integrate ERP software into its curriculum. St. John's has a goal with SAP to promote two essential business skills in students. They want students to have knowledge of new software and the ability to conceptualize business processes and how they work in everyday business functions. Trying to set them apart, St. John's wants its students to leave the university with something that students don't have at most other colleges. They want the students to leave with practical skills that can be implemented today. With a dozen faculty members trained in SAP, it is being offered in accounting and management courses. SAP is also available to students on the Web, enabling students to learn from any place with Internet access. To keep things in line with up-to-date business needs, an SAP Advisory Board has been created to keep the curriculum updated. The college is collaborating with industry contacts to find out what skills graduates need to acquire the job they want and are teaching those to students in the curriculum (http://www.stjohns.edu/academics/centers/teach/newsletter/archive/08-01/article_2.stj, 2002).

Central Michigan University is providing SAP technology to their students as well. They are incorporating SAP to show students how companies are using technology-based systems in day-to-day business. SAP is being used as a teaching tool to show how common business applications are used and how these business processes are related. CMU was one of the first five universities to offer ERP (SAP) instruction for its students. Many of the courses are

providing actual simulations to students instead of textbook case studies that allow students to see the actual effects of business transactions and how the processes are interrelated. Students realize the potential of SAP as well as the CMU faculty. The College of Business knows that the future added value of a student's knowledge in this field is attractive to employers. The demand for college graduates with SAP knowledge is so high that CMU has begun offering a web-based Introduction to SAP Concepts course for any student, no matter which school they attend or where they live. From a university standpoint, CMU is experiencing a never before seen recruiting of students for ERP related jobs due to their large and in-depth specialized variety of ERP related courses. Some of the applications taught at CMU are Introduction to SAP Enterprise Software, Navigation and Systems Operation, ABAP Programming, Database Management using Oracle, and SAP R/3 for Managers (<http://sap.mis.cmich.edu/>).

The curriculum innovations made possible by the Rutgers University School of Business, another SAP University Alliance member, feature a focus on accounting that builds on SAP strength in financial systems. Plus, Rutgers has a unique approach in that SAP is also taught in the School of Arts and Sciences. Currently, Rutgers is the only SAP University Alliance member that includes SAP in courses that are offered in the graduate Public Administration Global Studies programs as well as in undergraduate courses in Political Science. Most of these SAP courses are Masters level courses (http://sap.rutgers.edu/Program_Overview.html).

Penn State began adding SAP-related education into their curriculum in 1999. Penn State is at the forefront of education and research by being involved in the Enterprise Integration Consortium, which means that their teaching of SAP is integrated across three different colleges, multiple departments, and multiple campuses. SAP is taught in the College of Business, College of Engineering, and College of Information Sciences and Technology. The greatest emphasis is on teaching Supply Chain Management and Engineering applications. Like all universities involved in the SAP University Alliance, the teaching of ERP business processes is providing students a competitive hiring edge (http://www2.ie.psu.edu/eic/frames/SAP_UAP.html).

The universities mentioned above are just a few of the numerous members of the University Alliance Program or others teaching SAP or Oracle in their curriculums, be they in Business, Engineering, or Public Administration. SAP is becoming a major teaching tool, not only in the training and use of the software, but also in teaching business process integration.

The following section describes the challenges faced when teaching any ERP software, whether it be SAP or Oracle.

Challenges Faced When Teaching ERP Software

Teaching the fundamental concepts of any ERP program can be somewhat challenging to instructors as well as to students.

The general challenge, according to some research articles, is that university students do not have a clear understanding of business processes or the terminology associated with these processes. Students also have a hard time grasping how business processes integrate functional units of an organization (Nelson, 2002; Becerra-Fernandez, Murphy, and Simon (2000); and Guthrie and

Guthrie (2000). So before beginning the hands-on teaching of ERP software, it is highly recommended that students are taught what business processes are and how and why they are integrated in a business.

In order to use ERP software for teaching purposes, the following specific problems may have to be dealt with:

1. Overcoming resistance to the use of new software and to fundamental changes in the existing curriculum. This means that there is usually a steep learning curve for both teachers and students in mastering the many menu paths, data entry screens, and data elements within a single SAP application. Much time should be spent learning the many pathways for navigating SAP (Nelson, 2002).

When implementing SAP or Oracle into an existing course, some course content has to be cut out in order to spend sufficient time teaching and learning ERP concepts and specific applications. This may amount to as much as four to five weeks of instruction, so this requires cutting out previous topics that once had been covered. The other option is to create a new course where only ERP concepts and software are taught.

If the university is a member of the SAP University Alliance Program and wants its students to obtain the SAP Recognition Certificate, a minimum of five weeks of SAP instruction in three different courses (for a total of 15 weeks of SAP instruction) is required (SAP AG, 2004).

2. Acquiring the necessary resources for the use of ERP software. Whether the college decides to invest in their own ERP technology infrastructure or simply access the server and software provided by the SAP University Alliance, it is very expensive. Just to be a member of the SAP University Alliance program costs a minimum of \$8,000 a year. This entitles the member university to access the SAP software from a hosting institution that maintains, upgrades, and secures the SAP server.

3. Creating a multidisciplinary team of faculty members. This means getting faculty from different departments or colleges involved in the teaching of ERP concepts and applications. This is quite a challenge (Vluggen and Bollen, 2005).

When California State University - Chico implemented the SAP ERP system into its College of Business curriculum, the team encountered five major problem areas. These areas include: forming a faculty team and getting them to agree on how the ERP system should be incorporated into the curriculum, including the order of introducing courses into the curriculum; acquiring adequate funding to support all of the resources needed to implement a system of this magnitude, including funding for equipment, faculty training, new teaching facilities, etc; setting up a technical infrastructure and a corresponding support team to install, monitor and administrate the ERP systems; properly managing the recruiting activities of companies recruiting the students; and retaining the faculty who have SAP experience in a competitive market that offers financial rewards well in excess of academic salaries. Despite the number of challenges, CSU - Chico has been very successful in implementing SAP and has shown a significant return on the investment (Corbitt et al., 2000).

According to a publication in *Organization Science*, in order to overcome these challenges, universities need to become more “business-like” to find a middle ground with industries (Gioia et al., 1994). Universities considering an alliance with an ERP software company need to be aware of the project scale and intensity of effort required. In particular, the technical capabilities and resources of the institution will be strained. Without previous experience, installation of the software and teaching database is challenging and system maintenance and support also demand the development of specific skills. It is easy to underestimate the time and effort required to implement ERP software for teaching purposes (Scott et al., 1997).

Conclusion

Incorporating SAP R/3 or any ERP program into a business school curriculum is considered difficult and challenging (Noguera and Watson, 2001; Seethamraju, 2004); however, ERP alliance programs provide an active learning environment giving students responsibility for their education. The alliance provides an invaluable experience for students, faculty, and industry. It bridges the gap between the skills of university graduates and those required by industry. The alliance enables universities to build closer links with various industries as well. Though many universities have incorporated ERP software into their business degree programs, the extent and nature of such integration is entirely different from one university to another. However, the main objective of improving the marketability of our students through the teaching of business process integration concepts and ERP software is occurring and is expected to increase in the future.

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