The Impact of Coordination Methods on the Enhancement of Business Writing

Edmund Prater
Department of Information Systems and Operations Management, University of Texas at Arlington, Box 19437, Arlington, TX 76019, e-mail: eprater@uta.edu

Hyeun-Suk Rhee
School of Management, University of Texas at Dallas, Richardson, TX 75088, e-mail: suerhee@utdallas.edu

ABSTRACT

Universities with limited resources are being pressured to cover more material within their degree programs. Because of this, schools are looking to integrate material from different classes. This paper sets out to determine if students can learn business writing within the context of another class, specifically, an information systems class. The goal is to eliminate the need for a separate business-writing course. However, the students will have to learn the material with limited support in order not to place an additional load on the instructor. This study investigates whether individuals can develop their business-writing skills during the course of repeated group work and whether there are differences in the level of their learning, based on collaborative media. The results show that individuals can learn business-writing skills with a minimum of support through direct instruction. In addition, there is no difference between individuals working in face-to-face (F2F) groups and those working in groups using electronic collaborative work (ECW) systems.

Subject Areas: Business Writing, Collaborative Work, Distance Learning, Electronic Collaborative Work, and Information Systems.

INTRODUCTION

The goal of any university is to pass on the knowledge students need to prepare for the working world; however, while the writing skill of new hires is critical to business success (Friday, 1986), many university business-writing classes have had to be eliminated due to limited resources, etc. Therefore, it is of interest to universities whether business-writing skills can be incorporated within a classroom setting, thus allowing them to forgo a separate business-writing class. This question is what stimulates our study into whether teaching business-writing skills can be incorporated into technical classes. Specifically, we find that students can be taught these skills in the context of learning other information.

Traditionally, students have learned material in a face-to-face (F2F) environment, in which they physically interact with professors and group members directly. However, with the advent of the Internet and the Web, more students
are working and learning in an electronic collaborative work (ECW) environment using various computer-based tools such as e-mail, WebCT, Microsoft NetMeeting, and Lotus Notes. In an ECW environment, physical meetings are no longer necessary and students can collaborate without ever meeting each other in person. Of course, this raises the question as to whether one type of environment is more conducive to learning than another. There are many studies in education and information sciences that investigate online learning environments (Haythornthwaite, Kazmer, & Robins, 2000) and the effectiveness of computer-mediated groups with problem-solving tasks (Jonasson & Kwon, 2001). There is also a wealth of research on the impact of electronic systems on group communication (Kraut, Galagher, & Egido, 1987; Laughlin, Chandler, Shupe, Magley, & Hulbert, 1995; Valacich & Schwenk, 1995) and organizational performance (Daft & Macintosh, 1981; Daft & Lengel, 1986). However, there is little study that investigates what effects electronic systems have on individual group members’ learning of business-writing tasks. We are conducting this research to fill this gap. The first objective of this research is to determine if students can learn business-writing skills in the context of another class. The second objective is to investigate how the two different group coordination methods (F2F and ECW) impact the ability of individual group members to learn and improve their business-writing skills.

In the following sections we develop the theoretical foundations for our research hypotheses. We will then discuss our research method and our findings. The discussion of these findings leads us to our final conclusions. The overall goal was to find if business writing can truly be taught within the context of other academic courses.

THEORETICAL FOUNDATION AND RESEARCH HYPOTHESES

Collaborative Learning

Over the years, a number of theories have been proposed to explain how individuals learn. Behaviorists look at learning from the perspective of a change in observable behavior. Cognitive theorists focus on the “acquisition of knowledge and skills” and the “processing of information and beliefs” (Shunk, 2000, p. 1). More recently, learning theory has focused on determining the memory and structure of knowledge, the analysis of problem solving and reasoning, metacognitive skills, and cultural experience and a learner’s participation in the community (Bransford, Brown, & Cocking, 1999). Social-context learning theories involve the notion that people learn from “observing the behavior of others and the social consequences of those actions” (Gredler, 1997, p. 275). Both of these models point out the effectiveness of collaborative learning (Woods, 1993).

Collaborative learning refers to a situation in which groups of learners work jointly to understand some issue (Bruffee, 1999). Research on collaborative learning has been going on for nearly 25 years (Vygotsky, 1978). This research has shown that individuals learn well in a collaborative or group setting (Brown & Palincsar, 1989; Roschelle, 1992; Scardamalia & Bereiter, 1991). There are three main reasons for this. First, all individuals are actively working to achieve a goal. Secondly, when working with others, individuals receive support and positive motivation, as well as being introduced to different ideas and views. Finally, in collaborative
learning, the group is solving a problem. This forces them to build and transform various mental models to reach a solution. The bottom line is that through the use of collaborative group work, students should be able to learn business-writing skills. The key issue is what type of instruction will be needed. Therefore, we propose Hypothesis 1.

**Hypothesis 1:** With minimal instruction, individuals working in both ECW and F2F environments will significantly improve their business-writing skills.

**The Impact of Communication Media on Technical Subjects**

Contingency theory suggests that certain types of tasks are more suited to face-to-face (F2F) communication, while others are more suited to computer-mediated communication (McGrath & Hollingshead, 1993). For example, it is argued that face-to-face (F2F) communication is the most suitable communication medium for detailed collaborative work (Horton, Rogers, Austin, Brimm, & McCormick, 1991; Trevino, Lengel, & Daft, 1987). In addition, contingency theory predicts that using computer-mediated communication to accomplish complex collaborative work will be more difficult, especially for tasks that require interactive, expressive communication (Galagher & Kraut, 1994). Collaborative business writing requires group members to address a technical topic. The group must plan how to deal with the issues involved, address the problems in the task, negotiate disagreements, and decide on a course of action. Therefore, these tasks are complex and potentially difficult. Thus, we might expect the research to show that F2F work is more appropriate for this type of work. However, the literature is not totally clear on this issue.

Studies on the impact of communication media on collaborative work do report that ECW technologies alter group members’ interaction styles and media choice. ECW also impacts group members’ perceptions of their work and of other group members. Horton et al. (1991) found that groups in an electronically supported meeting room do less initial group planning, more individual work, and more revising than groups in a face-to-face meeting environment. However, while this affected their consensus-reaching processes, the technology did not affect overall document quality. These findings are supported by studies done by Jonasson and Kwon (2001).

Galagher and Kraut (1994) found that although the communication modality did not affect project performance, being restricted to computer-mediated communication made completing the work more difficult. It also diminished the participants’ satisfaction with their own work and with the other members of their groups.

Kraut, Galagher, Fish, and Chalfonte (1992) reported that media choice was a function of a task’s characteristics. For example, in highly equivocal tasks, such as planning and revising manuscripts, the students chose rich media. However, less equivocal tasks such as drafting or the actual revisions were more likely to be done using less rich (i.e., ECW) media. These results loosely support contingency theory. That is, a rich medium is appropriate for communication about uncertain and equivocal tasks.

To add one more element of ambiguity, another study (Valacich, Paranka, George, & Nunamaker, 1993) found evidence that computer-mediated and
Impact of Coordination Methods on Business Writing

distributed group members remained more task-focused than face-to-face groups that spent more time on social and non-task-related comments. Also, Valacich and Schwenk (1995) found some support for the idea that ECW groups consider more alternative solutions than F2F groups. This in turn leads to higher-quality solutions.

Applying this to our research, traditional learning theory supports the idea that the individuals in groups meeting F2F should be in the best environment to adapt to their individual learning traits. Compared to ECW, this is a more flexible and adaptive environment, allowing individuals to leverage their particular learning strengths. This would lead us to argue that individuals meeting F2F should outperform those using ECW with respect to individual learning of business-writing skills. However, that is not necessarily supported by studies of the impact of coordination media on the quality of business writing. The literature shows that the coordination media do not have different effects on the outcome of business writing. Because of this lack of consensus, we propose the following:

**Hypothesis 2:** The degree of performance improvements (in terms of business-writing skills) of group members meeting F2F will not be significantly different than the performance improvements in group members using ECW.

**RESEARCH METHODOLOGY**

**Teaching Method**

The teaching methodology we chose to use was a combination of direct instruction and group interaction. Specifically, during an Information Systems class, five business cases were assigned to be analyzed and written up in a business format. The class activities consisted of the analysis of five cases. The first case was given on the first day of class and each student completed it individually. This was the benchmark against which further results were compared. No instruction was given on how to write the case. All that was requested was that students write the case based on what they believed was a business format. This case was used as the baseline to determine the student’s initial writing skills.

Each initial case was returned with copious notes on the business-writing issues that were missed. On the day they were returned, one hour of instruction was given on business writing. These notes were available via the Web. The notes outlined the main issues of business writing and gave an example of a well-written document. The notes reflected basic material that can be obtained from any book or class on business writing.

During the quarter, three cases were worked on by groups of three to six students. In order to model a business environment, randomly assigned groups were used for three technical write-ups (Table 1). This simulates how businesses group employees together for limited projects and then disband them.

**Table 1:** Assigned case design structure.

<table>
<thead>
<tr>
<th>Benchmark Case</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Final Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>(individual)</td>
<td>(group)</td>
<td>(group)</td>
<td>(group)</td>
<td>(individual)</td>
</tr>
</tbody>
</table>
The initial case given on the first day was the same for each class. For the group cases, each case modeled a particular business-writing situation.

- Group Case 1—Addressed strategic issues (writing to a company CEO)
- Group Case 2—Addressed tactical issues (writing to a division president)
- Group Case 3—Addressed operational issues (writing to a department head)

Although the cases themselves change over the quarters, the issues stay the same.

Each case was graded as the sum of two letter grades. One grade assessed the technical competence of the paper; the second grade was for the business-writing capability of the paper. Both these grades were given by the instructor, not by the business-writing specialists discussed in the Assessment of Business Writing section. Again, each case was returned with notes from the instructor. The cases were reviewed on the days that they were returned. The review focused on the technical issues of each case, but a few minutes were taken during class to address business-writing issues that the students seemed to be missing. However, no further detailed instruction on business writing was given.

Finally, at the end of the quarter, as part of the 3-hour final exam, the students were given a case study. The write-up for this final case served as the comparison to the benchmark to determine whether the individual students had learned the requisite business-writing skills (refer to Table 1).

**Group Composition**

The data were gathered in two junior-level undergraduate Information Technology Management classes during the academic school year. The two classes had similar compositions and were taught by the same instructor. Management majors comprised the bulk of the students. Other majors such as engineering were present but comprised a minority of the students (refer to Table 2). The first numbers represent the students at the beginning of class. The numbers in parentheses represent the class distribution at the end of class. Due to the statistical similarity in class composition both at the beginning and end of the term, there is no skewed class composition that might impact the results of any comparison.

During the spring quarter class, the groups were randomly assigned. These groups met face-to-face (F2F), without the use of electronic communication media. Each group was allowed to choose its own group leader and set up its own structure for finishing the assigned tasks. This provided a baseline for measuring F2F interaction. In talking with the students, we did find that a few members in two of the groups used e-mail to communicate and pass information. However, this was actually done quite sparingly, since students preferred to meet F2F at the end of class. The fact that students preferred not to use e-mail is an interesting point that may warrant more research.

The next class (fall) used only computer-based electronic media for their group projects (class instruction was still done in a traditional F2F environment). All groups were randomly assigned for each case. The members of the group interacted electronically using the CALVIN (Collaborative Assignment Laboratory: Virtual Interaction System) tool (refer to the next section). This tool models decentralized business interaction. Only the group leader knew who the
Table 2: Student composition of classes (beginning and ending of class term).

<table>
<thead>
<tr>
<th></th>
<th>Spring–F2F Interaction</th>
<th>Fall–ECW Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>47 (26)</td>
<td>43 (30)</td>
</tr>
<tr>
<td>Management Science</td>
<td>2 (1)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Building Construction/Architecture</td>
<td>2 (1)</td>
<td>8 (5)</td>
</tr>
<tr>
<td>Engineering Disciplines</td>
<td>3 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Total</td>
<td>56 (31)</td>
<td>54 (38)</td>
</tr>
</tbody>
</table>

other members of the group were. These arrangements modeled a business environment where group members may be separated by a large distance and may never have the opportunity to meet. While it was possible that students could determine who was in each group and then meet F2F, only one of the groups admitted that they had done it, and then only for one meeting between a few of the members of the group.

**Group Coordination**

For the ECW groups, a system called CALVIN (Collaborative Assignment Laboratory: Virtual Interaction System) was used to provide a communication channel for distributed group members. Its features include a basic editor, computer-mediated communication, and a public bulletin board. CALVIN replaces the conventional forms of group interaction (i.e., face-to-face meeting) with computer-mediated interaction. This system was used in several classes at Georgia Tech to manage group projects assigned for these classes. CALVIN uses asynchronous communication.

CALVIN is accessible through terminals on campus and remotely through dial-in lines. The instructor uploads the cases to be worked on by the class. This allows students to access the cases electronically. The system randomly assigns group members for each case and gives out the assignment. For each case, a student is either a group leader or a critiquer. The group leader develops the initial draft. In our classes, CALVIN was set up to require that each student be a group leader at least once. The system is set up so that at a release time (set up by the instructor) students can view the case. When they view the case, they are also shown what their assignment is (drafter or critiquer) and when it is due. The total time allotted for each case was approximately two weeks.

In the first stage, the group leader develops a draft of the write-up and turns it in by the draft deadline. This draft is viewed electronically by the rest of the group members (called critiquers). They must review the draft and send back their critiques to the group leader by the critique deadline. The group leader reviews these critiques and the final write-up is then turned in. During this time, additional interaction can take place via e-mail. There is no limit to the number of interactions that can take place.

By keeping the students separate, this system has several practical modeling applications. For example, it provides a similar environment that students in a distance learning environment would face. This system also provides a way
of modeling an international business environment. In the business world today, a group may be composed of members in different locations, possibly different countries. Group members may only have direct contact with a group leader that has been assigned to a particular project they are working on. Their main method of communication is through electronic media. While CALVIN does not mimic this environment totally, it does allow a fairly accurate portrayal of the structure and problems inherent with these types of work.

**Assessment of Business Writing**

After the classes were completed, the assessment of business-writing capability was conducted for the purpose of this research. It should be noted that the findings of these assessments were never given to the students.

The goal of business writing is to communicate detailed and complex information in a straightforward and understandable manner. In determining what is good business writing, there are several aspects that can be measured (Selzer, 1983). However, two key issues are identified: visual impact and readability (White, 1986).

Visual impact includes the amount of white space, density of type, information chunking, and the presence or absence of headers. By using more white space, the text is easier on the reader’s eye. In addition, the use of white space, along with bullet points and headers, helps structure the text and leads the reader through the material. The emphasis is on the flow of information and the reader’s ease of access to it. It is important to the reader to easily comprehend the issues and focus on key aspects that may be of interest to him or her (Parker, 1993).

Readability factors include short word length, short sentence length, the exclusion of difficult technical jargon, and active versus passive sentence structure, among others. By using smaller words and shorter sentences, the risk of confusing the reader is reduced. Active sentences and the lack of obtuse technical wording also aid this. The key issue is to make the information easier to read and understand. This degree of conciseness has been found to be a key factor in business writing (Houp & Pearsall, 1984). For this research, it will be used as one of the key factors. The combined scores for readability factors will be reported as sentence length.

To test these aspects, writing consultants from the University of Alabama–Huntsville’s Graduate Business Writing Program evaluated the quality of the student’s documents. (The authors wish to thank Brenda Wade and Michelle Burke for their aid in this project.) The consultants developed grading scales for each of the criteria. These were pretested and conform to standard criteria used to evaluate business writing. Two scores were used: Visual Appeal and Sentence Length. The scales go from an integer value of 1 (lowest) to 6 (highest).

All student names and grades were removed from the cases. The first and final cases of each student and the group cases were randomly given to the evaluators. The evaluators were not informed of the goal of this research before they assigned the grades.
Table 3: Number of individual datasets after grading.

<table>
<thead>
<tr>
<th></th>
<th>F2F-Before</th>
<th>F2F-After</th>
<th>ECW-Before</th>
<th>ECW-After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Appeal</td>
<td>31</td>
<td>31</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>31</td>
<td>31</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

**FINDINGS**

**Data Preparation**

The following abbreviations will be used for all the data analyses:

- **ECW** ECW Group
- **F2F** Face-to-Face Group
- **VB** Visual Layout Scores Before Training
- **VA** Visual Layout Scores After Training
- **VDif** Visual Layout Difference Scores (After − Before)
- **SB** Sentence Length Scores Before Training
- **SA** Sentence Length Scores After Training
- **SDif** Sentence Length Difference Scores (After − Before)

The initial dataset received from the evaluators consisted of 31 data pairs of before and after scores for the F2F class. There were 38 data pairs for the ECW class. However, upon review, three scores for the sentence length values of the ECW class seemed to be in error. There appeared to be a transcription error. In these three cases, the students had perfect initial scores of 6. Then, at the end of the quarter, they had scores of 2 or 3. It is possible that a student can have a “bad day” and perform poorly. In fact, there were some cases where students had initial scores of 6 and final scores of 4 or 5. However, it is unreasonable for the score to be halved after the student has received instruction for a quarter. While it was possible to have the reviewers redo the cases, they had both moved to other institutions. Thus, it was decided to save time and take the more conservative approach and remove the data. For this reason, these data pairs were removed. The number of data points left for the analysis can be seen in Table 3.

An Anderson-Darling test was performed to test for normality. Only one dataset (F2F-SB) was determined to be normally distributed. Therefore, since the normality assumption was not valid, conclusions were based on nonparametric statistical tests.

**Results**

*Individual learning in each environment*

Before we analyze the degree of improvement between the two methods, we must test to see that some degree of learning took place in each environment. This is to ensure that the individuals were able to learn.

The boxplots (see Figure 1 and 2) show that in the visual and sentence categories, both the F2F and ECW individuals improved their scores. This is also borne out by the descriptive statistics seen in Table 4.
Table 4: Descriptive statistics of before and after datasets for individual scores.

<table>
<thead>
<tr>
<th></th>
<th>ECW -VB</th>
<th>ECW -VA</th>
<th>ECW -SB</th>
<th>ECW -SA</th>
<th>F2F -VB</th>
<th>F2F -VA</th>
<th>F2F -SB</th>
<th>F2F -SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>38</td>
<td>38</td>
<td>35</td>
<td>35</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Mean</td>
<td>2.039</td>
<td>2.553</td>
<td>2.629</td>
<td>2.914</td>
<td>3.161</td>
<td>3.597</td>
<td>3.258</td>
<td>3.677</td>
</tr>
<tr>
<td>Median</td>
<td>2.0</td>
<td>2.5</td>
<td>2.5</td>
<td>3.0</td>
<td>3.000</td>
<td>3.500</td>
<td>3.000</td>
<td>3.500</td>
</tr>
<tr>
<td>Std Deviation</td>
<td>0.925</td>
<td>0.812</td>
<td>1.017</td>
<td>0.752</td>
<td>3.000</td>
<td>3.500</td>
<td>3.000</td>
<td>3.500</td>
</tr>
<tr>
<td>Min</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.5</td>
<td>1.0</td>
<td>2.0</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Max</td>
<td>4.5</td>
<td>4.0</td>
<td>4.5</td>
<td>5.0</td>
<td>6.0</td>
<td>5.5</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Percentage Improvement</td>
<td>25.2%</td>
<td>10.8%</td>
<td>13.8%</td>
<td>12.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Visual impact scores for ECW and F2F groups.

Figure 2: Sentence length scores for ECW and F2F groups.

A Sign-Rank (Wilcoxon) test was performed to see whether the improvements were statistically significant. The Wilcoxon is the most robust test for this type of situation. It takes advantage of paired datasets and tests the difference of the before and after values. This takes advantage of the paired nature of the data and reduces
the amount of variability that is inherent in two-sample tests. In addition, it takes into account not only whether a value falls above or below the tested mean, but also the magnitude of that difference. The results can be seen in Table 5.

The tests reject the null hypothesis (i.e., accept the alternate hypothesis) that the “after scores” were better than the “before scores.” They all fall within a 90% confidence interval.

**Comparison of collaboration methods**

The degree of improvement between the two methods was also tested. This was done by comparing the differences of before and after scores for both methods. The boxplots of Figure 3 show that for visual scores, the students using ECW seemed to have improved more than those working F2F. The opposite seems to be true for the sentence scores.

The descriptive statistics in Table 6 show that there was improvement in each category. In three of the four cases this was approximately half a point (or approximately 8%). The lowest improvement was in the ECW sentence scores.

Even though the descriptive statistics and the boxplots showed differences, the Mann–Whitney test found no statistical difference between the two methods (refer to Table 7). The Mann–Whitney test is a two-sample test that assumes that the two tested distributions are generally the same except for a difference in position (i.e., scaling factor). We had previously determined that the makeup of the two classes was generally the same. Therefore, their distributions can be assumed to be similar. Also, since the boxplots showed that the ECW and F2F classes had different initial benchmark values, the assumption of a difference in initial starting position on the scale is met.

**Table 5: Visual and sentence scores.**

<table>
<thead>
<tr>
<th>p-values</th>
<th>ECW-Visual</th>
<th>ECW-Sentence</th>
<th>F2F-Visual</th>
<th>F2F-Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign-Rank</td>
<td>.008</td>
<td>.076</td>
<td>.067</td>
<td>.081</td>
</tr>
</tbody>
</table>

Ho: After = Before versus Ha: After > Before.

**Figure 3: Comparison of difference scores for ECW and F2F.**
Table 6: Descriptive statistics of dataset differences (after − before).

<table>
<thead>
<tr>
<th></th>
<th>ECW-VDif</th>
<th>ECW-SDif</th>
<th>F2F-VDif</th>
<th>F2F-SDif</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>38</td>
<td>35</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Mean</td>
<td>0.513</td>
<td>0.286</td>
<td>0.435</td>
<td>0.419</td>
</tr>
<tr>
<td>Median</td>
<td>0.5</td>
<td>0.0</td>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Std. deviation</td>
<td>1.177</td>
<td>1.066</td>
<td>1.487</td>
<td>1.597</td>
</tr>
<tr>
<td>Min</td>
<td>−1.5</td>
<td>−1.5</td>
<td>−3.0</td>
<td>−3.0</td>
</tr>
<tr>
<td>Max</td>
<td>2.5</td>
<td>2.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 7: Comparison of improvements between ECW and F2F.

<table>
<thead>
<tr>
<th>p-values</th>
<th>Visual</th>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney</td>
<td>.956</td>
<td>.791</td>
</tr>
</tbody>
</table>

This was a two-sided test with a null hypothesis of the improvements being equal versus an alternate hypothesis of the improvements being unequal. The null hypothesis was not rejected.

DISCUSSION

The first hypothesis was that the individuals in both groups would learn business-writing skills with a minimum of support. This was supported by our findings. This lends support to the business world’s current practice of “throwing” people together in groups and requiring them to support themselves in learning the business-writing skills needed to perform their jobs.

The most interesting finding is regarding the second hypothesis. It was hypothesized that there would be no difference between the two methods. The results supported this idea. However, what particular reasons are there for students performing as well as they did in an ECW environment?

In one case, it has been argued (Marcus, 1995) that the use of e-mail may actually give students an incentive to improve their writing skills. This is because they know that their compositions will be read by others in their class or around the world. Another explanation might be the fact that electronic media forces students to write concisely. Specifically, when using e-mail, users are more likely to be direct and concise rather than long-winded. This conciseness directly improves business writing.

Another explanation is that ECW actually provides an individual learning environment. Kolb’s experiential learning model has been expanded within the ECW environment (Scardamalia & Bereiter, 1993). This work argued that for learning to occur, the following had to be supported by an ECW:

- Balance between public and private, and individual and group knowledge processes
- Contribution and notification
- Source referencing
• Storage and retrieval for situating ideas in a communal context
• Coherence-producing mechanisms for dealing with information overload
• Linked resources providing access to the world’s advanced knowledge resources

In this research, the CALVIN environment supports these six issues. The CALVIN system is a total electronic system that supports anonymous group interaction. It supports joint document processing as well as e-mail transmission and deadline requirements. On one hand, since individuals never have to meet F2F, they can critique the document that is being worked on without fear of retaliation. This encourages shy individuals who might otherwise not provide input in a group setting. Also, since the main drafts (and subsequent revisions) are accessible to everyone as soon as they are posted, each group member has the same access to the document. This is opposed to hard copies where one person may be given a copy while others are not. Also, since CALVIN provides deadlines for various phases of the projects, it does not allow group members to become consumed in one phase of the project. This keeps the project work on schedule and focused. Finally, since CALVIN supports e-mail and since each student has access to the World Wide Web resources, they have access to the world’s knowledge resources. Because of these factors, the environment provided by CALVIN was sufficient for learning to take place.

CONCLUSIONS

To summarize the results, we found that

• Individuals working in groups were able to learn business-writing skills with a minimum of support and training.
• The F2F and ECW group coordination methods had the same overall effect on the individual learning of business-writing skills.

Business writing is a desperately needed skill for undergraduate students. Previous research has shown that students with technical majors enter college with the same writing skills as their peers. However, upon graduation, they are less proficient than their liberal arts peers (Friday, 1986). One major cause of this is the need to take so many technical courses. However, our results show that universities can incorporate business writing into other academic courses and students can learn this skill. Thus, a separate course on business writing is not necessary for students. The resources would be better spent of providing a business-writing course for all instructors so that they can incorporate it into their class work. This allows academic institutions to better utilize the resources they have.

Assuming that instructors have had training in business writing, then these methods are easily incorporated into a standard technical class. Instructors should note the final exam case was included as part of this research design and has not been used by the authors in their other classes. Rather, the key instructional method is the 1-hour overview of business writing and the three cases with comments included. The Management Information Systems course already included three cases as a way of teaching technical material, so adding the business-writing component only added a small amount of extra work for the instructor.
The results also show that there was no difference between communication modes even though there are aspects of uncertainty and equivocality in the process. This has direct implications for universities that offer distance education classes and online programs. Specifically, it tends to support the idea that with the correct type of electronic support, the negative effect of distance on successful communication and collaboration can be minimized. This is useful since many academic institutions and businesses are now offering distance learning classes, having classes at different universities, and offering online classes.

While this research was started to help meet an academic need, it also has implications for business. Companies such as NTT of Japan (Kodama, 2000) have invested heavily in ECW. They depend on ECW to allow them to adapt quickly to competitive changes and to incorporate new knowledge and ideas (i.e., learning) among employees and the corporation as a whole (Haeckel, 1993; Joia, 2000). Ray Stata, CEO of Analog Devices, states that “the rate at which individuals and organizations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries” (MacCormack, Newman, & Rosenfield, 1994).

Further research in this area can better support individual students as they learn new skills. It is also of direct import to business for, as Hammer and Champy (1993) state, “Job preparations are changing from training to education. . . . For multi-dimensional and changing jobs, companies don’t need people to fill a slot, because the slot will be only roughly defined. Companies need people who can figure out what the job takes and do it, people who can create the slot that fits them. Moreover, the slot will keep changing, it is clearly impossible to hire people who already know everything they’re ever going to need to know, so continuing education over the lifetime of a job becomes the norm in a reengineered company.” This type of research can help academic institutions and businesses to take better advantage of the groupware systems and methods they are already using. [Received: April 2002. Accepted: June 2002.]

REFERENCES


