15 A CODE OF ETHICS AS A COLLABORATIVE LEARNING TOOL: COMPARING A FACE-TO-FACE ENGINEERING TEAM AND MULTIDISCIPLINARY ONLINE TEAMS

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Elsewhere in this book, Bazerman proposes that both students and teachers of technical communication face a dual challenge. On the one hand, we must negotiate new forms of communication that transform work, citizenship and personal relations. On the other hand, we must continually re-orient ourselves to what Bazerman calls the "changing locations of encounter" that shape, and are shaped by, an evolving knowledge society. In this chapter, we examine a small spectrum of "changing locations" for collaborative writing: the discipline-specific and classroom-based location, and the multidisciplinary, online location.

While integrating collaborative projects into the classroom is now commonplace in technical communication courses as well as in engineering courses, what motivates and engages students to write together effectively and ethically, whether face-to-face or online? Collaborative writing alone, though integrating an important social dynamic into writing, provides no guarantee of student engagement—as every teacher who has integrated teamwork into a traditional or online writing course knows all too well. A fundamental part of the problem with engagement lies in assigning so-called workplace genres in a technical communication class; collaborative or not, such genres are dissociated from the social contexts that have shaped them in the first place. But if, as Artemeva (2004) points out, "it is only logical for us to agree that teaching genre conven-

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tions of workplace genres is useless at best" (p. 25), the question then becomes: what acts of writing in a technical communication classroom are indeed useful, and for what purposes?

One obvious use of team writing assignments is their educational value. Tonso (2006) argues that "teamwork improves learning, whether using discipline-specific, or interdisciplinary teams, in face-to-face settings or in virtual climates" (p. 26). In this paper, we further suggest that technical communication students benefit most from collaborative writing when it is not simply a means to teach workplace genres. Rather, the value comes about when such assignments enter the realm of the social: engaging students in the dynamics and challenges of teamwork and inviting critical reflection about the role of writing in the formation and governance of viable professional communities.

Consequently, an example of what we would consider a "useful" collaborative technical writing assignment rests on the following principles. First of all, the assignment must engage students and, secondly, it must promote responsibility and accountability. Finally, and most of all, the assignment must provide students with a glimpse, at least, of what it is like to be part of an ethical "community of practice"; that is, a group of people who both perform a function and learn together—thus understanding, to some extent, what it means to participate in a knowledge society. Students also learn both the requisite social skills (such as interpersonal skills) and the intellectual ones (such as learning about writing and genres). Collaborative assignments grounded on these principles and outcomes can be personally enriching as well as eminently practical, in that they encourage students to construct their identity not only as writers but also as members of a cooperative professional community.

In this chapter, we look at how one particular collaborative assignment—a written code of ethics governing team conduct, created and endorsed by team members—can help technical communication students, both face-to-face and online, gain useful insights into the social dynamics and challenges of participating in a professional community. We further suggest that such an assignment opens up another "location of encounter" created by a contemporary need to bring multiple knowledges together to solve increasingly complex problems, including the social and ethical concerns we outline here.

COLLABORATIVE WRITING AND THE ETHICS OF COMMUNITY BUILDING

Well-designed collaborative assignments play a key role in preparing students for future membership in professional communities. Through collabora-

tion with peers, students learn to converse in ways that are valued within an intellectual community at the same time as they become engaged in thought and reflection within a dynamic social context—what Bruffee (1984) calls "a community of status equals" (p. 642). Collaborative learning challenges the notion that knowledge originates from designated experts; rather, "to learn is to work collaboratively to establish and maintain knowledge among a community of knowledgeable peers" (Bruffee, 1984, p. 646). Bruffee highlights how peer learning reflects professional (and particularly scientific) practices by defining and creating knowledge as a social construct, as a process of negotiating community values.

Arising out of these principles are a number of practices fostering cooperative and engaged learning, practices that increase the chances that a collaborative writing assignment will be "useful." Cooperative learning involves group-based activities and depends on successfully realized interrelationships and communication among group members. A cooperative learning and writing environment needs an appropriate balance between facilitating/coaching (such as encouraging, rather than imposing, appropriate strategies for social interactions and behaviour) and supporting/directing group work (such as providing a rich array of materials and manipulating the environment to make group work easier) (Tinzmann et al., n.d.). Not surprisingly, cooperative-learning strategies can strongly influence student engagement. Students can begin to have a sense of actively participating in such a learning environment, of having a personal stake in the community building that happens within—and, at times, beyond—the classroom.

Increasingly, however, collaborative writing takes place in online environments where face-to-face interactions may not be possible (Lind, 1999; Reilly & L'Eplattenier, 1996), and, if this kind of immediacy is not possible, the question becomes whether collaborative learning can still occur. While the promotion of engaged and cooperative learning is not so new from the standpoint of teaching collaborative writing, this "social element" of participating in a community cannot be taken for granted in an online environment. Some critics, likeFranklin (1999), argue that electronically mediated environments do not promote the kind of community building essential for collaboration. In her view, community building depends on physical locale and reciprocity, the latter term meaning "some manner of interactive give and take, a genuine communication among interacting parties" (Franklin, 1999, p. 42). Rheingold (1993), however, would challenge this view that community depends on locale and face-to-face forms of reciprocity. Though often criticized for his view of electronic technology, he nonetheless believes that it can help us form new kinds of communities. For wholly online teamwork, then, we can take some inspiration from Rheingold's

position that interactivity can flourish in communities "not of common location, but of common interest" (Rheingold, 1993, p. 24). Specifically, from the standpoint of forming professional communities, Turns, Wagner, and Shuyler (2005) describe how students who use a computer-supported or online learning environment to fashion a shared repository of knowledge create a knowledge-building community in which knowledge production processes become visible to others.

However, such knowledge production processes are often inseparable from interpersonal interactions. Bazerman points out in his chapter in this book that while online connections "may seem to be pale shadows of those in embodied lives, seeking the easiest simulacra of gratification," people are nonetheless "drawn to these in a hunger for connection, a connection that will focus and activate our complex neural systems of meanings and emotions." Thus, a collaborative writing assignment—particularly one used in an online environment—ignores the interpersonal and the emotional to the peril of both students and instructors.

Since online course environments compel participants both to create a written product and also, in essence, to document all other processes, instructors can see this as an opportunity for documenting and reflecting on interpersonal and community building processes as well. In the online, multidisciplinary technical communication course profiled below, this reliance on writing remains, even when online student teams go offline to do some of their project planning (such as meeting face-to-face or talking on the phone). For, in the interests of record-keeping, accessibility, and accountability, online student teams are still required to post summaries of offline planning decisions in their team discussion thread. Another reason is that face-to-face team processes are usually tacit, inscribed by and through oral discourse, and therefore not always visible. Thus, one important difference between face-to-face and online teams lies in the degree to which the teams rely on writing as a planning and community-building tool. Though the face-to-face team discussed here also created a computer-supported repository of knowledge and shared it with each other, many of these important planning and community-building discussions took place while they were face-to-face in the classroom.

We must consider one final element in designing a written code of ethics assignment for a wide variety of student teams: assessing team effectiveness, or how well the team functions as a team. Indeed, team effectiveness "has emerged as central to understanding the use of teams in classrooms" (Tonso, 2006, p. 26) and, we would add, certainly in an online environment. In large part, the success of the project and the collaboration as a whole will depend on how effectively the teams are able to interact, either face-to-face or online. So, two fundamental

principles govern how we look at teams and how we measure team effectiveness. These are responsibility and accountability, the two lynchpins of collaboration and, coincidentally, of the engineering profession. On the one hand, responsibility relates to the project functions or the task needs; that is, the jobs or tasks to be done: "Responsibilities are *obligations,*" such as "*role* responsibilities, acquired when we take on special roles such as parents, employees, or professionals" (Martin & Schinzinger, 2005, p. 14). Each member of a team will assume a "communication role" that will help to "facilitate knowledge sharing and exploration and task coordination" (Dong, 2005, p. 447). Setting group rather than personal goals, sharing information, summarizing information, balancing the workloads and the contributions, knowing what the tasks are and who is "doing what and how," and setting project standards (such as the number and quality of the drafts) are other examples of the task functions (Dong, 2005, p. 446).

Accountability, on the other hand, "refers to the general disposition of being willing to submit one's actions to moral scrutiny and be open and responsive to the assessment of others" (Martin & Schinzinger, 2005, p. 99). As such, accountability relates to the process functions; that is, the social and emotional needs of the team as well as the team's interactions. For example, process functions would include such things as off-task interactions that occur when a team behaves as people rather than as members of a team; it will also include providing encouragement, compromising and managing conflict, demonstrating a willingness to have one's actions and ideas scrutinized by others in the group, encouraging participation, respecting the expertise of other team members and setting team standards, such as a code of ethics. As a team member, one accepts responsibility and, in doing so, holds oneself accountable to others on the team.

ENGINEERING TEAMS: ETHICS AND "THE NEW PARADIGM"

Because a knowledge-sharing community exists already for the engineering students, one would think the engineering team would be in a better position than the multidisciplinary team to achieve a productive "ethic of collaboration"—a set of "principles and values" grounded in a sense of "stewardship" (Haskins, Liedtka & Rosenblum, 1998, p. 34). Engineering students, for example, already share certain community norms, thus arguably laying a solid groundwork for cooperative learning and writing. As Davis (1998) states in *Thinking Like an Engineer,* "To claim to be an engineer is not simply to claim to know what engineers know; it is to claim to act as engineers act" (p. 115); that is, ethically.

For the past several years, however, engineering education has been changing, so much so that it "has been moving toward a new paradigm" (Donath et al., 2005, p. 403), one that has meant "substantial revision" of conventional practices, such as the traditional lecture, and one that demands that engineering educators recognize that learning is a social activity (Tonso, 2006, p. 25). Hence, the new paradigm includes teamwork and active learning, and there is now an increased emphasis on "a variety of non-technical competencies," such as good communication and interpersonal skills (Loui, 2005, p. 385). This new paradigm is also important precisely because it promotes "scientific literacy" and "science learning" (Tonso, 2006, p. 26); within the context of engineering, it facilitates knowledge gained through "hands-on" activities. In an increasingly complex and technological world, this kind of knowledge is even more important to engineering education and, indeed, signals the profession's ability to adapt to a world where the "locations of encounter" are constantly shifting, both locally and globally.

This new emphasis has significant implications for a technical writing course, which can effectively promote this new paradigm by developing team-based projects that give students the chance for this kind of "hands-on" learning. Fairly recent work on the subject of collaboration has supported the notion that collaborative writing projects help students learn the values and protocols and language of the engineering profession (Ingram & Parker, 2002; Lay, 1992). Put another way, "the construction of knowledge occurs through conversations about a subject matter, which serve to make knowledge explicit" (Dong, 2005, p. 447). Thus, the process of communication in which a team engages will help them gain and share their knowledge about a topic at the same time as it "instills the social element so critical to the success of the team's interactions" (Parker, 2009, p. 209). For example, when students participate in group projects and team-based learning, they catch a glimpse of the professional world they hope to some day enter, a professional world that is increasingly team-based (Reimer, 2002; Sageev & Romanowski, 2001; Vest, Long, Thomas, & Palmquist, 1995). A code of ethics is an integral part of this professional world, and the course can adapt a common engineering practice by introducing students to the need for a code of ethics within the collaborative setting.

It is this need for a code of ethics that points to the changes occurring in what we have called the "knowledge society," where technology has changed how and where we communicate. The ethics involved in working in this knowledge environment—and especially in a collaborative environment—are nowhere more pronounced than in the world of the engineer. Students are now becoming acutely aware that engineers must solve problems correctly because "they are personally responsible for the social consequences of their technical decisions" (Loui, 2005, p. 386). Aware of "how engineers daily cooperate in a

risky enterprise in which they exercise their personal expertise toward goals they are especially qualified to attain," engineers likewise become aware of their accountability (Martin & Schinzinger, 2005, p. 100). For students, this awareness of social actions and social consequences becomes integral to their view of themselves as professionals who are governed by rigorous standards of behaviour; that is, by a code of ethics. Hence, by writing their own code of ethics, students gain an insight into their very own ethical community of practice. According to Davis (1998), a group can achieve "full status as a distinct profession" if and when "they adopt their own code of ethics" (p. 115). At least in part, the reason that a code of ethics is so important to a profession is the confidence it helps to instill in the public—confidence in the profession itself and in the proficiency of its members (Sidnell, 2005). In part, too, codes are important because they "state the moral responsibilities of engineers as seen by the profession and as represented by a professional society" (Martin & Schinzinger, 2005, p. 44).

This designation of a profession rests on the view that its practitioners are responsible and accountable both to the public and to the profession itself. For example, most professional engineering societies consider their mandate to be devising a code of ethics that will contain standards of conduct related to the practice of professional engineering within a social, public setting; indeed, the code of ethics "is designed for the protection of the public" (The Engineering and Geoscientific Professions Act, 2004, p. 70). It is this commitment to the public—and their declaration of this commitment in a code of ethics—that links the profession to the community at large. Additionally, this commitment depends entirely on the specialized knowledge that engineers use to serve that wider community. For this reason, the code will demand a commitment to the continued pursuit of knowledge. Usually, too, the code will also outline that, in addition to "uphold[ing] and enhanc[ing] the honour, integrity and dignity" of the engineering profession, engineers must support their colleagues as well (Association of Professional Engineers and Geoscientists of the Province of Manitoba, n.d., Canons 3.2, 4 and 5).

Thus, it is because of the jobs they do and the responsibilities they fulfill that the code of ethics becomes so central to any definition of an engineering professional. A code of ethics "emphasizes professional responsibility," especially as it relates to safety (Loui, 2005, p. 385), and "functions as a commitment by the profession as a whole that engineers will serve the public health, safety, and welfare" (Martin & Schinzinger, 2005, p. 44). In fact, Loui (2005) concludes that professional responsibility can be understood both "as a liability for blame" and "in a capacious sense as stewardship for society" (p. 383). In fact, in Canada, an engineer's iron ring serves as a constant reminder of an early engineering disaster and is thereby a symbol of this stewardship.

In sum, a code of ethics for engineers typically will serve the following functions: "serving and protecting the public, providing guidance, offering inspiration, establishing shared standards, supporting responsible professionals, contributing to education, deterring wrong-doing, and strengthening a profession's image" (Martin & Schinzinger, 2005, p. 44). In the classroom, of course, the code will reflect only some of these different functions since we are not directly affiliated with industry or the public (although co-op programs and capstone courses are to some extent). Nevertheless, the code of ethics that each student group in the technical communication class creates and adopts becomes an important link between the team and the profession's commitment to integrity and stewardship within a highly complex and ever-changing knowledge society.

ONLINE MULTIDISCIPLINARY TEAMS: A CODE OF ETHICS AS SELF-GOVERNANCE

In technical communication classes that are open to students from a range of disciplines, it is obviously difficult to model team assignments or expectations of self-governance on distinct sets of professional practices. Add to this the challenge of communicating effectively and ethically in a wholly online environment. In this ever-shifting "location," the code of ethics assignment plays a different role: not as a link between a student team and an established set of professional commitments, as it is for the engineering students, but as a means of engaging first-hand with the challenges of creating a viable self-governed knowledge community in a CMC environment. In contrast to the face-to-face teams who are moving toward an established professional community, the online multidisciplinary teams define (based on instructor resources and other forms of scaffolding) standards of conduct, process, and accountability that they themselves consider "professional."

To understand both the challenges and the "usefulness" of a collaborative code of ethics assignment in the multidisciplinary online course under discussion here, some background is needed. The University of Winnipeg's "Strategies for Technical and Professional Communication (Online)" is open to students in second-year or higher, and there is no assumption of previous technical or professional experience. The only official pre-requisite is to have received a passing mark in the university's first-year writing course, or to have been exempted from the first-year course by other means.

The goals of "Tech&Pro Comm" are reflected in the instructor's statement of outcomes:

By the end of this course, you should be able to:

- appreciate some of the rhetorical and ethical challenges of technical/professional writing in general, and computer-mediated communication in particular
- define and describe specialized concepts in ways appropriate for your primary audience
- research, organize, and design professional looking electronic documents
- revise and edit your documents so they meet basic professional standards
- appreciate and incorporate basic visual and design elements
- manage a team online project and collaborate effectively with colleagues in a CMC environment.

The course has two distinct assignment streams: (1) completing a number of small documents (value 50%) designed to be folded into a final individual proposal addressing a "real life" problem, and (2) working on a team to create an informational web site not related to the larger proposal. As well as meeting basic expectations for expression, formatting, and content development, the team web project must also show some evidence of rhetorical and genre competence (though obviously a professional level of development in design and content lies beyond the scope of the assignment). However, the criteria for evaluating assignments are embedded as much as possible within real-world social expectations, encouraging students' engagement with meaningful issues. Also, to serve that end, assessment rests to a large extent on students' written evidence of co-operation, engagement, and team effectiveness (responsibility/ accountability), making their knowledge production "visible" to others (Turns et al., 2005, p. 53). To gain insights into the team and its effectiveness, the instructor relies on the team's code of ethics, the postings in each team's discussion forum, and a final individual report on team processes, seen and approved by the other team members.

Teamwork begins with self-selection (another precept of engaged learning) when students begin discussion-clusters around topics of interest to them. Thus, students are conditionally united by common interest, but this alone is

not enough ground on which to build a viable knowledge-sharing community with colleagues whom they may never meet face-to-face. One reason is that self-selection on the basis of interest can disadvantage students who, for various reasons, do not participate actively in discussion clusters and who end up on a team by default. The worst-case scenario here is that such teams become dumping grounds for unengaged students, which militates heavily against a good outcome. While cooperatively writing a code of ethics does not guarantee success (as the two profiles below illustrate), the assignment nonetheless improves students' chances of creating an engaged, effective ethic that will ground both process and product in a computer-mediated environment.

Four female students comprised the first team from 2005 profiled here, "Group Home." These students self-selected early and quickly reached consensus on their topic: how to find rental accommodation in Winnipeg (a city notorious for its low vacancy rate). The second team, "Life Without TV," included two females and one male, who joined late, having not participated in the discussion clusters. The two females had reached a tentative agreement to create a web site about how to live without TV, and the male endorsed that topic once he joined the group.

All teams are required to begin by first collaborating on a one-page code of ethics (worth 5%) that they agree will govern their social interactions and collaborative process. To prepare for this, students must complete required readings about leadership and teamwork (both face-to-face and online) as well as examine and discuss models or sample standards, some provided by former students. As evidenced by the two excerpts below, teams end up creating not only a set of expectations for completing the project but also a social contract governing their interactions. The "Group Home" code of ethics included the following:

- All group members will visit our private discussion group every second day.
- All group members will respect [other] team member's ideas and promote a positive working attitude.
- If a disagreement should arise, all group members will address the problem in a prompt manner via further email discussion or by phone.
- All group members will respect group and project deadlines.
- All group members will work individually on their Web

pages, but collaborate to edit each other's work.

- All group members will be open to editing suggestions and advice.

- All group members will contribute to the creation of the home page.

The "Life Without TV" code of ethics included the following:

- The team will be in contact frequently through email or on the team's private discussion thread, a minimum of twice per week.

- Each team member will be assigned specific duties that he/she feels comfortable with and commits to completing in advance of any due dates for peer review by fellow team members.

- If a team member has difficulty doing his/her share of the project, other team members must be advised so they can help.

- Each team member will be available for discussion or if help is needed by others.

- Each team member will share information in a mutually respectful manner.

- The team will collectively negotiate expectations to keep the team and the project moving.

- Conflicts will be resolved in a respectful manner giving each team member an opportunity to voice [his/her] opinion.

Using their codes of ethics as a basis, teams make more specific group decisions about the topic, the division of labor, rhetorical considerations such as audience and purpose, and content and design. As evidenced by their team forum postings and an interim progress report, all "Group Home" team members contributed points to the code of ethics. Furthermore, as the project progressed,

it became clear that "Group Home" was effectively basing social interactions and task decisions on this code. However, "Life Without TV" began losing cohesion when one member took most of the responsibility for drafting the code of ethics, with the second team member playing a supporting role and the third mainly unengaged. This trend continued, particularly evidenced in the two teams' postings throughout the project. In the "Group Home" forum, postings were frequent, thread-specific, substantive (task- and content-oriented), as well as personally supportive; however, postings in "Life Without TV" were more sporadic and often re-used the same subject/thread heading. They were also often one-sided; the same team member tended to initiate and the others to respond.

As mentioned earlier, when teams complete their project, students must summarize their own individual contributions to the team project and have all members of their team "sign off" on that summary. They also send a separate, private message to the instructor, and there they may add information they may not be comfortable sharing with the team. As might be expected, the final reports from "Group Home" were extremely positive, with two members agreeing this online collaboration was one of the most rewarding team experiences they ever had. There were no contradictory opinions in the private e-mails.

One might have expected more negative reports from the "Life Without TV" team, but all were supportive in tone, with the least engaged team member expressing great admiration for the hard work of the other two. In this case, however, the desire to cooperate outweighed truth. While this team's code of ethics spoke both to conduct and accountability, its promise was undermined by conflicting interests, differing levels of engagement and a common problem with teamwork: one well-meaning member taking control of the process in the interests of efficiency. Indeed, the "Life Without TV" team exemplifies—in miniature—Bazerman's caution about the "distances and obstacles" that online interactions pose for engendering "an ethos of care and trust" that goes beyond lip-service. In many ways, then, their online team experience underscores some of the challenges of creating and sustaining a knowledge society in this new "location of encounter."

THE FACE-TO-FACE COLLABORATIVE WRITING ENVIRONMENT: THE STUDENT ENGINEERING TEAM

Because engineers—as problem solvers—are expected to communicate their solutions to others and to serve the public interest (Mathes & Stevenson, 1976, p. 31), all engineering students must complete the technical communication course before they are allowed to graduate and become members of the pro-

fession. The learning outcomes for the course grow out of the engineer's need to communicate effectively: students must demonstrate an ability to manage a group project, to collaborate effectively within a face-to-face team environment, and to present their work in both written and oral genres. To facilitate these learning outcomes, the course provides formal instruction in the "engineering method" used in other technical courses (like the design courses) and in the practice of engineering (Parker, 1989, 1990), and then links this method to the requisite rhetorical principles, a connection other writing scholars have also discussed (for example, Dunkle & Pahnos, 1981; Flower, 1981; Maki & Schilling, 1987; Moran, 1982). For example, students learn about problem definition and criteria development, as well as about how to cogently express their analysis in writing, including how to formulate their report purpose and determine their audience.

Students begin by first choosing a broad topic area of interest, normally within their engineering discipline. They then research their particular approach to the topic, which will entail learning what the technical problems are and then developing criteria by which to evaluate any solution. Over the course of the term, they work on drafting and revising the various documents the project demands, such as the final written report. Along the way, they also prepare oral briefings, such as project updates. During this process, teams will brainstorm possible directions for the project, or prepare any upcoming assignments. More importantly, teams will engage in substantive discussions on the project and share their knowledge with each other; they must also help and support each other. Without these kinds of interactions, reflecting as they do a professional code of ethics, students are not gaining personal knowledge about the topic or about themselves. It is only "by writing and working as a team and by generating a product" that students will become more competent as communicators and thereby "more ready to assume their professional status" (Parker, in press).

Throughout the course, scaffolding is possible through the tutorials, where the instructor begins with a brief overview of the material, including any relevant theory, and the teams then engage in hands-on activities, such as reading and commenting (both verbally and in writing) on each other's work, or discussing various issues as a team. Thus, teams are first given the broad guidelines they will need for a particular task. Once they begin the task, there are various instructional materials available (such as sample reports) that they can consult as needed, or they can take advantage of the opportunity for many different interactions during a class. Indeed, one of the ways that we track a team's evolution and monitor their progress is by observing their in-class interactions. Individual students interact with the team in the first instance, but they might choose to interact with the instructor should they need any help. Teams often confer with

other teams as well. Students also have access to a campus-wide portal that allows them to communicate online with each other, to consult with the instructors or other members of the class, and even to store any of their documents. Finally, throughout this process, the tutorials and the assignments are interconnected so that the current one will build on the last and anticipate the next. Students thereby see the communication process in action.

The student team to be discussed here, the ME-2 team, will illustrate this process. This was one of two teams who chose "Mechanical Engineering" as their broad topic area for their final report; hence their name. The team was comprised of four students, most of whom were at different stages in their Mechanical Engineering program. One student, in particular, was a senior co-op student who, presumably, had some experience with team projects within a workplace environment. At the beginning of the project, however, he was disengaged and did not seem to share any such knowledge with his colleagues. In fact, all of the individual team members tended to come and go during group work in class; sometimes one or more of them would be absent altogether. Because of this initial reluctance to engage in the class itself or even in their own collaborative process, the team progressed very, very slowly.

This kind of cavalier attitude extended to their conversations in class, where they had the opportunity to share their knowledge of the topic. As noted earlier, Dong (2005) contends that the "construction of knowledge occurs through conversations about a subject matter," and it is these conversations that "serve to make knowledge explicit" (p. 447). Instead, often the entire team would sit looking at each other rather than discussing their project and sharing ideas. Nor did they seem to have the types of conversations (when they did have them) that would lead to shared knowledge. At first, for example, the team's conversations seemed fairly low-key, often with little animation displayed during their discussions and usually with just two of their members engaged in talking or in interacting with each other at all. In other words, conversations, and hence knowledge-building, were limited. Taken together, these signs of the team's cavalier approach to the project impacted how well they were able to construct and communicate their already acquired knowledge about the field of Mechanical Engineering in general.

After a couple of weeks of observation, coupled with a series of classroom oral briefings and in-class consultations, it became apparent that the team was struggling with choosing and focusing on a topic. When they began, for example, the ME-2 team announced that "anything automotive" was to be the focus of their paper; then it was "turbochargers" toward the end of the first month of classes. To their credit, the team did research the area of mechanical power generation more thoroughly than they had previously done and, together with the instructor's help and the help of a graduate student who had completed a thesis

in the area, the team finally settled on their topic: the feasibility of micro-hydro as an alternative to diesel generation in a remote northern community (micro-hydro, as its name suggests, is a smaller version of the typically large hydro dams that most power grids require and, as such, micro-hydro can feasibly supply the power to remote communities, such as the one eventually chosen by the team). It was after this decision was finally made that they noticeably "picked up the pace"; they began working harder in class and were less inclined to leave before the class had ended. More importantly, their conversations became more animated and more frequent as they began the task of constructing and sharing their knowledge of micro-hydro with each other.

The written, confidential documents that the team handed in clearly illustrate the students' increasing willingness to reflect on the team and the project as well as their growing sense of reciprocity. These documents represent another form of scaffolding that has worked especially well in this class. Not surprisingly, all ME-2 team members expressed the view that the "team could have been more organized" for half the course, as one of them remarked in his individual project log. Another commented that the team was often "scrambling" or "last-minute" in getting their work done. All agreed that the team needed to follow their own internal deadlines more closely, as they had been too lax as a group in honoring deadlines. But in their individual confidential reviews of the team's progress, two of them remarked that they would try and make the meetings—and the team—more effective. Although they were not too specific as to how to accomplish that, the in-class meetings subsequently seemed to be livelier than they had been and most of the team would be involved in the discussions. Clearly, there was some reciprocity beginning to develop.

Similarly, the team's project file—the record of the team's project work and its work as a team—showed that over the course of the semester they did begin to develop some "team building" mechanisms that would allow them to function more effectively. For example, in their meeting agendas and minutes, they started to introduce verbal "status checks" (as they called them) into their meetings. Here, they would provide progress reports on their individual work as well as updates on their project responsibilities and their team files. They also provided a detailed revision history of the final document to show how the drafts for the final report evolved over time. Detailed project standards were also included, and these showed they had indeed paid attention to the requirements for such things as visuals and report mechanics. In addition to these task-related functions, however, there was also a revised code of ethics that clearly reflected some of these changes to the way they worked.

Although student teams are expected to submit both an earlier version of the team's code of ethics and a later one, usually there are few, if any, differences

between the two. As well, the versions that most teams submit typically speak of very general expectations, such as "all team members will attend all meetings" or "all team members will work hard." ME-2, however, did rework their code of ethics, and these revisions reflect some of the precepts contained in the profession's code. For example, they set out "shared standards," such as defined project standards for the report; supporting each other as responsible members of the team; "contributing to education" by sharing information and knowledge; "deterring wrong-doing" by including specific details that would govern members' behaviour and interactions more exactly (Martin & Schinzinger, 2005, p. 44). In other words, they tried to outline issues of accountability and responsibility, both key to effective collaboration, in their code of ethics.

For example, they demanded that, if a team member could not attend a scheduled meeting, then that member must "notify the entire team by email at least 12 hours prior to the meeting and send regrets to the team"; likewise, they limited the number of times a team member could be late or absent either for in-class or out-of-class meetings. Most teams were not this exacting, even though issues of attendance are critical to many teams because attendance affects both the workload and the decision-making. But, at least toward the end of term, the ME-2 team did acknowledge the importance of attendance. They saw the impact that attendance issues could have and incorporated clear guidelines that would ensure that the task functions could be handled responsibly. So, too, with the process functions. This team's expectations of behaviour and interactions reflect their growing awareness of the need for respect, compromise and participation; this awareness likewise mirrors the local professional society's canon that professional engineers must support their colleagues. Even more important, perhaps, is their growing recognition that there is a need for "status checks." It is this guideline that the team added to their earlier version of the code, and it illustrates their growing commitment to reciprocity.

ASSESSING THE EFFECTIVENESS (AND EFFECTS) OF COLLABORATIVE CODE-OF-ETHICS ASSIGNMENTS

While at first the ME-2 team was certainly not an ideal team from the point of view of work ethic or even in-class behaviour, they did come to understand the value of the two lynchpins of collaboration and the underlying impetus for a code of ethics—accountability and responsibility. Without these, an ethic of collaboration cannot flourish, nor will the inherent richness of face-to-face communication be possible. In the workplace, as Vest and colleagues (1995) found, this kind of interaction is highly valued because it promotes

knowledge sharing and enhances the sense of a professional community. At the same time, it promotes the reciprocity that Franklin (1999) speaks of, that "give and take" that represents a "genuine communication among interacting parties" (p. 42).

This is clearly seen in their code of ethics. Timely resolutions of any conflicts; finishing pre-assigned work and meeting all the team's deadlines, even detailing the consequences should a team member fail to do so; committed and full participation; respect for others and for orderly exchanges of information; integrating status checks into the team's routine tasks—all of these provisos in the team's code of ethics demonstrate that the team has finally acknowledged the importance of their community and their commitment to it. So, at least for this student engineering team in the technical communication class, participating in a collaborative project has given them a taste of this community while showing them the importance of reciprocity.

A high degree of reciprocity also underlies the code of ethics written by "Group Home," the first multidisciplinary online team, and is sustained by subsequent textual interactions among members of that team. It is interesting to consider whether the code of ethics set the tone for this team, or whether the members' initial willingness to create a truly collaborative set of standards set the tone for the code of ethics: allowing the team to adhere to its code and rely on it as a means to achieve success. The code of ethics for the "Life Without TV" team also sets high standards—at times perhaps too high. Unrealistic expectations can quickly undermine team process and morale. However, perhaps a more influential factor for "Life Without TV" is the fact that the code of ethics was mainly the creation of one member. Arguably, this set the tone for subsequent problems; namely, low reciprocity in this team's interactions and a final product that did not achieve its initial promise. The team could not create or sustain a sense of shared engagement that would have enabled them to trust each other's abilities and cooperate in decision-making, forming a dynamic and productive learning community. Either way, how a team handles the code of ethics assignment can provide the instructor with some early insights into, and means to diagnose and support, team effectiveness.

Another problem for "Life Without TV" is that the available scaffolding, which included support for the code of ethics assignment, may have been insufficient. This result reminds instructors that requiring and conscientiously supporting a code of ethics cannot guarantee a successful team outcome in any environment, let alone one that combines the challenges of online (often asynchronous) communication with a multidisciplinary, heterogeneous student population: conditions increasingly shaping the nature of technical and professional instruction or training.

What does seem clear is that building an ethic of collaboration in the "new location" created by a multidisciplinary CMC environment requires instructors to provide a considerable infrastructure for support. But, as Bazerman (this volume) points out, this new location demands, in effect, that there be new ways to monitor and even shape both the new community that develops as well as the "virtual space" from which it emerges. These techniques and supports include:

- A forum for expressing, discussing and consolidating common interests
- Definitions and examples of accountability
- Models of helpful and unhelpful "codes of ethics"
- Sufficient scaffolding before, during, and after the "code of ethics" assignment
- Monitoring of team effectiveness
- Regular but not heavy-handed monitoring of discussions within forums

However, these strategies are designed to compensate for a mainly textual interface. Improvements in Web 2.0 technologies will likely allow teachers, students and professionals to incorporate more real-time, interactive (voice and visual) tools into online teaching and teamwork processes, which will arguably make it easier to create reciprocity and build viable learning communities.

TOWARD AN ETHICS OF COLLABORATION FOR TECHNICAL COMMUNICATION CLASSES

Even if the interactions of these disparate student teams—face-to-face and discipline-specific on one end of the spectrum, and distant, asynchronous and multi-disciplinary on the other end—were not entirely successful, they nonetheless opened the way toward conceiving and writing an ethic of community building within the knowledge society. Both types of teams must create, own, and hold themselves accountable to ethical codes governing not only the task but also the team process. For the engineering students, the lynchpins of responsibility and accountability help facilitate a richer collaborative experience. This

emphasis on collegiality and professional commitment might well define engineers as a kind of "community," at least in the terms Matei (2005) uses: that is, they "display community characteristics—group sanctioned identities, jargons, norms, strong personal relationships" (p. 346).

For online, multidisciplinary, technical communication teams, faced with creating and sustaining a learning community where none existed before, it is essential to lay the groundwork for cooperative decision-making through cooperative and engaged learning activities: in particular, "ground-up" ethical standards governing conduct and process. A written code of ethics can play a central role in compensating for the lack of interpersonal checks and balances that enrich face-to-face interactions—again, what Franklin (1999) considers essential for reciprocity. Writing a code of ethics can even play an important role in promoting respect and support, and enhancing engagement with the collaborative project.

While a team's code of ethics may only provide general guidelines for behaviour, it can nonetheless provide "helpful guidance concerning the main obligations" of the team members along with a shared sense of commitment (Martin & Schinzinger, 2005, p. 45). In this way, teams begin to take responsibility for their own learning at the same time as they nurture a sense of reciprocity that is so essential to both face-to-face and online student teams as a foundation for ethical community building. The outcome is not to master yet another decontextualized genre but, rather, to gain the experience of becoming meaningfully and ethically engaged; collaboratively writing a code of ethics can be seen as an effective analytic and learning tool as well, one that can be valuable in either learning environment. As such, writing together becomes a form of proto-professional engagement as well as "useful" exposure to the challenges of knowledge sharing in a variety of learning "locations of encounter."

In the final analysis, while encouraging and facilitating these ethical collaborative practices cannot guarantee either a positive team process or a successful product, we would argue that these ethical practices do encourage students to view teamwork as a professional activity that is "principle driven, valuing the people, engaging the culture and productive energies, and working as a collaborative workplace" (Marshall, 1995, p. 14). In this way, disparate individuals—both face-to-face and online—can come to think of themselves as a group of professionals who do indeed "share common interests, activities, and initiatives; who communicate regularly; and who derive benefit from their association" (Redish, 2004, p. 1; Quesenbery, 2005, p. 25). More broadly, integrating student teamwork within an ethic of community building helps foster the formation of a shared set of values and meanings (Artemeva & Freedman, 2001), all of which are essential to forming communities of practice that are both productive and sustainable within the knowledge society.

REFERENCES

Artemeva, N. (2004). Key concepts in rhetorical genre studies: An overview. *Technostyle, 20*(1), 3-38.

Artemeva, N., & Freedman, A. (2001). "Just the boys playing on computers": An activity theory analysis of differences in the cultures of two engineering firms. *Journal of Business and Technical Communication, 15*(2), 164-194.

Association of Professional Engineers and Geoscientists of the Province of Manitoba. (n.d.). *Code of ethics for the practice of professional engineering & professional geoscience* [Pamphlet].

Bruffee, K. A. (1984). Collaborative learning and the "conversation of mankind." *College English, 46* (7), 635-652. Retrieved fromhttp://www.jstor.org/view/00100994/ap020352/02a00010/0

Davis, M. (1998). *Thinking like an engineer: Studies in the ethics of a profession.* New York, NY: Oxford Press.

Donath, L., Spray, R., Thompson, N. S., Alford, E. M., Craig, N., & Matthews, M. A. (2005). Characterizing discourse among undergraduate researchers in an inquiry-based community of practice. *Journal of Engineering Education, 94*(4), 403-417.

Dong, A. (2005). The latent semantic approach to studying design team communication. *Design Studies, 26,* 445-461.

Dunkle, S. B., & Pahnos, D. M. (1981). Decision-making and problem solving: An holistic writing assignment. In D. W. Stevenson (Ed.), *Courses, components, and exercises in technical communication* (pp. 205-209). Urbana, IL: National Council of Teachers of English.

Flower, L. (1981). *Problem-solving strategies for writing.* San Diego, CA: Harcourt Brace Jovanovich, Publishers.

Franklin, U. (1999). *The real world of technology.* Toronto, Ont.: House of Anansi Press.

Haskins, M. E., Liedtka, J., & Rosenblum, J. (1998). Beyond teams: Toward an ethic of collaboration. *Organizational Dynamics, 26*(4), 34-50.

Ingram, S., & Parker, A. (2002). The influence of gender on collaborative projects in an engineering classroom. *IEEE Transactions on Professional Communication, 45* (1), 7-20.

Lay, M. (1992). The androgynous collaborator: The impact of gender studies on collaboration. In J. Forman (Ed.), *New visions of collaborative writing* (pp. 82-104). Portsmouth, NH: Boynton/Cook Publishers.

Lind, R. (1999). The gender impact of temporary virtual work groups. *IEEE Transactions in Professional Communication, 42*(4), 276-285.

Loui, M. C. (2005). Ethics and the development of professional identities of engineering students. *Journal of Engineering Education, 94*(4), 383-390.

Maki, P., & Schilling, C. (1987). *Writing in organizations: Purposes, strategies, and processes.* New York, NY: McGraw-Hill Book Company.

Marshall, E. M. (1995). The collaborative workplace. *Management Review, 84*(6), 13-17.

Martin, M. W., & Schinzinger, R. (2005). *Ethics in engineering* (4th ed.). Boston, MA: McGraw Hill.

Matei, S. A. (2005). A sounding board for the self: Virtual community ideology. *Journal of Technical Writing and Communication, 35*(4), 345-365.

Mathes, J. C., & Stevenson, D. W. (1976). *Designing technical reports: Writing for audiences in organizations.* Indianapolis, IN: Bobbs-Merrill Educational Publishing.

Moran, M. G. (1982). A problem-solving heuristic. *Technical Communication, 29*(3), 38.

Parker, A. (1989). A case study workshop and a problem-solving approach to technical communication. *Technostyle, 8*(1/2), 38-51.

Parker, A. (1990). Problem solving applied to teaching technical writing. *The Technical Writing Teacher, 17*(2), 95-103.

Parker, A. (2010). Introducing a course in technical communication into the curriculum of a Canadian school of engineering. In D. Franke & A. Reid (Eds.), *Design discourse: Composing and revising the professional and technical writing program.* Perspectives on Writing. Fort Collins, CO, and West Lafayette, IN: The WAC Clearinghouse & Parlor Press. Available at http://wac.colostate.edu/books/.

Quesenbery, W. (2005, January). Virtual communities: Weaving the human web. *Intercom,* 26-29.

Redish, G. (2004). STC transformation project: Focus on communities. *Devil Mountain Views:* Newsletter of the East Bay Chapter of STC, May/June, 1-4. Retrieved from: http://www.ebstc.org/newsletter/0504/mountford.htm

Reilly, C. A., & L'Eplattenier, B. L. (1996). Redefining collaboration through the creation of World Wide Web sites. *IEEE Transactions on Professional Communication, 39* (4), 215-223.

Reimer, M. J. (2002). English and communication skills for the global engineer. *Global Journal of Engineering Education, 6*(1), 91-100.

Rheingold, H. (1993). *The virtual community: Homesteading on the electronic frontier.* Reading, MA: Addison-Wesley. Retrieved from http://www.rheingold.com/vc/book/intro.html

Sageev, P., & Romanowski, C. J. (2001). A message from recent engineering graduates in the workplace: Results of a survey on technical communication skills. *Journal of Engineering Education, 90*(4), 685-693.

Sidnell, J. E. (2005, October/November). The code of ethics: What weight does it carry in the courts? *Canadian Consulting Engineers: Engineers and the Law.* Retrieved from www.canadianconsultingengineer.com

The Engineering and Geoscientific Professions Act, (2004). *2004*. Winnipeg, MB: Association of Professional Engineers and Geoscientists of the Province of Manitoba.

Tinzmann, M. B., Jones, B. F., Fennimore, T. F., Bakker, J., Fine, C., & Pierce, J. (n.d.). *What is the collaborative classroom?* Retrieved from http://www.ncrel.org/sdrs/areas/rpl_esys/collab/htm

Tonso, K. (2006). Teams that work: Campus culture, engineer identity, and social interactions. *Journal of Engineering Education, 95*(1), 25-37.

Turns, J., Wagner, T., & Shuyler, K. (2005). Moving toward knowledge-building communities in informational web site design. *Technical Communication, 52*(1), 52-63.

Vest, D., Long, M., Thomas, L., & Palmquist, M. E. (1995). Relating communication training to workplace requirements: The requirements of new engineers. *IEEE Transactions on Professional Communication, 38* (2), 11-17.