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Communications of the **A**ssociation for **I**nformation **S**ystems

AMCIS 2002 WORKSHOPS AND PANELS V: TEACHING ERP AND BUSINESS PROCESSES USING SAP SOFTWARE

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ABSTRACT

This workshop prepares instructors to teach an “ERP & Business Processes” course using Systems, Applications and Products in Data Processing (SAP) technology. It is based on my experience in teaching seven sections of this course over the last two years.

Keywords: ERP, SAP, business processes, IS curriculum

I. INTRODUCTION

Enterprise Resource Planning (ERP) software programs are at the cutting edge of information systems technology. ERP systems manage company-wide business processes, use a common database and share management reporting tools. These systems support the efficient operation of business processes by integrating business activities, including sales, marketing, manufacturing, accounting, and staffing.

Recent years saw reports about the integration of ERP software into graduate and undergraduate business curricula and about the potential value of such initiatives in promoting cross-functional understanding of business processes (Becerra-Fernandez, et al., 2000; Calitz and Marais, 2001; Closs and Stank, 1999; Lau, et al., 2000). To address this educational agenda we introduced an “ERP and Business Processes” course into our business curriculum in the spring semester of 2001. This workshop describes the rationale, educational objectives, design, and evaluation of this course.

II. COURSE RATIONALE AND EDUCATIONAL OBJECTIVES

Note: Portions of the following discussion are excerpted from a conference paper by Nelson and Millet [2001].

The primary reasons for introducing an ERP and Business Processes course to our business curriculum can be classified as both ‘technology push’ and ‘technology pull’. On the ‘pull’ side, we hoped that by using ERP technology we would be able to provide our students with a concrete and better understanding of business processes. We also believe that business students should understand what an ERP system is and what it can do for a company. [Brady et.

al.,2001]. On the 'push' side, once we committed ourselves to integrating SAP into our business curriculum, we looked for a course design that would provide a foundation for future ERP-related courses while requiring a reasonable amount of preparation effort from our faculty.

As reflected by the educational objectives listed in the course syllabus (Appendix III), this 15-week course combines conceptual and hands-on content. Accordingly, class time in this course is divided into two major parts. In the first part, two hours of lecture time each week are used to introduce conceptual material, which is then reinforced by case studies, discussions, and guest speakers. In the second part, two hours of computer laboratory time each week are used to expose students to concrete aspects and user-skills related to business processes and ERP software.

III. COURSE DESIGN AND DELIVERY

The course should be designed to include key business processes that are essential in all types of businesses. As reflected in the course syllabus (Appendix III), I chose to focus on Sales, Production, Procurement, and Human Resources because they represent the primary or supporting activities of an organizational value chain.

The textbook for this course must combine understanding of business processes with pertinent ERP material. I chose the Curran and Ladd's textbook (2000) entitled "SAP R/3 Business Blueprint", which provides an explanation of SAP's business processes in common business terms.

Before teaching this course, it is essential to attend SAP training. Table 1 shows four recommended courses which were valuable in course preparation. These courses provide baseline knowledge of SAP's business solutions. They should be taken in the sequence shown because SAPTEC and SAP01 provide entry-level training prior to enrolling in the second tier courses (LO150 and LO020).

Table 1. SAP Educational Courses

	Course Nr.	Title	Days	Description
1	SAPTEC	mySAP Technology Solution	3	Overview of basic technology and business framework architecture
2	SAP01	R/3 Overview	3	Overview of SAP's entire business solution
3	LO150	Processes in Sales and Distribution	5	In-depth understanding of business processes involved in Sales and Distribution
4	LO020	Processes in Procurement	5	In-depth understanding of functions of procurement processes

Course time is divided into lectures and computer laboratories. Lectures primarily focus on ERP concepts and business processes while laboratories are used to provide hands-on exposure to the SAP software and demonstrate concepts explained in the lectures. Similarly, course assignments are divided into conceptual and hands-on components. On the conceptual side, individual students complete readings and case studies. Student teams study, present, and demonstrate process overviews related to specific ERP features such as "Sales and Distribution Reporting". The teams then lead the class through hands-on exercises demonstrating these features.

On the hands-on side, navigational exercises using the SAP software help students understand how ERP systems support business processes. These navigation exercises begin with an in-laboratory discussion explaining the business process. This discussion is followed by a navigation exercise aimed at locating and identifying critical fields used in the process. For

example, if the business process dealt with the relationship between a sales order and the sales order items, students undertake a navigation exercise in which they use the SAP software to work with specific sales orders and locate and retrieve information related to the order items. A sample navigation exercise related to sales order processing is included in Appendix II.

Students earn individual grades for take-home and class quizzes, exams and class participation. Take-home and class quizzes require students to demonstrate they read the material in assigned chapters and class notes. Two mid-semester examinations and one final examination are given in the course. The final is divided into two parts: a hands-on laboratory examination focusing on SAP navigation skills and a comprehensive essay examination requiring students to discuss and reason about specific business process situations.

IV. COURSE EVALUATION

STUDENT EVALUATIONS

At the end of each semester, students complete a confidential Student Rating of Teaching Effectiveness (SRTE) questionnaire. The overall quality of the course is measured on a Likert-type scale of 1-7 with '1' designated as "lowest rating" and '7' indicating "highest rating". Table 2 contains summary information taken from the most recent semesters the course was taught.

Table 2. Quality of the Course

Semester	Course Rating	# of Students
Spring 2002	6.05	44
Fall 2001	6.02	60
Spring 2001	6.00	29

These evaluations reflect consistently high student satisfaction with the course. One section of the course was initially taught in Spring 2001. Additional sections were added in the Fall 2001 and Spring 2002 to support the increased interest in the course.

INSTRUCTOR INSIGHTS

It is surprising to find out how much is missing in undergraduate students' understanding of business processes and terminology. Students have difficulty grasping how business processes integrate functional units in an organization. Commonly used business terms (e.g. Bill of Material structures) are unfamiliar to many students and class time is needed to explain and review basic terminology used in a business environment.

It was evident from the first laboratory exercise that students enjoy hands-on assignments and projects using the SAP software. By completing exercises within each business process, they are able to gain a concrete understanding of business processes and business terminology while having fun with the software.

Teaching with ERP software such as SAP involves some risk due to the complex infrastructure needed to access and run the application. A dedicated administrator is required to ensure network, security, hardware, and software issues don't impact the course negatively. This requirement is particularly important during upgrade and maintenance periods.

Because the SAP software is complex, with many data entry screens, data elements and reports, students frequently are at a loss when SAP branches from known screens to unknown ones due to business logic. As a result, navigation exercises must be structured to protect students from branching to unknown screens and becoming lost.

I strongly recommend the use of guest speakers in this course. Students enjoy listening to professionals who have been involved with implementing and using ERP systems. The speakers share real-life experiences and insights related to ERP implementations and their impact on business processes.

A very rewarding aspect of the course is observing how students eventually realize the importance of business processes and how the processes relate to one another. A "light bulb" turns on when students realize the connections between business functions and the benefits of integrating business processes.

Because the course prerequisite is an entry level business information course taken in the third or fourth semester, a class can be composed of sophomores, juniors and seniors. In comparing seniors to juniors and sophomores in the class, seniors tend to grasp business processes better than the juniors and sophomores. This difference is understandable because many of the senior students took courses such as Operations Management, which explain cross-functional integration issues (e.g., link between Sales and Production Logistics). Unless the course is positioned as a foundation to a follow-up course, I believe it should be limited to seniors. Requiring senior standing would avoid wide variations in what students know about business processes.

Another rewarding aspect of teaching the course is the high level of student attendance, participation, and motivation. Because the majority of students in the class are seniors, many already completed their internships or have worked in business. As a result, they are willing to express their opinions, offer insights, and relate personal experiences. Students seem to realize the value and relevance of the material covered by the course.

V. CONCLUSION

The list of topics covered in the workshop presentation is outlined in Appendix I. I hope that presenting this workshop to the IS community encourages and facilitates the introduction of an "ERP and Business Processes" course into the curriculum of other business schools.

Editor's Note: This article is based on the author's workshop at AMCIS 2002 in Dallas, Texas. It was received on September 13, 2002 and was published on November 16, 2002 in a special issue of CAIS together with other articles from the Panels and Workshops. The special issue was under the editorship of Les Ball.

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APPENDIX I. WORKSHOP TOPICS

I. Session I

- A. Review of Course Content
  - 1. Course/Educational Objectives
  - 2. Course materials
  - 3. Specific Educational Objectives
  - 4. Course Preparation
  - 5. Evaluation Methods
  - 6. Course Design
- B. Navigation Exercise #1

II. Session II

- A. Business Process Difficulties
- B. Navigation Exercise #2
- C. Navigation Exercise #3
- D. Course Evaluations/Student Comments
- E. Course Insights
- F. Discussion Session

Note: Attendees were provided numerous samples of course documents and exercise materials that would be explained and used in the workshop. Samples included course syllabi and schedule, reading assignments, tasks, case studies, group projects, presentation formats and copies of final exams.

APPENDIX II: SAMPLE NAVIGATION EXERCISE

- Identify icons
  - Change user settings
  - Search for customers and customer related data
  - Search for customer orders and identify order item information
1. Make sure you change the settings to 1) "*Do not display image*" and 2) "*Show technical name*".
  2. **Customer/Order** Navigation and **Search** Capabilities:
    - a. If you do not have the **VD03** navigation path in your Favorites Folder, add it now.
    - b. Do a search of Customers (general) and choose Feralloy as the customer name.

Customer Number: _____
    - c. Using the customer number above, determine the:

1. Sales Organization: _____
2. Distribution Channel: _____
3. Division: _____

- d. Using the same screen where you found the answers to 1-3 above, search the list of organizations to determine the name of sales organization = 6000.
- e. Using the Display Sales Order: Initial Screen, do a search on orders. Enter the sales organization/Distribution Channel/Division above, in your search criteria and retrieve all the orders. (Make sure you select the category "**Sales documents by customer**").

_____ Partner (Record #1)

_____ Purchase Order Number (Record #1)

_____ Document Number (Record #1)

_____ Partner (Record #2)

_____ Purchase Order Number (Record #2)

_____ Document Number (Record #2)

- f. Click on the "Partner" number for **Record #2**.
What is the Order No. displayed? _____
- g. Click on the **Sales** button.
- h. What is the Net Value of the order? _____
- i. What is the code for Payment Terms? _____
- j. What customer is the order for? _____
- k. What is the Total Weight? _____
- l. How many items on the order? _____
- m. What is the total order quantity? _____
- n. What is the material for Item 20? _____
- o. What is the Unit Price of Item 30? _____
- p. What is the Plant Code of the items? _____
- q. What is the name of the City where the plant is located? _____
- r. What is the Requested Delivery date of the order? _____
- s. What is the material description for Item 30? _____
- t. Click on "Status Overview" (**May take a long time to retrieve information**)
  1. What is the status of the entire order? _____
  2. How many items were rejected? _____

u. Click on “Document flow”

1. When were the goods issued? _____
2. What was the invoice nr. of the order? _____

APPENDIX III. COURSE SYLLABUS

PENN STATE - ERIE
The Behrend College, School of Business

INTRODUCTION TO ERP USING SAP ENTERPRISE SOFTWARE

MISBD 297, Spring 2002, Bob Nelson

Textbook: ***SAP R/3 Business Blueprint; 2nd edition; Thomas A Curran and Andrew Ladd; Prentice-Hall Inc: 2000***

Prerequisites: MIS 204 – Introduction to Business Information Systems

Course Description:

This course provides a detailed explanation of Enterprise Resource Planning (ERP), a group of integrated software modules used to run virtually all business processes in an organization. The course explains and demonstrates how business processes such as Sales Logistics, Production/Material Management, Procurement and Human Resources are supported by SAP, the leading ERP software package. Hands-on exercises, using SAP software and guest speakers will provide special insights on ERP and business processes.

Course Objectives:

1. Develop knowledge of what ERP is and why it is important
2. Explain Value Chain Management
3. Understand and describe key business processes.
  - a. Sales Logistics
  - b. Production Logistics
  - c. Procurement
  - d. Human Resources
4. Understand how business processes interface with other business processes
5. Develop competence in navigating in SAP R/3.
6. Acquire knowledge and skills to complete hands-on assignments and projects using SAP R/3.
7. Recognize and explain advantages, limitations, and issues of conducting business processes via ERP software.
8. Understand critical success factors in ERP implementations
9. Improve skills related to writing and communications.
10. Learn and work independently as well as with a team

Method of Instruction:

The reading assignments and case studies cover more than can be presented in class. I will be addressing important concepts and points from the textbook during class time. In addition, I will be using class time to share material from other sources; as well as, my personal experiences and yours. Students will be given hand's-on assignments, utilizing SAP enterprise software, to demonstrate their understanding of business processes.

Class Quizzes:

During the semester, approximately **5 class quizzes** will be administered which will address material from chapters assigned and notes covered in class. These quizzes will be strictly individual and will be taken at the beginning of class. Composition of the quizzes will be multiple choice, true/false and completion. Quizzes will be returned the following class.

Home Quizzes:

Home quizzes will help you demonstrate (to yourself and to me) that you have read and understood the assigned material. It will also prove very useful when preparing for exams. Home quiz work is strictly individual. However, provided that you have read the material and have developed an opinion about the correct answer, you may discuss the questions and debate with other interested students.

At the beginning of each class, your answers to all the questions in the assigned home quiz should already be clearly marked on the quiz itself and on a separate page. I will collect these pages and go over the correct answers. We will discuss problematic or important questions, and you will enter your score into an "Attendance & Score Sheet." I will check, at random, the answer pages submitted.

If you miss a class, you **must** e-mail the home quiz answers to me **before** class. Only if you have a **good** reason for not getting the home quiz to me on time, you may e-mail me your quiz score and a description of the problem as soon as possible. There will be a 25% penalty on such late scores. If you join the class while we are going over the home quiz, I may apply a penalty of up to 25% to your grade.

E-mail:

In addition to classroom contact and office hours, e-mail will be an important communication channel between us. I will assume that you check your e-mail at least **once** every other day. I check mine at least once a day. My messages may include tasks, assignment hints, exam hints, and occasional administrative details.

Grading Policy:

Group Project/Presentation	19%
Tests	20%
Final Exam:	20%
Assignments, Cases, Tasks	25%
Home/Class Quizzes	10%
Participation	6%
Each Missed Class Beyond 3	-0.75%

Grading Scale:

93 – 100	A
90 – 92.99	A-
87 – 89.99	B+
83 – 86.99	B
80 – 82.99	B-
77 – 79.99	C+
70 – 76.99	C
60 – 69.99	D
<60	F

*** You should retain a copy of all work submitted to the instructor.

Attendance, Missed Exams, and Late Assignments:

Make-ups on exams will be permitted only for university-approved absences (illness, death in family, etc.) or with prior arrangement with me. Assignments may be handed in late under the same circumstances. Otherwise, the grade for late homework will be reduced by 5% per class period. Note however, that grades for late assignments may be reduced even further if class discussion rendered the assignment easier.

Assignments are due at the beginning of class.

Group Projects:

Typically, all group members will receive the same grade. However, when clear differences in effort and quality of work are reflected in the peer evaluation forms, I will adjust grades accordingly.

Writing Quality:

I can't emphasize enough that you will receive severe penalties in cases where your writing reflects lack of care and attention.

Academic Integrity Policy:

Penn State puts a very high value on academic integrity, and violations are not tolerated.

Academic integrity is one of Penn State's four principles to which all students must abide. This principle states:

I will practice academic integrity. Academic integrity is a basic guiding principle for all academic activity at Penn State University, allowing the pursuit of scholarly activity in an open, honest, and responsible manner. In accordance with the University's Code of Conduct, I will practice integrity in regard to all academic assignments. I will not engage in or tolerate acts of falsification, misrepresentation, or deception because such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Any violation of academic integrity will receive academic and possibly disciplinary sanctions, including the possible awarding of an XF grade which is recorded on the transcript and states that failure of the course was due to an act of academic dishonesty. All acts of academic dishonesty are recored so repeat offenders can be sanctioned accordingly.

MISBD 297A COURSE SCHEDULE*(Fall 2002)*

	Topic	Read/Quiz	Submit/Do
8/27	Course Review/Business Engineering	Introduction	
8/29	Lab Workshop - (meet @ N156)		Internet Research
9/3	ERP Basics		Reading Assignment #1 Due
9/5	Value Chain		HQ #1
9/5	Lab Workshop	Exercises	Lab Exercise #1 (SAP Navigation)
9/10	Case #1 Discussion		Case Study #1 Due
9/12	Value Chain		CQ #1 (Class Notes)
9/12	Lab Workshop	Exercises	Lab Exercise #2 (SAP Navigation)
9/17	Sales Logistics		Process Assignment #1 Due
9/19	Sales Logistics (cont'd)		HQ #2
9/19	Lab Workshop	Exercises	Lab Exercise #3 (Customer)
9/24	Sales Logistics and Customer Service		
9/26	Review Process Assignment Approaches		Process Assignment #2 Due
9/26	Lab Workshop	Exercises	Lab Exercise #4 (Sales Orders)
10/1	Sales Logistics (cont'd)		Reading Assignment #2 Due
10/3		Test #1	(Class notes, Home Quizzes)
10/3	Lab Workshop	Exercises	Lab Exercise #5
10/8	Case #2 Discussion		Review Test #1 Results and Case Study #2 Due
10/10	Presentation		Project #1
10/15	Fall Break		
10/17	Production Logistics		HQ #3
10/17	Lab Workshop		
10/22	Reading Assignment #3 and Case #3 Discussion		Reading Assignment #3 and Case Study #3 Due
10/24	Lab Workshop		Project #2
10/29	Process Assignment #3 Discussion		Process Assignment #3 Due
10/31	Lab Workshop		Project #3
11/5	Production Logistics (cont'd)		CQ #2
11/7	Guest Speaker		<i>ERP Speaker</i>
11/12	<i>Procurement Logistics</i>		HQ #4
11/14		Test #2	Class notes, Home Quizzes, Projects 1-3
11/19	<i>Review Test #2 Results Case #4 Discussion Procurement Logistics (cont'd)</i>		Case Study #4 Due
11/21	Presentation		Project #4 & Project 5
11/26	HR Business Process		HQ #5
11/28	Thanksgiving Holiday		
12/3	<i>HR Business Process (cont'd)</i>		
12/5	<i>Presentation</i>		Project #6 & Project 7
12/10	<i>HR Business Process (cont'd)</i>		CQ #3
12/12	Lab Final & Written Final		

ABOUT THE AUTHOR

Robert J. Nelson is a Lecturer in MIS and Computer Science at Penn State Erie. He holds an M.Ed. degree from Edinboro University. His research and teaching interests include systems analysis and Enterprise Resource Planning. Mr. Nelson previously held various MIS positions at Lord Corporation, a privately held corporation that designs, manufactures and markets chemical and mechanical products worldwide. While at Lord Corporation, his emphasis was in project management and corporate information technology strategic planning.

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