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# DEPLOYMENT OF BUSINESS TO BUSINESS SCENARIOS IN ERP EDUCATION: EVALUATION AND EXPERIENCES FROM AN INTERNATIONAL COLLABORATION

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## Abstract

*Collaboration between Universities has increased in an attempt to help curriculum stay abreast with the business of the 21<sup>st</sup> century. Many businesses have extended to an e-business world that is business to business process oriented, web-centric, and ERP driven. Developing effective collaborative methods that simulate this new process oriented e-business world remains a challenge. This paper presents a description of the collaboration and the preliminary evaluation results, in the form of students' feedback, of an international collaboration between two universities that address these issues of new e-centric business practices. The collaboration deploys a case scenario methodology that utilizes SAP R/3 and the web to link geographically dispersed students. A description of the collaborative method and a report on the lessons learned in deploying this type of collaboration is provided.*

**Keywords:** Enterprise resource planning, collaboration, inter-organizational processes, curriculum

## Introduction

For the past several decades, we have seen organizations on a global scale continue to streamline their business processes and extend their processes to an inter-organizational level enabled by web-centric enterprise resource planning (ERP) systems (The Economist, 1999). With this process-oriented e-business, relationships between organizations need to be established differently than traditional business (Ludwig and Whittingham, 1999). In fact the ability to collaborate between organizations may be as important as the ability to deploy appropriate technology in maintaining a competitive advantage (The Economist, 1999). As a result, ERP collaboration initiatives between universities have increased (Rosemann et al., 2000). The challenge remains in deploying effective collaboration methods not only between remote participants, but also those that focus on the design and implementation of a business to business processes enabled by an ERP system.

In developing inter-organizational process integration, Kalakota and Robinson (1999) discuss two implementation methods. The first method involves a shared process where both organizations are interdependent upon each other within the process. This method requires extensive collaboration among the organizations to ensure success. The second method is when each organization maintains their own independent process, designed to invoke each other's process when needed.

For our classes, we developed case scenarios utilizing the second method of independent processes allowing the universities to be autonomous. While this method requires a level of collaboration between the universities, it is not as intensive as the first method of a shared process. The collaboration needed to establish relationship necessary to ensure success for autonomous, peer organizations involve:

- Goal Orientation: Both organizations agree on the goal;
- Privacy: The ability to disclose information on process models or business information;
- Flexibility: The ability to change the process;
- Independence: The ability to stay independent of internal changes of the other organization (Ludwig and Whittingham, 1999).

In developing the case scenarios, we provided the students with the goal orientation description without providing them with the process solution. This goal orientation was developed jointly between the instructors of each university. Each university team represented a separate organization. The student teams were required to negotiate and implement privacy, flexibility, and independence during their collaboration and resulting process designs. This case scenario method of collaboration, allows the simulation of business to business process development between autonomous university class teams creating a type of supply chain.

The objective of this paper is to describe the deployment of an international collaboration between two universities, and present the evaluation results of students' perceived effectiveness of this collaboration in its ability to help students understand business to business issues. We provide a report on the lessons learned in deploying this type of collaboration, which may be beneficial for other universities.

## Collaboration Description

The two universities involved in the collaboration, began a relationship in 1998. The first collaboration occurred October through December 1999, the second collaboration occurred October through December 2000. This was the only time-frame that was feasible based on the semester schedules of the two universities. Each university already had established ERP-based courses utilizing SAP R/3. Similar courses between the two universities that focused on process modeling using SAP R/3 Business Workflow were targeted for the collaboration. The Goal of the collaboration was to expose students to the design of inter-organizational processes and the implementation of those processes within the construct of an enterprise system.

Initially one business to business case scenario was developed for the 1999 collaboration. Subsequently, four more scenarios were developed. Each of the cases were developed utilizing the method described in the prior section and represented typical business scenarios where the outsourcing of a portion of the business process was easily defined. Each university then assumed a role of either the customer or the provider where the provider represented the outsourcer (see Figure 1).

The resulting case scenarios included Help Desk, Loan Approval, Graphics Design, Insurance Claim, and Recruitment. In each case scenario the German University teams played the role of the outsourcing company and the U.S. teams played the role of the Client Enterprise.

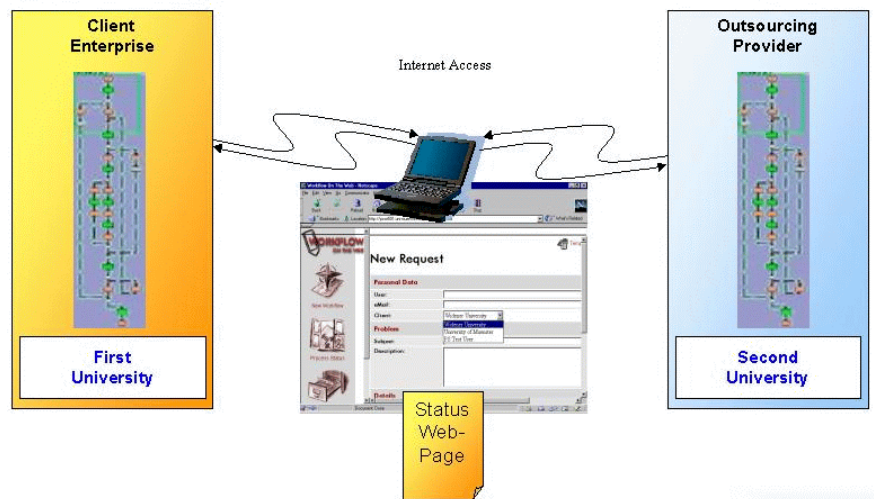


Figure 1. Basic Construct of Business to Business Case Scenarios

A business to business web site was developed for the students to utilize as an online forum for collaboration. Students were required to utilize this web site to establish contact with their virtual partners and negotiate process details. An example of the web site is shown in figure 2.

### First Collaboration

For the 1999 collaboration, there were 16 students from the U.S. university and 8 students from the German university who participated. Four cross-cultural teams were formed (students chose their own groups) where each team participated in the same help desk case scenario. Each team represented an autonomous set of organizations, one playing the role of the client enterprise, the other the role of the outsourcing enterprise. These students also utilized the global web-based discussion forum with the goal of resolving case questions and Business-to-business related issues. This forum was provided from a central web site that was available 24/7. Throughout the course, students from both Universities were required to participate in panel discussions.

**B2B Workflow Teams**

Team	Scenario	Posts	Replies	Last Post	Author
Team 1 - Insurance Claim	Discussion forum for the Insurance Claim scenario	2	2	October 31, 2000 07:27	
Team 2 - Helpdesk	Discussion forum for the Helpdesk scenario	6	7	November 27, 2000 00:48	
Team 3 - Graphics Design	Discussion forum for the Graphics Design scenario	7	21	November 18, 2000 23:26	Gerrit
Team 4 - Recruitment	Discussion forum for the Recruitment scenario	6	13	November 23, 2000 01:45	Martin
Team 5 - Loan Approval	Discussion forum for the Loan Approval scenario	6	8	November 28, 2000 15:23	

All times are GMT 1.  
 New Posts Since Your Last Visit  
 No New Posts Since Your Last Visit  
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**B2B-Workflow Discussion Forum - Netscape**

**B2B-Workflow**

Team 3 - Graphics Design (moderated by Gerrit)

[profile](#) | [register](#) | [preferences](#) | [faq](#) | [search](#)

New Topics: All registered users may post new topics in this forum.  
 Replies: All registered users may post replies in this forum.

Topic	Topic Starter	Replies	Last Post
<a href="#">project status</a>	Gerrit	2	November 18, 2000 23:26
<a href="#">Widener's team Request for Proposal Workflow</a>	Jeff	4	November 18, 2000 22:59
<a href="#">order specification</a>	Gerrit	3	November 09, 2000 20:19
<a href="#">meetings</a>	Gerrit	1	November 08, 2000 10:35
<a href="#">Welcome to party no. 3</a>	Gerrit	3	November 02, 2000 10:20
<a href="#">High Level Project Outline</a>	Paula	1	October 31, 2000 15:07
<a href="#">Widener Team's E-mail Addresses</a>	Jeff	0	October 28, 2000 19:06

Figure 2. Business-to-Business Web Site, Online Forum Exchange

The students from each participating University negotiated and resolved inter-organizational issues prior to implementing the desired business process in SAP R/3. Once the implementations were complete, student groups from each University posted their proposed business processes and powerpoint presentations on the web site, at which time the students were able to evaluate each other's process. This demonstrated how the collaboration worked and gave the students the opportunity to evaluate similarities and differences in approaches taken, and teach them how to handle the personal bias that affects reengineering efforts with multiple modelers from different backgrounds. At the end of the semester, each team presented their solutions.

### Extensions of the First Collaboration, the Second Project Collaboration

We learned from the first collaboration that the students expressed a preference of having the class teams work on different case scenarios. Therefore, the second class was once again divided into several autonomous teams with each team having a different scenario. It is important to note that the activities of the students were the same as the first collaboration. Initially there were 20 students from the U.S. university and 20 students from the German university participating in the collaboration. Early in the semester, one student from the U.S. withdrew from the course. The U.S. students formed 5 teams of 4 students each (one containing 3 students), and they randomly selected the case scenario to work on. The German students were given a choice of which scenario they wanted to work on, as a result there was an uneven amount of students working on each scenario, with one scenario having no German participants. This meant that the U.S. team working on that scenario had to design their solution based on assumptions.

Collaboration between remote participants can introduce challenges of building trust without a face-to-face interaction (Jarvenpaa, Knoll and Leidner, 1998), in addition there are global challenges of varied time-zones and language differences. With this in mind, we surveyed the students at the completion of the first pilot asking if the use of some type of video-conferencing would enhance the collaboration. 9.1% felt it would not be useful at all; 9.1% felt it probably wouldn't be useful; 18.2% were neutral; 63.6% felt it may be helpful, and no-one felt strongly that it would help. As a result, we introduced additional face-to-face features in the fall 2000 collaboration. The Professor from the German class visited the U.S. class for the first two weeks of the semester, thereby establishing a face-to-face relationship with the students. In addition, the students were provided access to a computer with video-conferencing capability during their projects. At the end of the fall 2000 course, 18.8% of the students felt these face-to-face features did not improve their perception of the collaboration relationship; 18.8% were neutral; 37.5% felt it made some influence toward a positive relationship with the German team; and 25% strongly agreed it made a difference. However, it is important to note that the students rarely utilized the equipment provided, therefore one can only speculate that the presence of the German instructor and the availability of the video-conferencing equipment were the only factors considered when the students answered this question.

## Student's Feedback

To evaluate the students' perceptions of the international collaboration, a survey was conducted at the conclusion of the courses. The questionnaire was distributed in the classroom for the U.S. students and was distributed via email to the German students. Note that at the time of writing of this paper, the second German Class had not concluded, therefore these preliminary results only represent the U.S. students' feedback. Out of the 18 students in the U.S. fall 1999 class, only 11 surveys were usable. Among the U.S. fall 2000 class, all 19 survey were filled out correctly, however, 3 had to be thrown out for the interaction portion due to no interaction by that group, leaving 16 usable surveys for the interaction portion. The purpose of the survey was to solicit students' opinions concerning the following research questions:

Q1: Is the use of case scenarios as a collaborative method effective in increasing the students' perceived understanding of business to business issues? What issues were (were not) perceived to be enhanced by the collaboration?

Q2: Would the students recommend using this type of collaborative method again for other classes?

## Findings

The raw data, gathered from the 27 students, were analyzed using SPSS™. From the initial analysis of the combined classes, the data shows that a majority of the students feel they benefited from the joint venture (59.2%) and also feel not only should the collaborative method be used again for similar or other classes (59.2%), but SAP R/3 should also be used between the universities (59.2%). A majority of the students felt that their learning was enhanced by the collaboration method :

- 7.7% of the subjects agreed that the business to business web forum was advantageous for simulating B2B commerce.
- 2.9% of the subjects agreed that the business to business web forum was advantageous for understanding process modeling.
- 4% of the subjects agreed that the business to business web forum was advantageous for collaborating on similar projects.

Table 1 shows the detailed percentages of the responses of each category from strongly disagree to strongly agree.

We also wanted to know if there were any significant differences between student demographics, interaction level, type of scenario, and the student responses. The first analysis of student demographics (age, major, gender) and student responses showed no significance.

The second analysis involved an interaction level that was derived from the amount of postings and emails each group and student participated in during the collaboration. The level categories ranged from no interaction to extensive interaction. There was no significant difference found between interaction level and the student overall responses, however there was an indication of difference in the student responses, (A), (G), and (I) between interaction levels but only for the first collaboration (F1999), not the second (F2000). Table 2 show the means of the students' responses for each of the interaction levels.

All three of these responses might suggest that that the more interaction a student had during the collaboration, the higher the students' perception of understanding business to business issues. When looking at the resulting means, the perceived understanding of business to business issues increases as the level of interaction increases. This would suggest that by encouraging more interaction the students would feel more satisfied with the collaboration. This is what we would expect from all the collaborative sessions, however the fact that it only was significant for a few items within only one collaboration group does not verify the assumption.

Lastly, we wanted to see if the students' perception of effectiveness of the collaboration differed among various business scenarios conducted in the F2000 collaboration session. As previously stated, the first collaboration in Fall 1999 was based upon one business to business scenario, the help desk scenario. In the Fall 2000 collaboration, the students were divided into five groups, each group working on a different scenario during the collaboration. The analysis between the scenarios and the students' responses indicated differences between the scenarios and four of the student. The four responses are as follows:

- "The business to business site is advantageous for process modeling".
- "In the future, the business to business site should be used in other classes".
- "In the future, the business to business site should be utilized the same way without additions".
- "I see the benefit from the joint venture".

Table 3 shows the means of the response item within each scenario. Notice that there are no means for the Insurance Claim scenario. This is the scenario group that did not have German participants.

**Table 1. Percentage of All Students Reporting Their Perceptions of the Collaboration**

Item	N	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean	Std. Dev
(A) The interaction between the universities added to my understanding of B2B issues.	27	11.1%	22.2%	25.9%	22.2%	18.5%	3.15	1.29
(B) I was not clear on what B2B Workflow and the B2B interaction helped me to clarify issues.	27	0%	29.6%	29.6%	33.3%	7.4%	3.19	.96
(C) The B2B site is advantageous for simulating B2B commerce.	27	0%	3.7%	18.5%	48.1%	29.6%	4.04	.81
(D) The B2B site is advantageous for understanding international issues.	27	0%	33.3%	22.2%	25.9%	18.5%	3.30	1.14
(E) The B2B site is advantageous for understanding process modeling.	27	3.7%	11.1%	22.2%	44.4%	18.5%	3.63	1.04
(F) The b2b site is advantageous for collaborating on similar projects.	27	0%	7.4%	18.5%	44.4%	29.6%	3.96	.90
(G) In the future, the b2b site should be used in other classes.	27	3.7%	11.1%	25.9%	25.9%	33.3%	3.74	1.16
(H) In the future, the b2b site should be utilized the same way without additions.	27	14.8%	18.5%	25.9%	37.0%	3.7%	2.96	1.16
(I) I see a benefit from the joint venture.	27	11.1%	11.1%	18.5%	33.3%	25.9%	3.52	1.31
(J) SAP R/3 should be utilized between the universities on this B2B sites.	27	11.1%	7.4%	22.2%	29.6%	29.6%	3.59	1.31

**Table 2. Analysis of Variance Between Interaction Level and Student Responses for Students in F1999 Only**

Item	N	F	Sig.	Mean of Response Item for each Interaction Level				
				No Interaction	Little Interaction	Average Interaction	Above Average	Extensive Interaction
(A) The interaction between the universities added to my understanding of B2B issues.	11	4.137	.05	0	1.00	2.67	3.80	4.50
(G) In the future, the b2b site should be used in other classes.	11	4.866	.039	0	2.00	3.00	4.20	4.50
(I) I see a benefit from the joint venture.	11	7.87	.012	0	1.00	3.33	4.40	5.00

These results indicate that the loan approval and graphic design scenarios gave the students a better understanding and appreciation of the collaboration. Perhaps these results may suggest that there are possibly some scenarios that are better suited for representing process models. However, when you look at the results from the fall 1999 group for the help desk scenario and compare that to the fall 2000 help desk scenario group, the results are very different (see table 4). Therefore, it is difficult to conclude that there's any real difference between scenarios and student perceptions. Perhaps additional studies will help clarify this issue.

## Discussion and Lessons Learned

The collaboration provided the students an opportunity to experience international collaboration in a real-world setting and also enhanced the universities' capabilities of distant learning and teaching techniques. The survey results indicate that the U.S. students had an overall positive experience with the collaboration method of case scenarios, and did perceive the collaboration assisted in learning various business to business issues. The German student data needs to be analyzed to determine if they had similar experiences.

**Table 3. Analysis of Variance Between Scenarios and Student Responses for Students in Fall 2000 Only**

Item	N	F	Sig.	Mean of Response Item for each Scenario				
				Insurance Claim	Help Desk	Graphics Design	Recruitment	Loan Approval
(E) The B2B site is advantageous for understanding process modeling.	16	5.398	.012	----	2.00	3.00	4.00	4.25
(G) In the future, the b2b site should be used in other classes.	16	4.301	.025	-----	2.00	3.50	4.00	4.75
(H) In the future, the b2b site should be utilized the same way without additions.	16	5.575	.011	-----	1.67	2.75	3.75	3.75
(I) I see a benefit from the joint venture.	16	5.107	.014	-----	2.00	2.50	3.25	4.50

**Table 4. Comparison of Help Desk Scenario Results for Selected Student Responses Between Both Classes**

Item	N	Mean of Help Desk Scenario (F1999)	Mean of Help Desk Scenario (F2000)
(E) The B2B site is advantageous for understanding process modeling.	11	3.94	2.00
(G) In the future, the b2b site should be used in other classes.	11	3.75	2.00
(H) In the future, the b2b site should be utilized the same way without additions.	11	2.94	1.67
(I) I see a benefit from the joint venture.	11	3.25	2.00

The case scenarios that were developed utilized the concept of outsourcing portions of the business process, thereby allowing each university to remain autonomous and their processes to be independent of their partner. This in turn provided an effective collaboration method between remote participants that permitted the students to focus on the design and implementation of a business to business processes enabled by an ERP system.

This collaboration initiative had some difficulties that should be noted. The classes utilized the web to simulate business process integration across company boundaries by exchanging transactions between universities based on open interface standards. These standards had to be developed and were very complex. The German teams were successful in developing XML interfaces, where the U.S. team struggled with developing web interfaces for SAP R/3 utilizing the ITS transaction server. Developing the platform that allows the direct data exchange between the two individual SAP R/3 systems was a difficult task, and required extensive learning on the part of the instructor.

In the future, it would be interesting to compare the XML based web environment to the pure SAP R/3 interface. In addition, we are exploring the use of an ERP portal, such as MySAP.com, to create a learning community and platform for the scenarios. This would provide the capability of multiple Universities to collaborate and simulate a B2B process-oriented environment without pre-defined collaboration plans. We would also like to extend each scenario to include a third University to play an additional role of a supplier. The current outsourcing scenario lends itself to extension possibilities for all partners involved.

This joint venture has already given the participating students the opportunity to utilize state-of-the-art technology in addition to obtaining experience on an international level. Future collaboration promises to simulate the new e-enterprise environment, enabling these Universities to embrace the business challenges of the 21<sup>st</sup> century. As organizations continue to increase interactions with other organizations on an e-business level, universities need to continue to create learning environments that reflect this evolving business practice.

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