

The Use of an Online-based Enterprise Resource Planning (ERP) System to Teach Supply Chain Management

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ABSTRACT

One of the recent developments in the evolution of information systems has been directed towards integrating all the business activities and processes throughout an entire supply chain from suppliers to customers. These information systems are commonly referred to as supply chain management information system. The primary purpose of this paper is to study the use of an online-based ERP system which is useful for supply chain management courses. The secondary purpose of this paper is to evaluate the effectiveness of our on-line modules for teaching supply chain management courses.

INTRODUCTION

Today supply chain management is emerging as one of the popular fields and curriculums in the business schools. ERP is an essential subject for the supply chain management (SCM) course since it changes the traditional concept of supply chain management (Becerra-Fernandez, et al., 2000). To address the need for ERP/SCM training, many universities have offered a course or a program. However, ERP programs cost a minimum of \$300,000 for a very small company up to several million dollars for an international giant; therefore, it is too much expensive for a medium-sized business school to buy and implement an ERP program. Therefore, the primary purpose of this paper is to study the use of an online-based ERP system, which is useful for supply chain management course. The secondary purpose of this paper is to evaluate the effectiveness of our on-line modules for teaching supply chain management courses.

LITERATURE REVIEW ON SCM AND ERP

A great deal of attention has been focused on ERP and SCM during the last few years (Davenport, 1998; Scheer & Habermann, 2000; Vakharia, 2002; Bajwa, Garcia, & Mooney, 2004; Hayen & Cappel, 2003). Tarn, Yen, and Beaumont (2002) discussed the need of integrating ERP and SCM. They mentioned that ERP providers have recognized the necessity of the integration of ERP and SCM system application to remain competitive in the market. Hayen, Holmes, & Cappel (1999-2000) address a framework for SAP R/3 Enterprise Software Instruction.

The Most Popular ERP Software

ERP is a business-oriented information system for identifying and planning the enterprise resources needed to take, make, ship, and account for customer orders. Today, 70% of the largest 1,000 U.S. companies have implemented ERP software such as SAP, Oracle, or PeopleSoft. There is widespread agreement that SAP R/3 is the leading software package for ERP. Today, more than 7,000 companies have adopted SAP, and its share of the ERP market is estimated to be 26 percent. Examples of companies that use R/3 include Microsoft, Owens-Corning, IBM, Chevron, and Compaq Computer (Chen & Lee, 2000).

Different Ways to Use ERP Systems to teach SCM

There are different ways for students to use ERP software to learn supply chain management concept: A) using a computer-based learning hypermedia system, B) using the on-line access system in the SAP University Alliances Program, C) developing an on-line ERP model using software package such as Macromedia Flash. The details are described as follows:

A) Many universities use a computer-based learning hypermedia system, CBT/SAP training package, developed by SmartForce. SmartForce is one of the leading providers of information technology interactive educational software. This educational software includes eleven different teaching modules. Some of them are: 1) Business Process Introduction - Financial Accounting, Human Resources, Management Accounting, Manufacturing, Financial Accounting, and Procurement, 2) Cost Accounting, 3) Customer Invoice and Payment Processing, 4) Employee Management, 5) Inventory Management, 6) Planning and Production Activities, 7) Purchasing Processing and Purchasing Requisitioning, and 8) Vendor Invoice Processing (Chen & Lee, 2000).

B) Use on-line access system under the SAP University Alliances program. For example, Several Universities in Michigan (Central Michigan University, Eastern Michigan University, and West Michigan University) are participants in the SAP Universities Alliances program (Hayen, 2003). To teach the ERP subject in the business courses, professors first installed a SAP GUI 6.2 portal to access the SAP server in the California State University at Chico (CSUC). The procedures are described in Appendix A. Handouts for SAP INC. and other universities develop different modules. Appendix B is a portion of the "Plug and Play" handout developed by faculty members at the University of South Dakota. We have interviewed professors at a public university at Michigan and they indicated one of the major disadvantages is that the database at CSUC is very complex and interrelated. If the students forget one exercise in one module such as accounting, the

exercise in another module will not work. Another problem is that the exercise is not very flexible. Unless the instructor knows how to fix the problem, students have to carefully type the number in order to finish the exercise completely.

C) Develop online-based and hands-on approach modules, which are useful for, supply chain management courses. A module of the ERP learning system (ERPLS) is being designed, developed, and implemented by one of the authors. ERPLS are developed using JAVA, HTML, Visual Basic .Net, and Macromedia Flash. The systems are then stored in a web server. Students can access the web server and play a small but complete system. The major problem is that it takes time to develop such a system. The second problem is the copyright issue, which has to be resolved with the major software vendors (SAP or PeopleSoft).

EXPERIMENTAL DESIGN

The purpose of this study is to evaluate effect of an on-line based Enterprise Resource Planning system to teach supply chain management concept. Five SAP models were used for in explaining the concept of supply chain management in a SCM course offered by the College of Business at an AACSB Midwest university. In this study, the on-line access system developed by the SAP University Alliances program was used.

The subjects for this study are students enrolled in a one-semester three credit hour course, SCM 614 "Information Technology in Supply Chain Management". This course is a required course for all MBA students with a concentration in supply chain management. The five modules selected for this study were: 1) Sales and Distributions, 2) Material Management, 3) Production Planning and Control, 4) Manufacturing Execution, and 5) Procurement Process. One section of this course was offered in the spring of 2004 and was taught by a CIS professor. During the semester the total number of students enrolled 20. An attempt was made to survey all of the students in the class.

There were three different survey instruments used during this research. They included a general student evaluation used to evaluate the success of the Supply Chain Management course. Then there was a specific survey questionnaire about SAP. Finally, there was a written test to gather information about learning effect after exposure to the treatment, which was the midterm and final exams.

For the purpose of this research, four hypotheses were tested in this study. These are stated as follows:

- H1: From students' opinion, this course improves their knowledge and skills in supply chain management and SAP covered in this course.
- H2: From the students' opinion, the instructor stimulates interest in the course.
- H3: From the students' opinion, they learn a lot in this course.
- H4: Use of the SAP on-line access system helps me understand the relationship between the subject (Supply Chain Management) and the ERP system.

CONCLUSIONS AND FUTURE RESEARCH

The purpose of this paper is to evaluate the effectiveness of using an online-based ERP system for Supply Chain Management course. An on-line based system was used to test the effectiveness of student learning. Using the online access system in teaching SCM has been a good experience for the instructor and students. Initial research results confirm the author's belief that the major advantages of using online access system over the traditional method are: 1) Students know a new and popular ERP software package. The best learning method for ERP software is being able to 'experience' it hands-on; 2) Students gain better understanding of the relationship between ERP and SCM; and 3) Using an online access system as a tool also provides students an experience of using extranet. However, the number of students who involved in the experiment was relatively small. Finally, other factors outside the control of this study may have an influence on the results observed as well. Future study should improve the experimental design of the study.

We find the quality of the handout is a critical factor for student learning for SAP/SCM concept. The SAP R/3 itself is very complex software. The Question 3 in the survey is: "The step-by-step handouts help me understand how SAP or ERP work." The mean score for student response of the Question 3 is 4.67, which the highest score among six questions. One of the student cited, "I think I might have floundered a bit if I didn't have them (handout) to follow. At first, these especially were helpful. It was definitely nice to see the examples and be able to walk-through what was going on." According to students, a one-page diagram sheet for business process is very useful in visualizing the documents involving in a business process under SAP system.

REFERENCES

- Bajwa, D. S., Garcia, J. E. & Mooney, T. (2004). An Integrative Framework for the Assimilation of Enterprise Resource Planning Systems: Phases, Antecedents, and Outcomes. *Journal of Computer Information Systems*. XLIV(3), 81-90
- Becerra-Fernandez, I., Murphy, K. E., & Simon, S. J. (2000, April). Integrating ERP in the Business School Curriculum. *Communications of the ACM*. 43(4), 39 - 41
- Callaway, E. (1997). ERP: Test for success. *PC Week*. 14 (53), 69-70
- Chen, K and Lee, H. (2000). A Study of a Computer-Based Training System for Enterprise Resource Planning (ERP) Subject in POM and Information Systems Courses. *Proceedings of Southwest Decision Sciences Institute*. Thirtieth Annual Conference, San Antonio, Texas, March 2000
- Davenport, T.H. (1998). Putting the Enterprise into Enterprise System. *Harvard Business Review*. (July/August) 121-133
- Gefen, D. (2002). Nurturing client's trust to encourage engagement success during the customization of the ERP systems. *Omega*. 30(4), 37 - 38

- Gulliedge, T. R. & Sommer, R. A. (2004). Splitting the SAP Instance: Lessons on Scope and Business Processes. *Journal of Computer Information Systems*. XLIV(3), 109-115
- Hayen, R.L. Supply Chain Management with R/3, SAP Enterprise Software. Available at <http://sap.mis.cmich.edu/sap.intro/lesson02/sld004.htm>, Accessed March 1, 2003
- Hayen, R.L., Holmes, M. C. & Cappel (1999-2000, Winter). A Framework for SAP R/3 Enterprise Software Instruction. *Journal of Computer Information Systems*. 40(2), 79-85
- Hayen, R. L. & Cappel, J. J. (2003, Spring). Enterprise Software Certification Academy: A Longitudinal Study. *Journal of Computer Information Systems*. XXXXIII(3), 75-80
- Knolmayer, G., Merten, P., & Zeier, A. (2002). Supply Chain Management Based on SAP Systems. Springer-Verlag Berlin Heidelberg: New York
- Kumar K. and Hillegersberg J.V. (2000). ERP – Experiences and Evolution. *Communications of the ACM*. 43(4), 23-31
- Ross, J. (1998). Clueless execs still keep ERP from delivering value. *Computerworld*. 33(38), 30
- SAP AG. (2000). Integration mySAP.com. Participant Handbook. 2000
- SAP Home Page. Available at <http://www.sap.com/company>, Accessed May 1, 2004
- SAP Home Page. Available at <http://www.sap.com/solutions/business-suite/erp/index.aspx>, Accessed December 20, 2004
- Scheer, A, & Habermann, F. (2000). Marking ERP a success. *Communications of the ACM*. 43(4), 57-61
- Siau, K. & Tian, Y. (2004). Supply Chain Integration: Architecture and Enabling Technologies. *Journal of Computer Information Systems*. Vol. XLIV(3), 67-72
- Smith, Mark. (2004). SAP Netweaver 2004: A year of slow but steady progress. Available at <http://www.intelligent-apps.com/showArticle.jhtml?articleID=55300851>, Accessed December 20, 2004.
- Stedman, C. (1999a). Flash! ERP works if you're careful. *Computerworld*. 33(50), p.1, 14
- Stedman, C (1999b). Tracking changes a must in ERP projects, business users sometimes fail to realize importance. *Computerworld*. 33(7), 41
- Stratman, J. K. & Roth, A. V. (2002). Enterprise Resource Planning (ERP) Competence Constructs: Two-Stage Multi-Item Scale Development and Validation. *Decision Sciences*. 33(4), 601-628

- Sweat, J. (1999). Learning Curve - Savvy Companies Apply The Painful Lessons Learned from Implementing Enterprise Resource Planning Software To Next Generation Applications. *Information Week*. August 2, 1999, p. 44
- Tarn, J. M., Yen, D. C. & Beaumont, M. (2002). Exploring the rationales for ERP and SCM Integration. *Industrial Management & Data System*. 102(1), 26-34
- Vakharia, A, J. (2002). E-Business and Supply Chain Management. *Decision Sciences*. 33(4), 495-504
- Wilde, C. (September 25, 2000). Demand for IT Pros Drives Vendor Certification Growth. *InformationWeek*. 214-220