The Complexity of Online Groups: A Case Study of Asynchronous Distributed Collaboration

Hope E. Chandler
NC State University

Abstract

Work preparing documents is increasingly being done by diverse, geographically separated project teams. This essay describes some of the characteristics of such collaboration and applies them to a case study involving a team composing a mission statement. The group succeeded in their task, even though shortcomings inherent in asynchronous, distributed collaboration did lead to some problems. **K.4.3 Organizational Impacts—**collaboration, online publishing

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Introduction

Due in part to the explosive growth of information technology, researchers must struggle to stay current in their applications of theory to practice. The area of collaboration, long a favorite of researchers studying both academic and non-academic fields, is no exception in this struggle (Debs, 1989; McGarry, 1994). While much of the conventional body of research in collaboration theory still applies today, we must adapt these theories and look at the new issues encountered as more modern methods of collaboration emerge and become more commonplace. This article provides a case study involving some of the most recent collaborative issues and examines these issues within the context of past research and future possibilities.

Collaboration theory

The reasons for forming teams have changed little, despite the emergence of new technologies. According to Gordon (1993, p. 177), these reasons include common needs, interests, and goals, physical proximity, and cultural similarity. Certainly the first three reasons still apply today, both for physical and for virtual teams. However, technology has changed the need for physical proximity and even cultural similarity by allowing collaborative groups to form across geographic and international boundaries. Teams have become increasingly heterogeneous, forming cross-functional groups of individuals from a variety of fields and backgrounds that come together for a common purpose (Kent-Drury, 2000; Marchwinski & Mandziuk, 2000; Robey, et al., 2000).

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Another compelling reason for forming groups is the social interaction that occurs within groups. As Reither (1993) points out, "Writing, especially for and with co-workers, serves personal and social needs to be visible, to belong, to maintain internal networks, and to sustain a sense of community within the organization" (p. 200). Technology allows individuals to become a more significant part of more geographically diverse organizations by allowing them to actively participate in various collaborative efforts. In fact, technologies are enabling new communities to emerge that would have been otherwise unlikely or impossible using conventional techniques (Burnett, et al., 1997).

Along with the fundamental reasons for forming groups remaining constant, group dynamics have also stayed fairly consistent with emerging methods of communicating. Generally, we still frequently see individuals assume the following roles in when they are working in groups:

- *Initiators* request information, add new ideas, or provide solutions.
- *Information seekers* ask for clarification or specific answers.
- *Information givers* provide answers and clarification.
- *Coordinators* bring ideas together.
- *Evaluators* pass judgment on the quality of work.
- *Encouragers* provide warmth and praise, even humor to keep the group motivated.
- *Harmonizers* help resolve tensions within the group.
- *Gatekeepers* draw in other participants and/or more shared ideas.
- *Standard setters* help define the group, particularly its goals.
- *Followers* agree with others in the group.
- *Group observers* keep track of group activities.
- *Blockers* are negative or stubborn.
- *Avoiders* resist participation (adapted from Gordon, 1993, p. 191).

Individual group members may assume one or more of these roles at any given time during the collaboration. Because the goal of any collaborative effort is success in some activity, researchers have studied what makes groups effective. Negotiation and coordination seem to be the answers (Kent-Drury, 2000). Without negotiation, groups cannot overcome the interpersonal conflicts that often arise. Without coordination, work cannot get done as quickly and as effectively as possible. In fact, one of the greatest problems with group work is the lack of coordination. For instance, reviewers must carefully coordinate drafts to save editing time and to ensure accurate final copies, particularly when multiple reviewers are concurrently editing the same draft (McGee, 2000). Also, coordination of deadlines is another area that determines the success or failure of a group's work. If members fail to meet group deadlines, the entire collaborative process can be jeopardized.

Current collaboration technologies

So why do contemporary collaborative efforts seem more rather than less complex than traditional pre-computational efforts. To answer this, we must understand the available technologies and their implications, advantages, and drawbacks. Much recent research has attempted to differentiate the various types of collaboration currently in use (Briggs & Vogel, 1997; Burnett, et al., 1997; Docherty, et al., 1997; Greenberg, 1998; Grønbæk & Trigg, 1999; McGee, 2000; Neuwirth, et al., 2000; Neuwirth, et al., 1998; Robey, et al., 2000; Shirk, 1997; Shneiderman, 1998). The general term for current technologies that enable a variety of collaboration methods is groupware. Groupware can range from networked computers within the same room that allow groups to work together or project scheduling tools to some form of videoconferencing/computer technology. Even e-mail and listservs are types of groupware that researchers are currently studying. Although numerous acronyms have emerged to describe this body of technologies, the most common appears to be CSCW, Computer Supported Cooperative Work (Docherty, et al., 1997; Greenberg, 1998; Grønbæk & Trigg, 1999; Shneiderman, 1998). As with the term groupware, CSCW has come to represent a number of technological uses for collaboration at a broad, general level.There are four major types of collaboration that can occur using contemporary technologies: face-to-face (same place, same time), asynchronous (same place, different time), synchronous distributed (different place, same time), and asynchronous distributed (different place, different time). Figure 1 provides examples of each type. Because all four types have both advantages and disadvantages, no one has

Table 1: Time-space matrix of collaboration (Schneiderman, 1998, p.481)

	Same time	Different time
Same place	face to face (classrooms and meetings)	asynchronous (project scheduling, coordination tools)
Different place	synchronous distributed (shared editors, video windows)	asynchronous distributed (e-mail, listservs, conferences)

emerged as the dominant type. Researchers agree, however, that regardless of the structure of the collaboration, one of the most important aspects that determines a group's success is the coordination of documents through a shared, neutral workspace that enables and encourages turn-taking among the participants (Docherty, et al., 1997; Greenberg, 1998; Grønbæk & Trigg, 1999; Kent-Drury, 2000). Groups need such a space to encourage contribution and to provide a stable, semi-permanent storage space for their work. This shared space also reduces the frequency of confusion over different document versions and edited drafts of work by keeping the master file in one place.

Developers are trying to provide tools that serve each of the four categories of collaboration that would provide the best option for shared space and meetings. If the technology were more advanced and user-friendly, face-to-face or synchronous distributed options would probably become favored because conventional collaboration theory suggests that "same time" work is the most effective (Briggs & Vogel, 1997; Marchwinski & Mandziuk, 2000; Neuwirth, et al., (Shneiderman, 1998, p. 4812000; Robey, et al., 2000). Face-to-face is particularly important because it allows users to interact with each other on verbal and nonverbal levels. The significance of nonverbal cues within group interactions drives much of the research to improve technology by providing users with ways to offer nonverbal cues in their group work.

Nevertheless, the current trend seems to favor asynchronous distributed tools such as e-mail, listservs, and electronic conferences. These tools provide groups with quick, relatively easy ways to transfer ideas and documents and allow individuals to continue other work assignments while awaiting responses from other group members (McGee, 2000). Another advantage to asynchronous distribution is that it allows conflicting team members to continue working together with a reduced level of interpersonal interaction, thereby increasing their productivity (McGee, 2000, p. 47). Although this is a distinct advantage over face-to-face interactions, it points to some clear disadvantages of asynchronous distributed tools. Because the interaction is less personal, confusion is more frequent. There are fewer cues enabling readers to pick up on changes from draft to draft, leading to frustration over unexpected changes. As Neuwirth, et al., remind us, "One of the most basic properties of asynchronous communication is that the participants forget what is going on." Group members must struggle with ways to compensate for the lack of cues. Other drawbacks exist, as well, to asynchronous distributed forms of communication. Unfortunately, the e-mail and listserv technologies currently available are, according to Shneiderman (1998) "too loosely structured …too overwhelming…[and] too transient" (p. 482). In spite of these difficulties, this type of collaboration tool is becoming increasingly popular. Hill & Mehlenbacher (1998), for example, report that in 1997 over 50 percent of Americans and almost 90 percent of all college graduates use computers at work, at home, or in both places. The following case study may shed some light on why asynchronous distributed tools are currently the best option, despite their obvious problems.

Asynchronous distributed collaboration: a case study

My study focused on the collaborative efforts of the board members of an international professional organization as they endeavored to rewrite the organization's outdated mission statement. This group's membership ranges from academic to industry professionals, joined

together by their common interest in technology and its surrounding literacy. Most of the organization's members communicate via the organization's listserv, with typically no more than one face-to-face meeting per calendar year. Nine of the group's board members worked together via their listserv, an asynchronous distributed method, to write the new statement. Of these nine, six originated from industry and three from academia. The board members themselves somewhat reflect the international make-up of the organization, with all nine situated in either the United States or Canada. They are a cross-functional group because of their backgrounds, but they are joined together by their common interests in the profession.

Although the listserv discussion reported here occurred over approximately three and a half months, the mission statement was actually completed in just over one month, with the initial request on March 3, 1998, consensus about the mission statement on April 7, 1998, and follow-up comments ending June 18, 1998. Because of the high profile of this organization, the board members strongly believed that their mission statement was a crucial element for maintaining appropriate visibility among similar professional organizations and for drawing in new members to their own organization. Although the nine contributors differed in their enthusiasm for and participation in rewriting the mission statement, they all agreed that the mission statement needed updating (see appendix for original and new mission statements).

Limitations of the study

It is important to understand some of the limitations in this case study before continuing. This organization did not face some of the typical pressures facing groups during their revisions of a mission statement. Although they wanted to finish the mission statement for certain upcoming events and publications, they did not experience the typical deadline pressures a corporate team faces. Also, the members' work with this organization is remote from their daily work duties, almost voluntary in nature. This difference can also alleviates some of the typical stresses that groups often experience. Their performance in this group does not directly affect their jobs and therefore does not demand the immediate attention they must give their other job-related tasks. Despite these limitations, this study is still relevant and can offer us new ways of viewing collaborative dynamics in professional settings.

Results

From March 3, 1998 to June 1998, the listserv participants discussed the mission statement, the organization's upcoming conference, award nominations, and a group slogan. There were a total of fifty e-mails messages generated that focused on the mission statement. All but one of these e-mails messages focused entirely on the mission statement, omitting the other three topics of discussion. Most of the e-mail messages concerning the mission statement contained, as attached text, at least one or two previous e-mail messages on the same topic, particularly ones that contained new edits based on previous comments and requests for change. Of the fifty e-mail messages, the following topics and contributor roles (in parentheses) emerged. Note that many e-mail messages contained overlapping topics and roles.

- One e-mail initiated the request for the new mission statement (Initiator).
- Eight e-mail messages provided drafts (Information givers/Coordinators).
- Thirteen e-mail messages requested specific editing (Evaluators).
- Eight tried to define the organization's audience (Evaluators/Standard setters).
- Seven asked for clarification (Information seekers).
- Seven provided clarification (Information givers).
- Three validated the importance of the mission statement (Encouragers/Standard setters).
- Two invalidated the importance of the mission statement (Blockers).
- Six praised the new drafts (Evaluators/Encouragers).
- Eight provided simple agreement about the new drafts (Followers)
- Four asked for general opinions to bring in more participants (Gatekeepers/Information seekers)
- Four reminded the group of approaching deadlines (Group observers)
- Two focused only on humor regarding general mission statements (Encouragers).

It is important also to note the different levels of activity and participation among the nine group members as they created the mission statement. Five of the nine provided significant levels of contribution, with three of those writing drafts and all five suggesting

major editing changes. Two other participants provided minor editing changes fairly late in the process. One participant only requested a copy of the finalized version to include in material for the organization's booth at another conference. One mentioned a negative reaction to the mission statement from outside of the organization, buried deep within meeting minutes of the organization's annual board meeting.

The updated mission statement was almost twice as long as the original one but shifted from the original's two-sentence structure to a one-sentence structure, divided into four distinct units. Several early listserv comments attempted to clarify the length requirements of a mission statement in an attempt to validate a longer, more thorough mission statement. The updated version focused much more on the service-oriented nature of the group, including a discussion of humans and their professional roles and research goals. The participants were very careful to define the organization's audience and its goals, showing their desire to shift the emphasis to a more human-centered mission statement. In fact, most of the editing changes either explicitly or implicitly addressed the organization's audience definition.

One problem that arose during the collaborative effort was the discovery during this study of a second version of the updated mission statement that currently appears on the organization's website. This second version was a version that the group members tentatively approved on April 3, 1998 before making some final, but significant changes (See appendix for this version). This statement did not reflect later changes made to collapse two sections into one and to broaden the audience appeal from "technical communication" experts to broader professional fields. The person who put the mission statement on the website had asked for clarification after the approval of the April 7 version, requesting the "official" copy for the website. She received two responses on the listserv, both of which contained the complete text from the April 7 version. She referred to another e-mail message from a group participant, not sent to the listserv, that "looked pretty much like this."

Discussion

First, it is clear that this group has formed its own online discourse community (though the annual face-to-face meetings surely strengthen the online interactions). Because of the listserv technology, they are able to stay in contact with each other on at least a weekly, if not daily, basis despite being separated by great geographical distances. They have used this listserv for several years and are becoming more comfortable with the constraints of this technology.

They adapted conventional group roles within the process of writing the mission statement, mainly focusing on the roles of information seekers, information givers, evaluators, and encouragers. The five main contributors remained consistent in their roles throughout the process, although one of these five made a comment toward the end of the process that questioned the importance or necessity of a mission statement. Because this negativity came at the end of the process, it did not detract from the overall collaborative process.

As mentioned earlier in this article, negotiation and coordination are vital to the success of any online collaboration. This group was able to negotiate changes very effectively, through a series of repeated editing attempts, sometimes at the phrasal level but more frequently at the word level. This group was also effective because the listserv allowed them to coordinate their writing efforts easily and quickly, enabling multiple writers to see current drafts and to update them based on current editing requests. For them, the listserv has become a productive, shared workspace.

Because they chose an asynchronous distributed (different place, different time) method of collaboration, they were able to collaborate at their convenience, sometimes going several days without adding anything new to the mission statement discussion. However, this also meant that the process took longer and required more text reminders within each e-mail message than it would have under other circumstances. Had the nine members been able to meet face-to-face, they could have more quickly developed a new mission statement, although face-to-face meetings almost always necessitate someone from the meeting actually going off and "doing" the work. Because frequent face-to-face meetings are impossible for this group, and because they did not have a strict deadline, the asynchronous distributed method worked best for them in this situation.

The analysis of this writing project also uncovered some of the shortcomings of asynchronous distributed collaboration. The number of e-mail messages the subscribers to this listserv receive is overwhelming. The fifty e-mails pertaining to the mission statement represent only a fraction of the overall e-mails to this listserv over the three and a half month time period. Although the listserv participants have developed some clear strategies for distinguishing the topics, such as clear

subject headings and isolated topic discussion within individual e-mails, the fact that an incorrect version of the mission statement managed to find its way to the organization's website is an obvious indicator of the potential for group "forgetfulness" (Neuwirth, et al., 1998).

Another potential problem with the medium is that no one appeared to notice, based on the sheer volume of e-mails to the listserv, that a sharp criticism of the mission statement was buried deep within the meeting minutes of the board's face-to-face meeting. The meeting was held one month after approval of the final version of the mission statement. Someone from outside of the organization had called the mission statement "too academic," something this organization had struggled to avoid because of its desire to appeal to professionals in both academic and non-academic settings. Perhaps those who were most active in writing the mission statement, because of their connections to academia, ignored the comment; but it is more likely that very few participants even noticed the comment. The e-mail that contained this information also contained notes on most of the organization's business for the year and was extremely lengthy. Most listserv participants would have skimmed the message quickly, looking for items of interest, which explains why they might have overlooked the criticism of the mission statement.

Another shortcoming of the medium, not frequently discussed in the research, is the power and influence of particular individuals within group work. Often, groups form because of what they can accomplish together, but they rely on individuals within those groups to do very specific tasks. If an individual with specific responsibilities makes an error or decides to go against the group's wishes, it becomes difficult for the group to react. Because several versions of the mission statement were generated that the group tentatively agreed to adopt, it would be easy for any one individual to make an error or to make an executive decision on behalf of the group. The best analysis of the error is that one e-mail that was sent to the individual requesting the "final" version contained an older version. Had this message gone to the listserv, other participants might have noticed and corrected it. However, the sender of this e-mail was probably trying to refrain from overloading the listserv with what could have been considered a personal request, not worthy of sending to everyone. Even though two follow-up e-mails contained the correct version, because the mistaken version was so similar, the person who posted the mission statement to the website would probably not have read three similar messages very carefully. It is not at all surprising, then, that the wrong version of the mission statement is currently in use. Of course how much or how little visitors to the website actually attend to the organization's current mission statement is uncertain.

Implications for the future

What does all of this suggest about asynchronous distributed collaboration? This method can be highly effective in group situations where participants who are geographically separated and who have a number of unrelated job duties must communicate quickly and easily with each other. It is also highly effective for organizations that do not have strict deadlines to meet. As organizations that actually face strict deadlines and face more issues of group conflict have continued practice using listservs and developing appropriate strategies for them, asynchronous collaboration will most certainly become more popular and valuable. Still, researchers clearly need to further elaborate via case studies on all four forms of collaboration: face-to-face, synchronous distributed, asynchronous, and asynchronous distributed. Technological advances already promise to enhance more than undermine in all four of these collaborative processes, but as with most technological advances, social processes are often slow to follow and are sometimes entirely surprising.

Industry and the academy are both constantly seeking new ways to provide employees, students, and faculty with improved methods for effective and useful collaboration. While nothing is likely to entirely replace face-to-face meetings, technological innovations certainly require our constant emphasis and analysis. After all, as yet unimagined developments could one day make asynchronous distributed collaboration the privileged method of collaboration. Clearly the board members of the ACM SIGDOC organization, having collaborated aggressively via traditional listserv technologies for many years, are experiencing the benefits and the shortcomings of a developing collaborative space.

Appendix – original and updated mission statements

Original mission statement:

We provide a forum on documentation and user support for computer products and systems. The SIG studies and publishes processes, methods and technologies for communicating information via printed and online text, hypermedia, and multimedia.

Updated mission statement:

We (1) encourage and promote practitioners, researchers, and educators who take an interdisciplinary approach to the study of online, print, multimedia, and human-computer interfaces; (2) provide avenues for publication and for the exchange of professional information; (3) support research that focuses on the needs of humans and their goals and tasks in technological contexts; (4) support the development and improvement of computer-supported communication technologies.

Current web site mission statement:

We (1) promote the professional development of technical communication practitioners, researchers, and educators; (2) encourage interdisciplinary approaches to solving communication problems related to online and print documentation and to human-computer interfaces; (3) provide avenues for publication and for the exchange of professional information; (4) support research that focuses on the needs of humans and their goals and tasks in technological contexts; (5) support the development and improvement of computer-supported communication technologies.

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