Using CSCW Technology to Connect Classrooms

Amita Goyal, Ph.D.
Department of Information
 Systems, School of Business
Virginia Commonwealth
 University
Richmond, VA 23284-4000
email: amita@cabell.vcu.edu

Alka R. Harriger
Computer (Information
 Systems) Technology
 Department
Knoy Hall of Technology
Purdue University
West Lafayette, IN 47907-1421
email:
 harriger@vm.cc.purdue.edu

ABSTRACT: This paper describes the details and results of a pilot study in which students at two geographically dispersed institutions of higher education were linked together using communication technologies and the Internet. Experiments were designed to require student groups at both universities to collaborate locally and with their remote partners using electronic mail, the Internet, and other computing technologies to output joint solutions to class assignments. The successful results of these Computer Supported Cooperative Work (CSCW) experiments suggest future implementations of similar inter- and intra-university projects will enhance the quality of IS education, benefiting both students and prospective employers.

KEYWORDS: *CSCW, Email, Internet, Student Projects, Teamwork*

INTRODUCTION

To remain competitive and function efficiently in today's global marketplace, organizations are upgrading their processes to capitalize on state-of-the-art computer and communication technologies. Due to the complex and inhibiting nature of technology, a wide gulf exists between intellectual learning of how to use technology and practical learning of applying technology to the point of functionality and efficiency. Educators have the responsibility of exploiting information systems technology to create opportunities and design exercises which simulate real-world organizational processes that provide students with hands-on experience using technology efficiently and effectively. Institutions of higher education bear the responsibility of preparing students to not only function in this environment, but also to master the skills to be able to compete for the best jobs in the competitive information technology field. Therefore, educators must meticulously design exercises, projects, and simulations which support intellectual and practical learning experiences.

Computer Supported Cooperative Work (CSCW) is one example of a state-of-art technology that is currently being implemented in most business organizations, but is not being taught in a practical manner in most universities. Research and experimentation in CSCW technologies has primarily been conducted in business communities; higher education has participated in CSCW research, but only to explore the role of CSCW in business organizations. CSCW technologies utilize networking, communication, concurrent processing, and windowing environments (Grudin, 1991) to support people working together in local and geographically dispersed groups. CSCW has 2 main components (Wilson, 1991):

1. underlying technologies, including communication systems, shared work space facilities, shared infor-

mation facilities, and group activity support facilities; and

group process issues, including individual aspects, organizational aspects, group work design aspects, and group dynamic aspects.

CSCW exercises can be complex ideavors using distributed process-g and expensive group work soft-are, or they can be relatively rudientary projects which link geoaphically dispersed individuals via e Internet. In this paper, CSCW fers to all schemes which employ mputer technologies to allow two more participants to collaborate on oint venture.

n order to properly prepare stunts for the job market, educators ust introduce this technology into e classroom. The specific purposes this paper are: (1) to describe a CW Project which exploits current mmunication technologies to npower students and to provide m with hands-on information techlogy experience, (2) to present spec implementation details so as to se the efforts of future adopters of e CSCW Project, (3) to present the sults of a pilot implementation of e CSCW Project at two geographilly dispersed universities, (4) to disss the unique benefits that implementation of the CSCW Project proles to the students and prospective iployers, and (5) to list pitfalls that n be avoided in future implementans of the CSCW Project. rthermore, we show that the CSCW ject is versatile and simple enough be implemented in introductory as ll as advanced classes, and in urses inside or outside of the infortion technology discipline.

NIQUENESS OF APPROACH

his approach is unique in that it velops a comprehensive learning perience which includes intellectual ucation and practical application of te-of-the-art communication techlogies. Additionally, this approach

extends beyond the traditional scope of one classroom, one institution to that of a global education environment — creating a sense of a virtual educational community. Functioning successfully in this extended classroom gives students the skills and confidence to function in today's global business environments.

LEVEL OF STUDENTS

Students at two geographically dispersed universities participated in a pilot implementation of the CSCW Project. Students at Purdue University (PU) were manufacturing students in their junior or senior year while students at Virginia Commonwealth University (VCU) were junior business majors. The majority of the participants were "normal" college students, who were familiar with information technology, but were not experts in computing. A preimplementation skills assessment and background survey was conducted to ascertain the homogeneity of the sample population. (A copy of the survey instrument may be requested from the authors.) Table 1 shows that most students had begun to develop at least amateur-level literacy in information technology.

TABLE 1: IS/IT Literacy		
IT/IS Level	PU (%)	VCU (%)
Advanced	11.76	0
Average	58.82	36.36
Amateur	23.53	30.30
Novice	5.88	27.27
No response	0	6.06

IMPLEMENTATION DETAILS

All students at both universities were given an individual electronic mail (Email) account ID and password. The students were instructed on Email usage during class meetings and given handouts to abet their learning efforts. They were also encouraged to establish mail aliases to simplify electronic correspondence and were required to practice send-

ing Email to their local and remote groups and instructors. Outside of class meetings, all students were given access to computer labs equipped with Email capabilities and Internet connections. Some students also used a modem and communication software to dial into the campus machines from home.

Six "CSCW Groups" were formed. Each CSCW Group consisted of 3 members from PU and 5 members from VCU. To facilitate interaction, a reference sheet with the names and Email addresses of all student groups and both instructors (local and remote) was distributed to all participants. All CSCW groups were assigned two Inter/IntraUniversity Group Collaborative assignments. The assignments created hypothetical scenarios which could only be resolved through computer mediated communication and interaction, and information exchange between the local and remote group members. To alleviate the common problem of unequal contribution to the group effort from each group member, both groups were required to give a quality resource rating to their remote partners and group contribution rating to their local partners. The final grade was computed as a weighted average of the local group's final report, the individual student's group contribution rating, and the individual student's remote quality resource rating.

HANDS-ON ASSIGNMENTS

Two hands-on exercises requiring utilization of information technologies were assigned to the CSCW Groups. (A copy of the assignments may be requested from the authors.) The purpose of the first project was to introduce the students to the technologies and to require heavy electronic communication exchange. The purpose of the second exercise was to compel the students to further explore and navigate the Internet, becoming knowledgeable and savvy of the vast resources available.

Assignment #1

The first assignment was discussed and distributed within the first five weeks. At this time, there was wide disparity in the specific MIS concepts covered at the two universities (due to unique topic outlines). To develop an assignment that required frequent electronic communication with remote partners, the task had to take advantage of each site's unique knowledge. Since one important difference across the two sites was the major field of study (manufacturing versus business), a hypothetical scenario to aid in job hunting was devised. One of the greatest challenges students face during job hunting is defining exactly what skills they have and what job markets are most suitable to their background and career goals. Therefore, the first assignment was designed for the students to hone in on their abilities and marketable skills which would allow them to gain suitable employment.

Each local group had to educate their remote partners about their field of study, suitable job possibilities, and potential hiring organizations. The remote group, in turn, would investigate the available employment and educational opportunities for their counterparts. Email was used to exchange questions and answers throughout the project until both sites had enough information to make an appropriate recommendation. In cases where the local group did a good job of educating their remote partners about their major, they received sufficient, relevant information to make the best decision. In other cases, the remote groups did not understand the major sufficiently, and as a result, sent irrelevant information. When evaluating the written project reports, it was important to review all of the communication on both sides to determine whether each side performed the best possible given the information received from their partners. Any potential problems were identified, so that the

groups could improve their results on the second assignment.

Assignment #2

After conquering the hurdles of computer mediated communication using Email and limited CSCW, the students embarked on an Internet exploration and navigation assignment requiring a high degree of CSCW. The students were given a number of questions which when compiled constituted an "Internet Treasure Hunt". The CSCW Groups were required to research the questions both using traditional library research methods and electronic methods, specifically the Information Superhighway. This project gave the students the opportunity to not only navigate the Internet, but also to compare the quality and expediency of traditional and electronic research methods. Before beginning the Hunt, the groups had to consult with each other to divide up the responsibilities of the Hunt, set intermediate deadlines, develop a plan of action, etc. The students also exchanged word-processed documents over the Internet using the uuencode and uudecode utilities.

ROLE OF INFORMATION TECHNOLOGY AND ELECTRONIC COMMUNICATION

Information technology and electronic communication played a vital role in the CSCW Project, in the absence of which, the project could not have been implemented. The telephone and postal systems could not sufficiently have met the needs of the students.

Students used electronic communication and the Internet to communicate with members of their local groups, members of their remote group, and with the local and remote instructors. The instructors monitored all electronic project-related communication, intervening and advising groups if they went astray. Electronic communication provided several benefits: (1) a written log of dialogue,

agreements, progress, etc. was maintained and available, (2) group members could read and process Email at their own convenience, (3) group members (local and remote) did not have to consult all schedules and meet at a mutually convenient time in order to make progress on the assignments, (4) since students were required to carbon copy (CC:) both faculty on project-related correspondence, faculty could facilitate and advise students as necessary, and (5) students could communicate with both faculty via Email, even outside of the established office hours.

RESULTS

Although formal results have not yet been compiled, student comments and responses to course evaluations clearly favor future implementations of CSCW projects. However, a number of obstacles and difficulties were encountered during the pilot implementation. For example, students concerns and pitfalls encountered include:

- The different course structures at the universities. While students at PU could take advantage of the lab segment of their course, students at VCU had to use the lab outside of class time. The course structure at VCU allowed students to meet only for lectures.

- The level of confidence in using the technology differed at the two sites, but the demands of the assignment limited sympathy for partners who did not supply the needed information in a timely manner.

- The expectations of remote partners at each site were higher than the quality of information provided to the remote partners, resulting in frustration for some groups.

- The classes at PU and VCU met on different days. Because most students processed their Email before and after the class meeting times, meeting on different days of the week sometimes deterred expedient communications.

- The holiday breaks were somewhat different. This introduced some lag in information exchange, causing some frustration to the students.

- The file exchange and Email systems differed significantly between the universities. Hence, students could not advise members of their remote groups with specific instructions on system usage.
- The two sites had not standardized on word processors or even microcomputers, resulting in compatibility problems exchanging report elements across sites.

To reduce the levels of frustration, the instructors maintained flexibility in terms of submission requirements, deadlines, etc. In spite of the above impediments, the students felt the CSCW Project was a worthwhile undertaking and felt the projects should continue to be implemented in future courses. All students felt electronic communication and CSCW were the wave of the future and the skills they developed in the CSCW Project would provide them an edge when searching for employment.

SUMMARY AND CONCLUSION

In order to produce employees suitable for today's workforce, institutions of higher education must empower students with the skills and experience to function in a high-tech environment. Because CSCW is a vital technology for the effective exchange of information between geographically dispersed individuals, this paper details the incorporation of a CSCW Project into the coursework. The results of a pilot implementation of the project have been discussed. The simplicity of the project, the ready availability of the necessary communications technology, the increased reliance on global communications, and the proven ability of non-technology oriented students to become able participants, all suggest that future implementations of the CSCW Project are necessary for benefiting prospective employers and further enhancing the quality of higher education.
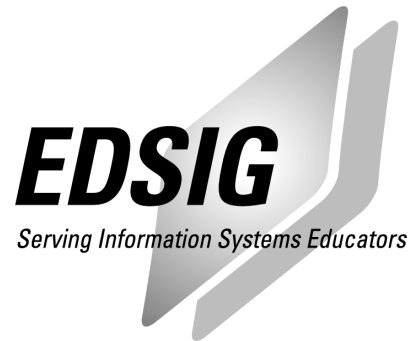
AUTHORS' BIOGRAPHIES

Dr. Amita Goyal is an Assistant Professor in the Information Systems Department at Virginia Commonwealth University. She received her B.S. in computer science and M.S. and Ph.D. in information systems, all from The University of Maryland at College Park. Her research interests include distributed database systems and multimedia and curricula integration. Dr. Goyal is a member of the Association of NeXTSTEP Developers, Inc. (ANDI).

Alka Harriger is a Professor in the Computer (Information Systems) Technology Department at Purdue University, where she has taught courses in expert systems, pc literacy, structured programming, reporting and documentation techniques, and information technology for the past twelve years. She received a B.S. in math and computer science and a B.A. in mathematics from California University of Pennsylvania, as well as an M.S. in computer science from Purdue University. Prof. Harriger served as the former six-year and founding editor of the Journal of Information Systems Education, as well as the program chair for EDSIG's first Information Systems Educators Conference (ISEC 1994).

REFERENCES

Clement, A. (1990). Cooperative Support for Computer Work: A Social Perspective on the Empowering of End Users. *Proceedings of the Conference on Computer-Supported Cooperative Work*, 223-236.

Dix, J. (1994). Teaming with Technology. *Network World*, 11, SS8-SS16.

Galegher, J., Kraut, R.E., & Mogensen, P. (1993). CSCW Challenges: Cooperative Design in Engineering Projects. *Communications of the ACM, 36*(6), 67-77.

Grudin, J. (1991). CSCW Introduction. *Communications of the ACM, 34*(12), 30-34.

Harriger, A., Al-Dhelaan, & Agrawal, J.C. (1993). International Team Teaching Using Long Haul Networks. *Proceedings of the 1993 Problem Solving Across the Curriculum Conference*, 43-50.

Kling, R. (1991). Cooperation, Coordination and Control in Computer-Supported Work. *Communications of the ACM, 34*(12), 83-88.

Straus, S. & McGrath, J. (1994). Does the Medium Matter? The Interaction of Task Type and Technology on Group Performance and Member Reactions. *Journal of Applied Psychology, 79*, 87-97.

Wilson, P. (1991). Computer Supported Cooperative Work (CSCW): Origins, Concepts and Research Initiatives. *Computer Networks & ISDN Systems, 23*, 91-95.

Information Systems & Computing
Academic Professionals

Serving Information Systems Educators

STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.