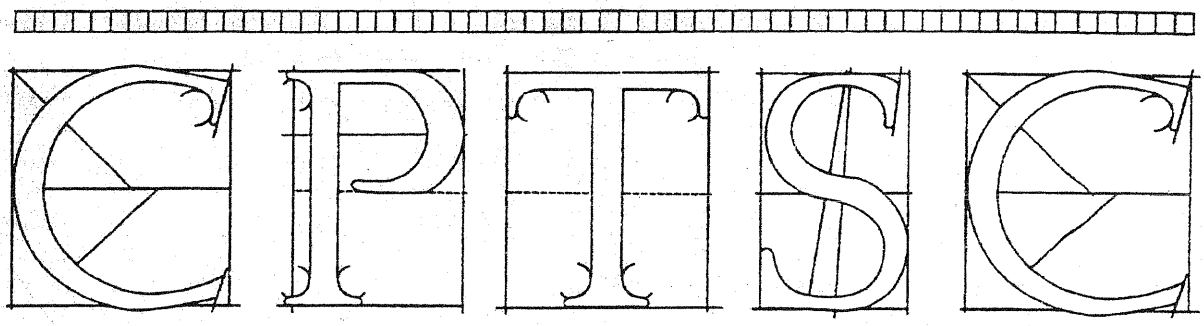

The Council for Programs In Technical and Scientific Communication

Proceedings
1996

Oxford, Ohio

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Proceedings

The Council for Programs
in Technical and Scientific Communication

23rd Annual Conference

Oxford, Ohio
September 36-28, 1996

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Program

23rd Annual Meeting
The Council for Programs in Technical and Scientific Communication

Host: Humanities Department, Miami University
Location: Miami Inn, Oxford Ohio
Date: September 26-28, 1996

Meeting Theme:
"Reinventing Programs in Technical and Scientific Communication"

Thursday, September 26

4:00 pm — Registration, reception, buffet, cash bar: Miami Inn

8:00 pm — Keynote by Stephen Bernhardt "What We Do Well: Lessons Learned in the Pharmaceutical Industry": Marcum Center, Rm 180

Friday, September 27

7:00 am — Continental Breakfast: Marcum Center, Rm 150

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Moderator: Paul Anderson

Russel Hirst, "Priorities and Interests in Education and Training: Signals from STC Proposals"
Marilyn Cooper, "Strategies for Postmodern Technical Communicators"
James Porter, "Postmodern Management and Writing Practices in the Electronic Corporation / Classroom"
Don Payne, "Reinventing Our Technology Relationships"

9:45-10:05 — Coffee Break

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Session IIb: Marcum Center, Rm 158

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Kenneth T. Rainey, "The STC Job Competencies Study: Implications for Curriculum"
Charles Kemnitz, "A New Program Design Process"
Herb Smith, "Evolving Roles in the Workplace for Technical Communicators"
Margaret Hundleby, "What's the Purpose of Teaching Technical Communication at GM?: Reinventing Collaboration with Industry"
Gerald Savage, "What Can Technical Communication Internship Programs Do for Derailed and Trackless English Majors?"

Session IIb: **Interdisciplinary Connections**
Moderator: Deborah Bosley

Kaaren Blom, "Re/inventing the Technical and Scientific Communication Wheel..."
Tim Peeples, "New Academic Organizational Structures Lead to New Opportunities and Responsibilities for Technical, Professional, and Scientific Communication Programs"
Peter Hager, "Curricular Interdisciplinarity of Future Programs in Technical and Scientific Communication"
Chris Birchak, "(Creativity)2: Raising Professional Writing to a New Dimension"
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Moderator: Steve Bernhardt

Debby Andrews, "Developing Programs for the Global Community"
Bruce Maylath, "Yankee, Leave Home! Reinventing Technical Communication Programs for Documentation Abroad"
Deborah Bosley, "Service Learning and Projects-Based Education: Let's Get Them Out of Our Classes"
Jeffrey T. Grabill, "Universities and Community-Based Literacy Programs: Connections Pushing Curricular Change in Technical Communication"

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Moderator: Katherine Staples

Mohsen Mirshafiei, "Do We Need to Reinvent or Supplement Our Programs in Technical and Scientific Communication?"
Laurie Schultz Hayes, "On Not Forgetting Oral Communication When Reinventing Programs in Technical and Scientific Communication"
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Paul Anderson, "Make More Room for Ethics: Our Programs Should Address Ethical Issues Concerning Treatment of the Participants in Empirical Research and User Testing"
Anthony Flinn, "Adventures in Artifice: Simulating Professionalism in the Software Development Team"

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Session IVa: **Setting Goals**
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Meg Morgan. "Assessing Technical Communication Programs: Who Does What to Whom and Why"
Karen Rossi Schnakenberg. "Reconceiving the Theory/Practice Relationship"
Katherine Staples. "Reinventing *Praxis* in Technical Communication: Two-Year College Programs and the Disciplinary Community"
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Johndan Johnson-Eilola. "Technical Communication in a Post-Industrial Age: Five Key Projects"

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Martha Sammons, "Issues in Preparing Students to Write for New Technologies"
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5:00-7:00 Executive Board Meeting & Dinner: Marcum Center

6:00-8:00 Private Showing of Miami Art Museum

7:00-10:00 Dessert & Wine: Western Lodge

Keynote Address
Our Core Business: What We Do Well

Stephen A. Bernhardt
New Mexico State University, Las Cruces

My goal in this keynote talk is to share recent experiences gathered during a year of consulting to the pharmaceutical industry with Franklin Quest Consulting Group (formerly Shipley Consultants; soon to be Franklin-Covey). In the process, I hope to identify some of our core competences -those things we do well as technical communication faculty.[1] I will focus on our consulting involvement with a single large pharmaceutical company headquartered in Basel, Switzerland, a company with business locations around the globe.

The Context

The part of the pharmaceutical industry I consulted with focuses on drug development: taking a chemical from laboratory to market. The work is research intensive, with long development timeframes, high costs, and potentially high benefits. The pharma world is highly regulated, with multiple oversight and approval agencies for various world markets, all with differing regulations and complex processes. Like many industries, the pharma business is moving from local/functional organization to global, team-based management structures, with many consequent changes and disruptions.

The industry is a document-intensive knowledge organization; it essentially sells knowledge products through verbal processes of presentation and argumentation. The cross-functional teams that develop the drugs and application filings pull together researchers, chemists, regulatory experts, and business representatives from Europe, England, the U.S., and Japan in an effort to develop an application that can be submitted simultaneously for multiple markets. As a benchmark, a typical filing for a new drug in the U.S. might run to 600 volumes and some 100,000 pages, a massive document by any standards. Pharma companies are moving rapidly to implement technologies that coordinate the global production of large volumes of information.

Our consulting intervention project began with an extensive document evaluation-some 60,000 pages from four different new drug applications were evaluated for document quality using modified primary-trait scoring. After identifying multiple problems with document quality, the intervention expanded to training classes in document standards, writing processes, and document coordination. As the project gained momentum, it became part of larger initiatives to change the working culture at the company, and consultants became team facilitators, joining project teams and changing the ways of working to apply document science, to foster good collaborative writing techniques, and to further integrate a new rhetoric of scientific discourse. Still later in the project, in response to increasing demands for global teamwork, the consulting team played increasing roles in exploiting technology for document development and teamwork. The final stage of the intervention was the creation of a new, internal department to take over the function of the consultants.

The Mantras

Four mantras tended to guide the project; they were repeated frequently as we attempted to bring about new ways of working:

- Drug development is message-driven and issue-oriented.
- Seeing is thinking is writing.

---

[1]These are notes of my talk constructed after the keynote address, not the complete text, as I normally speak from overheads rather than writing out my presentations. The recorded talk is available via RealAudio at the CPTSC website: http//www.hu.mtu.edu/cptsc. I have written in some detail about these experiences in two places:

"Using Technology to Support Global Drug-Development Teams" To appear in *Redefining Professional Communication as an International Discipline*. Edited by Carl R. Lovitt and Dixie Goswami. Under consideration by Ablex Publishers, for ATTW's Series on Technical Communication, Jimmie Killingsworth, Series Editor.

"Technology-Driven Documentation in the Pharma Industry." *Journal of Computer Systems Documentation*. Winter, 1995.

- Writing is a process.
- Technology creates collaborative space.

Drug development is message-driven and issue-oriented: We attempted to let documentation drive the science. As early as possible in the development of documents, we worked with the groups to agree on consistent messages about fixed issues. We encouraged teams to confront the development issues directly with coherent responses and rationales grounded in the data. We attempted to guide the whole development process by group consensus about what were the most important things the team could say about their compound and what were the most difficult issues confronting development. We wanted to get the messages and issues clearly articulated so the team worked with shared goals and understandings. We also wanted to help them identify needed rationales and support for the claims they intended to make in their drug application.

Seeing is thinking is writing: We used visual thinking processes as much as possible to create shared standards, shared ways of working, and shared messages and issues within the teams. We developed tools for putting language in front of the team, organizing messages, issues, responses and support within MIRS Tables™, visual representations of the team's thinking. We didn't allow issues to float in the air, or to be represented only orally, or to be the subject of discussion without being written down. Instead, we tried to use writing as a thinking tool, to get issues out in front of the team where they could be debated in common language toward common understanding. We used early document prototyping™, mapping out as far in advance as possible the key messages and issues to be placed in reports. Long before the data were in, we prototyped the research reports, identifying what we must be able to say, how we would line up the data, what interpretation we would attempt to support. We used visual display technologies in meetings, always trying to get the right language nailed down as part of the team process of formulating their arguments for the new drug. These products of visual thinking were the work and outcomes of many of our meetings, so people would not just meet and talk, but meet and get work done-physical representations of their thinking and arguing, representing research and development work.

Writing is a process: We attempted to institute sound process-oriented document development, with early planning and drafting of key documents following the rapid prototyping. We encouraged open, collaborative composing of documents, with frequent, team-based sessions where documents were drafted, reviewed publicly, debated, and changed. Throughout document development, we encouraged team-ownership documents as opposed to individual ownership. Our processes of drafting and review were based on cross-functional teamwork, documents were stored in team accessible spaces, and group review and markups systems allowed review cycles to become public affairs. We attempted to pry documents loose from their closely held positions by individual authors.

Technology creates collaborative space: We continually pushed uses of technology toward social applications, creating shared spaces for teamwork. Although we found the need for document-intensive technologies to be ahead of the available tools, we were able to work with shared drives, document cycling, application sharing, and various display technologies so that teams could work on documents in shared workspaces. We came to rely increasingly on global teamrooms, technologically facilitated workspaces that connected globally dispersed teams through multipoint video and phone conferencing, connected computers, large display computers, and groupware applications.

Needed Skills for Consulting

In the kinds of work described above, certain skills emerged as important for consultants. Consultants needed interdisciplinary foundations, to understand rhetoric across scientific, technical, and marketing contexts. They needed to be quick studies, able to come up to speed quickly on the mechanisms of degenerative arthritis or the tests for viral replication of HIV. Consultants needed a good understanding of writing and group process skills, knowing how to encourage individuals to develop their writing in a collaborative team setting and how to handle conflict. Familiarity with organizational communication issues was also important, because the development work took place within large, global bureaucracies with many local, competing cultures and agendas. And an understanding of writing and group technologies was constantly called for: how to conduct meetings and reviews on-line, how to work with revision tools and directories, how to design and revise data displays, and how to format documents.

More than any other skill demanded of the consultants was that of being a good group facilitator, aware of how the teams were functioning, what was going wrong, how to get group involvement and support for new ways of working. The consultants needed to be quick thinking, tenacious, and oblivious to insult. There were constant challenges to our authority and we constantly had to prove we added value to the teams and the larger organization.

What We Do Well

As teachers of technical communication, we do many things well that are highly valued in such a consulting intervention and in the workplace at large. We should hold to these skills as foundational competencies for ourselves and our students. These competencies should influence our courses and our programs, and we should be certain that whatever else we manage in our programs we do not shortchange these skills:

- We understand writing processes: thinking, seeing, shaping, planning, governing.
- We know how to foster teamwork through managing conflict and consensus.
- We see both writing and technology as essentially social.
- We are teacher/rhetoricians: agents of cultural change.

These core competencies can guide what we do and help us define secure roles in the emerging knowledge organizations that define the workplace today.

Disciplinary Issues—
Theory, Practice, Technology

Priorities and Interests in Education and Training: Signals from STC Proposals

Russel Hirst
The University of Tennessee, Knoxville

I am Education and Training (ET) stem manager for the 44th annual STC conference in Toronto, Canada (May 11-14, 1997). My reviewers and I have recently read through the 38 proposals submitted to that stem. The submissions propose individual papers, workshops, demonstrations, and panel discussions. I'm going to discuss the main themes of those proposals.

It's interesting to look at these themes because the size and diversity of STC membership means that the STC Call for Proposals throws a wide net. It embraces industry trainers and consultants as well as academicians-and in fact, the numbers of proposals I received from people in these two general groups balance pretty evenly. Looking at this batch of proposals affords some insight into the current opinions, plans, predictions, and concerns of tech comm educators across the board.

The ET Stem portion of the STC call for papers (deadline was August 1) reads like this:

"This stem is for proposals of particular interest to educators and trainers in technical communication, in academic, industrial, and business settings. Share your experience and research on the following topics: academic curricula or corporate training programs in technical communication, specific experiences and exercises for teaching technical communication, student and faculty internships, the application of information technologies to education and training, collaboration between academia and industry, professional concerns for educators and trainers, and the future of education in technical communication."

Most of the proposals focus on the new information technologies, distance education, and collaboration between industry and academia.

We're all aware that information technologies are transforming tech comm practice and pedagogy. The proposals I've received that are devoted to curricular change in academia are replete with advice for integrating the new technologies into existing curricula. They describe how to deliver distance education; how to "re-create the tech comm classroom on the world wide web"; how to teach web page design; how to make proper use of e-mail, listservs, and electronic discussion groups; how to teach students to do on-line research, to publish on the web, to use multi media, and to take advantage of the Internet in all sorts of ways. These are not, of course, *brand-new* themes. But what is somewhat newer are proposals that now offer extensive *evaluation* of tech comm education that has been using these information technologies, and proposals that offer solutions to the problems that have come in with the new technologies.

Take, for example, the problem of virtual versus real presence in tech comm (or any) instruction. The proposed solutions are, in general, technological and programmatic. Existing software and hardware goes a very long way towards making virtual presence as good as, and in many ways better than real presence, the proposals claim-but tech comm educators themselves are not yet (in general) expert with the technology. Hence the many proposals offering suggestions for ways to "phase in" or "integrate" the new technologies with existing curricula and teachers.

On the industrial side of the equation, I have a number of proposals with the words "old," dog," "new," and "tricks" somewhere in the title or subtitle. The canines referred to range from the company's general workforce (little dogs) to management (big dogs), and the steaks for learning "the new system," whatever it may be, are stacked high. Productivity must not suffer. The industrial scenario differs from the academic one principally in terms of those ever shifting steak stacks, the age of the dogs, and the technological expertise of the instructors.

The proposals I received from our educational cousins in industry are generally quite good. They offer models and advice for analyzing the audiences to be trained, analyzing various educational media and methods, working with organizational hierarchies, developing training databases, applying ISO 9000 to training, and so on. Their resources

are often extensive. When I compare what I'm doing with instruction in information technology compared with what Motorola Universities is doing, I can't help feeling a little threatened. One of our academic colleagues who submitted a proposal predicts that as information technologies continue to explode, many more non-traditional students will demand education, the difference between on- and off- campus education will become blurred-and private enterprise will compete heavily with academic higher education in tech comm. This is a prediction that should get the attention of academicians.

Personally, I am comforted by the proposals that describe not competition but collaboration between academia and industry, principally in the form of internships (both student and faculty internships), collaborative teaching, and a sharing of knowledge and resources in general. By the way: submissions advocating that academia and industry should collaborate in teaching tech comm, or that herald past or present collaboration, describe a heavy dependence upon the new information technologies to make that collaboration work. Technology and "distance education" can bring academia and industry together as well as shoulder them apart. This reminds me of those little "infomercials" many of us saw in our youth: "Atomic energy: friend or foe?" It all depends on how we use it.

Finally, in giving an accurate report of the themes represented in the proposals I've reviewed, I must add that quite a few of the more traditional themes are still present and very welcome: how to teach people to write winning proposals and trouble-free procedures, how to teach people to prepare technical documents for translation, how to make oral communication a pillar of your tech comm class, and so on.

As manager of the Education & Training Stem for STC's 1997 Annual Conference, I will end with an invitation. It's not too late to send me a proposal, even though the official deadline has passed. I would like to have a panel dedicated to ethical and social concerns in scientific and technical communication. I have a couple of proposals that dwell on these themes-particularly in terms of environmental communication and communication about "difficult subjects" such as AIDS- but I'd like more. I'd also like a panel with a title something like Teaching Tech Comm Literacy in Volunteer Settings (I don't mean strictly in Tennessee settings). And I'd like something on the place of rhetorical theory, composition theory, literary theory, and humanistic concerns in general within various levels and kinds of tech comm programs. How about a panel called "Isocrates: the Greatest Technical Communicator Who Ever Lived"?

Educating Postmodern Technical Communicators

Marilyn M. Cooper
Michigan Technological University

It is a commonplace in discussions of technical and scientific communication programs that studying sophisticated academic theories is a dangerous distraction for students who need to acquire practical communication skills and technological knowledge to succeed in an increasingly competitive job market. And postmodern theory, it might be thought, is the most dangerous distraction of all. What I want to argue, however, is that an understanding of the postmodern condition—which is nowhere more real than in the workplace—should be central to the education of technical and scientific communicators if we want to help them succeed.

Postmodem theory, of course, is composed of many strands, some more productive than others. In arguing for its usefulness to technical communicators, I follow Fredric Jameson's characterization of it "as a symptom of the deeper structural changes in our society and its culture as a whole . . . " (p. xii). Postmodem theory argues that these deep structural changes in society are so profound that we need new assumptions to cope with them, and it attempts to describe the new assumptions that motivate and make understandable the changes in such things as workplace organization, communication and marketing strategies, and social planning and control (or the lack of it).

The central tenet of postmodern theory is that changes in the global economy—the creation of a world market—and in transportation and communication technologies, which have brought about the real and virtual mixing of populations with different cultural values and beliefs on a daily basis, have caused shifts in social structures and in the way we think about and represent our world and ourselves. Some examples: global finance, no longer tied to the US dollar, eludes understanding and control by any nation, any collective, or any individual; cultural diversity renders standards of communication and behavior meaningless, both locally and in the "global village"; global trade and exchange of information makes control of the development of technology by nations or individual industries or companies impossible; international competition destabilizes business organizations—and national control of business—and fuels rapid technological development; overdevelopment causes global environmental destruction that cannot be predicted or reversed. If we look on this world from a modernist perspective, which assumes that only universal standards, laws, and values and strong national control of trade assures a stable and good society, we see a nihilistic world out of control. But postmodern theory suggests that if we abandon these assumptions, we can develop new strategies for coping with this changed world.

In what follows, I suggest four strategies derived from postmodern theory that technical communicators need to learn to survive and thrive. These strategies are not hypothetical but are already used by workers and organizations to adapt to the changed conditions. Though I discuss them separately, in practice of course the four strategies work together and rely on each other. After brief sketches of each strategy, I examine one of them—shared responsibility—in more detail. The strategy of shared responsibility is clearly observable in discussions of the new corporate structure, but its theoretical basis and effects have received little attention. The other three strategies, though arguably postmodern rather than modern in orientation, are more familiar to technical communication teachers and researchers, and mapping is being used in technical communication classes at Purdue and at New Mexico State.

The first strategy is **contextualization.** Instead of seeking universal truths, we need to examine the multilayered local and particular circumstances that structure all events. Brockmann quotes the book *Corporate Cultures,* which points out that the everyday business environment copes with relativism quite differently than philosophers, who find themselves "without convincing responses": "Even if ultimate values are chimerical, particular values clearly make sense for specific organizations operating in specific economic circumstances" (qtd. in Brockmann, 111). Paradis also points in this direction when he insists that technological products are embedded in complex social relations and must be aligned with social ends.

The second strategy, **mapping,** complements the first. All local situations are also structured by global forces, and these connections need to be traced in order to "locate" oneself for effective action. Unlike modernist metanarratives of progress, postmodern maps are contingent, singular, practical truths: new maps are drawn for new purposes and multiple ways of navigating the changing structures are revealed. Johndan Johnson-Eilola argued at last year's CPTSC that successful technical communicators need to position themselves as what Reich calls symbolic analysts.

and Reich emphasizes the centrality of mapping in the education of symbolic analysts: "To discover new opportunities . . . one must be capable of seeing the whole, and of understanding the processes by which parts of reality are linked together.... Learning how to travel from one place to another by following a prescribed route is one thing; learning the entire terrain so that you can find shortcuts to wherever you may want to go is quite another" (p. 231).

The third strategy is **shared responsibility.** Instead of reestablishing standards of behavior and communication and bolstering authoritarian structures of command, we need to make everyone a participant in and responsible for decisions. This strategy represents perhaps the most radical shift in assumptions, for it replaces authority and expertise with universal participation. It suggests that good decisions and solutions come out of the sharing of multiple perspectives, and thus business ethics becomes a practical matter rather than a personal matter of living up to prescribed standards.

The fourth strategy is **sustainability:** instead of developing new technologies to correct the damages of old technologies, we need to integrate the technologies we use with healthy social and natural environments. Paradis calls for this when he says that the function of operators manuals is to align the products of technology with the value-laden ends of society, and Feenberg suggests that a critical theory of technology would recover and examine the connections between technologies and social and natural environments. And, again, what might appear from a modernist standpoint as a matter of personal ethics—doing the right thing—becomes from the postmodernist standpoint a practical matter of designing successful products. Since you all have my abstract, I'm not going to repeat the rationale for looking to postmodern theory to supply new strategies for technical communicators.

The strategy of shared responsibility comes out of an insight that seems to have struck corporate management, economic and business advisors, academics in organizational communication and organizational behavior, and social critics at the same time: the insight that the modernist model of top-down control of organizations or societies is not only ineffective but has led to many of our economic and social problems. Needless to say, these different stakeholders inflect their versions of shared responsibility differently, and there is a definitely serious struggle over how the strategy will be applied in the workforce. Nevertheless, the insight that grounds shared responsibility makes it a strategy that will work for technical communicators (and others) both in the current global marketplace and in the more localized economies that many critics expect to follow the immanent collapse of globalization.

Andrew Feenberg's name for this strategy is collegiality. He explains:

> It seems appropriate to call this praxis "collegial" since individuals participate in it only insofar as they share responsibility for an institution.... In modern societies collegiality is an alternative to traditional bureaucracy with widespread if imperfect applications in the organization of professionals such as teachers and doctors. Reformed and generalized, it has the potential for reducing alienation through substituting conscious cooperation for control from above. (190)

From this point of view, shared responsibility offers workers a stake in and some control over the decisions and operations of the companies they work for.

From the point of view of corporate management, shared responsibility offers greater flexibility and creativity in decision-making, increased productivity, and reduced labor costs. Corporations can easily eliminate middle management when all workers take on middle-management tasks. Here's the introduction to a handbook that accompanies Price Pritchett's workshops on "career success":

> You're involved in something *BIG.* The shift to an entirely new economy . . . a new age . . . a vastly different approach in the way organizations operate.
>
> Work is going global. We're entering the Information Age. The economy is shifting more and more toward *services,* and toward *knowledge work.* Before long, top management absolutely won't be able to run things the old way, even if it desperately wants to.
>
> New technologies—especially computers and telecommunications—have already created intense, worldwide competition for business. Soon, competition for your very own job could come from practically

anywhere on earth.

Careers have already quit working like they used to. That's not really *anybody's* fault. But employees and organizations are very much at fault if they, to don't change in order to adapt....

And change *always* comes bearing gifts.

Considering the scope and speed of change these days, there will be precious gifts—many priceless opportunities—for those of us who play by the new rules, position ourselves right, and take personal responsibility for our future.

In the rest of the handbook, Pritchett tells corporate employees that they should commit themselves to providing customers with high quality and speedy service, setting priorities in their job, taking responsibility for the success of the entire enterprise, holding themselves accountable for outcomes, upgrading their own job performance, and finding solutions rather than shifting blame.

These are all good recommendations, good not only for career success but for a just society and a stable economy—as long as a couple of conditions are added. First, employees must also commit themselves to finding solutions and outcomes that ensure the long-term success of the enterprise (and the society in which it is embedded) by employing the other strategies I mentioned: by contextualizing their decisions in the multilayered local and particular circumstances, by mapping the connections between local circumstances and global forces, and by seeking economically and environmentally sustainable solutions.

Second, top management must also commit itself to sharing these responsibilities. Otherwise, shared responsibility becomes merely a ruse, a way of shifting responsibility to employees while CEO's and stockholders benefit from increased profits. The language of the Price Pritchett handbook belies this orientation throughout by portraying top management as helpless in the face of naturally evolving global forces to which both employees and organizations must adapt. David Korten, previously of the Harvard Business School, critiques this position:

> A global economy is inherently unjust, unstable and unsustainable.
>
> The removal of barriers to the international flow of goods and money did not happen as part of a natural evolution, as its advocates claim, nor was it the consequence of inexorable historical forces. The policies that made it happen resulted from conscious choices of a self-interested minority who, over the past half-century, have designed, shaped, and now control the institutions that dominate global economic activity.

As he points out, the global economy is not inevitable or irreversible, but resulted quite explicitly from decisions at the Bretton Woods meetings of 1944 that founded the World Bank and the International Monetary Fund and laid the groundwork for the General Agreement on Tariffs and Trade. CEO's who pretend that such decisions are out of their control and not their responsibility while insisting that their employees take responsibility for the success of the enterprise effectively exempt themselves from the rules of Pritchett's "new economy."

In conclusion, I argue that by employing these four strategies, technical communicators can position themselves to be the symbolic analysts who will succeed in the global economy. But these same strategies will also help them succeed in—and participate in structuring—a more sustainable and stable economy after the collapse of globalization.

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Postmodem Management and Writing Practices in the Electronic Corporation/Classroom

James E. Porter
Purdue University

Increasingly, the work of technical communicators will be internetworked cyberwriting (Porter, in press). Cyberwriting refers to the creation, design, organization, storage, and distribution of electronic information via wide-area networks. Electronic information includes not only verbal text, but also audio, visual, and cinematic "text" distributed via the Internet and World Wide Web. It includes forms like synchronous chat, e-mail, and hypertext web sites. The Web in particular provides a means for corporations to communicate with clients and customers, not only in the conventional ways (i.e., to sell products and services, to distribute corporate information, to promote the corporation), but in *potentially* more interactive and intimate sorts of ways. The electronic environment has already changed, and will continue to dramatically change, both the definition of writing and the writing practices of professional writers.

Rosile and Boje (1996) argue that there are three forms of management and work practice that coexist in the contemporary workplace: premodern, modern, and postmodern. Rather than seeing these three forms as distinct stages of history, they argue that the postmodern supplements the modern and premodern forms of management—so that we now inhabit an era where the features of three management/work paradigms coexist in sometimes happy and sometimes unhappy coincidence.

point #1
professional/technical writing should design instructional learning environments that correspond to—though do not passively accept the power relations of—workplace writing environments

type of work/ design of learning environment*	site for learning	relationship between workplace and learning
premodern	on-the-job apprenticeship	strong link between workplace and learning
modern	university classroom	divides student from workplace/worker role
postmodern	computer network	links classroom and corporaion virtually (potentially)—but with what relations and under what conditions of power?

*Categories adapted from Rosile & Boje (1996)

I would like to consider how technical and professional writing programs might adjust to the postmodern aspects of professional writing work—and learn to coordinate that sort of work with modern and even premodern practices and developments—in the ways that we design courses, assignments, and instructional computing spaces.

How is internetworked computer technology used as a writing/working tool? How will it be?

Limited or no use

The business professionals in Dautermann's study (1996) were not yet using the full network capabilities of computers. Most of them were using the computer in limited ways, largely for word processing.

Traditional use (modern: technology supports existing hierarchies/relations and distribution of print materials)

The WWW is often used as a way to advance conventional hierarchies and business alignments: for instance, (1) as an electronic means of distributing traditional corporate information (e.g., TIAA-CREF annual report); (b) as an electronic means of selling products and services. Is this a de-skilling or constraining use of the technology, moving power out of the hands of writers/developers and readers/users Johnson-Eilola & Selber, 1996)?

Future/potential use (postmodern: technology supports the development of new kinds of information and relations)

Management futurists focusing on the emergent features of "the postmodern workplace" note several things about the changing nature of work. The increased use of internetworked computers will encourage the breaching of traditional boundaries—cultural, corporate, academic, and disciplinary. The university vs. workplace division will be breached, as will national borders and even corporate boundaries, as there will be more "interfirm alliances" (Ciborra & Schneider, 1992), more global alliances, more interfield/interdepartmental projects.

Peters (1992) says that "tomorrow's effective organization will be conjured up anew each day" (p. 11). The new corporation will be characterized by dynamic and fluctuating roles and responsibilities, unclear lines of authority, and the flattening of hierarchies. Professional writers will need a keen sense of infrastructural development; they will need to know how to assess an organizational structure, negotiate it, adapt it, and work on its margins and/or resist it in order to "get work done." Work will be situated around projects rather than company or product based; the focus will be on "extended family project management" (Peters, 1992, p. 122) and "integrated teams" (Killingsworth-Jones, 1989) constructed across corporate and disciplinary lines. Cyberwriting will have a key role to play in these developments—and may in fact be their prime mover.

Although futurists gleefully proclaim the arrival of the post-capitalist workplace, we should be sobered by two points: (1) New ways are unsettling. The restructuring of the corporation will result in anxiety of identity, in loss of stability, and in disruption of the structures that provide people with support and comfort (even when they constrain). (2) Old ways die hard. Traditional business interests are using legislative action, legal remedies, and strict management policies to recover the loss of stability and power that such a shift to a postmodern workplace entails. The electronic workplace sets up a counter-structure to the non-electronic workplace which threatens to overturn established interests and develop a new set of valued skills and power relations. So the professional writer may need to negotiate projects and positions perhaps within even harsher parameters and constraints than before. The modernist corporation is by no means dead—though its paradigm is being challenged—and the effective professional writer will need to be a good modernist as well as a postmodernist.

point #2
professional technical writing should respond to the changing nature of workplace writing and management theory/practice

field	workplace development
professional/technical writing	cyberwriting
management (especially critical management)	post-capitalist economy and work

Conclusion

Will the electronification of the workplace lead to the electrocution of the worker/writer? Will computers be used to informate or automate (Zuboff, 1988; see also Johnson-Eilola & Selber, 1996)— that is, will they be designed in ways that subordinate and oppress or in ways that enhance the status of workers/writers and enable better relations across boundaries? Technical and professional writing programs will have a say in guiding this development. But what will they say?

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Reinventing Our Technology Relationships

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To the extent that computers are the defining technology for technical communicators approaching the twenty-first century, we may need to reinvent the relationships between communication and technology and to reshape our programs accordingly. For one thing, digital technology is altering technology's objective status. For professional communicators, technology has historically most often been the subject matter, the thing outside itself, the content to be communicated. Computers can be viewed this way, of course. Computer manuals and on-line documentation are conspicuous examples of writing about computers for specific purposes and audiences. But computers play a second role as the very tools of professional communicators. We understand more clearly today that electronic communication has given us the contrastive lens we needed to reexamine print technology. Print had become so transparent that we routinely ignored its technological character. We can never again be so naive about our communication technologies.

Our field now has a new set of concerns. When we adopted computers as our primary tools of production, we accepted ethical responsibility for monitoring their effects. If we have learned the lessons of our love affair with print, then we cannot treat computers as just another external technology, like some chemical process or engineering design. Instead we must look beyond its physicality and become attuned to technology as a sociopolitical construct that shapes what we do at a most fundamental level. The field of professional communication must expand now to include yet another Sisyphean labor, the postmodern labor of perpetually deconstructing its communication technologies. In the digital age, technology as object and technology as system are merging. The instrument is becoming the defining environment and the interpretive filter for our professional communication activities. At a practical level, it may well be that our programs will effect some paradoxical balance. On the one hand, we will likely continue to integrate computer technology into both the content and pedagogy of our courses, the natural path of shifting from computer-as-fad to computer-as-infrastructure. On the other hand, we may need to expand our core of computer-intensive courses, not the least of which may be one or more focused on the ethics of technology.

Developing Connections: Workplace Connections

Developing Connections

Workplace Connections

The STC Job Competencies Study: Implications for Curriculum

Kenneth T. Rainey
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A study now proceeding within the Society for Technical Communication to identify job competencies in technical communication, irrespective of the industry in which the communicator works, will produce information that academic program directors and instructors will find useful in evaluating and in reinventing their curricula The study will produce a job analysis report and a job competencies guidebook that will furnish information also that individuals could use in career planning, that human resources personnel could use in writing job descriptions, that training directors could use in preparing training courses, and that a professional association could use in a certification program.

Information for reinventing technical communication curricula will be based on research data gathered using a structured focus group approach known as the Nominal Group Technique (NOT) and from additional data gathered from a broad-based survey of 2,000 technical communicators who have been in the profession for at least three years. Survey respondents will be randomly selected from the membership lists of such professional organizations as the Society for Technical Communication,, the Association of Teachers of Technical Writing, the Council for Programs in Scientific and Technical Communication, American Medical Writers, ACM/SIGDOC, and American Society for Training and Development..

Data already gathered show some specific themes:

- Professionals in technical communication are masters at recasting information so it can be used by someone less technically oriented.
- They design both verbal and visual messages.
- They are highly skilled with the written language.
- Their intellectual skills are inductive.
- They value and take pride in their ability to communicate complex concepts.
- They make use of technology and different media to design and transmit information.
- They see themselves as advocates for the information end user.
- They see their role as one of assuring access to information
- They appreciate or have facility with technical concepts, i.e., engineering, scientific, electronic, etc.
- They see their profession as ill defined and misunderstood.
- They lack skills in public relations and marketing.

The data also show statistically significant concepts in four specific areas:

- Characteristics that distinguish the field of technical communication from other fields.
- Assignments unique to technical communicators.
- Skills and abilities appropriate to technical communicators.
- Characteristics that distinguish a competent technical communicator.

What distinguishes the field of technical communication from other fields?
Managers, consultants, and editors/writers agree that what distinguishes the field are that

- It requires highly developed skills with language, identifying user needs, and analysis and synthesis of information.
- The field is misunderstood and ill defined.

What assignments are unique to technical communicators?
Managers, consultants, and editors/writers agree that these assignments are appropriate for technical communicators:

- Analyzing user information requirements.
- Information design.

- Executing documents to be used by a less technically oriented audience.

What skills and abilities must a technical communicator have?

Managers, consultants, and editors/writers agree that technical communicators must be skilled in

- The selection, manipulation, and adaptation of language to communicate complex concepts, rules, and procedures.
- The analysis and synthesis of technical information to extract key relevant rules, concepts, and procedures.
- The identification and analysis of user information requirements.
- Establishing collaborative relationships with individuals of different status.
- Setting priorities, organizing tasks, and staying focused.

What distinguishes a competent technical communicator?

Managers and editors/writers emphasize the importance of being reliable, i.e., the ability and willingness to consistently produce information that is usable in content and form. Managers, consultants, and editors/writers agree that what distinguishes the competent technical communicator are

- A relentless focus on identifying and providing end users with usable information.
- Superior language, message design, and interpersonal skills.
- A dedication to continuous, self directed learning.
- Superior project/dine management skills.
- An affinity toward technical content.
- Adding value beyond what was expected.

Based on the data thus far accumulated the following competency areas are being developed:

- Professional Core
- Analytical, Conceptual, Reasoning
- Environmental, Social, and Contextual
- Interpersonal
- Product Development and Management
- Self Management
- Career Management

Professional Core Competencies include such abilities as the ability and willingness to be an advocate about the end user's needs as well as knowledge of information design, presentation of data, language, and communication principles and theory. This group of competencies also focuses on the ability and willingness to apply information design, language, and communication models, theories, rules, and standards as well as the ability and willingness to be open to new ideas and the ability to be innovative without sacrificing usability or accuracy. The professional technical communicator will also possess the ability to understand the requirements and appropriate uses of different media and to specify the media appropriate to the need. Finally, the competent professional will have the ability and willingness to use appropriate support tools, including computer application software and will possess an orientation toward usability and providing value to the user of information.

Analytical and Conceptual Competencies include the ability to recognize patterns and relationships, to identify logical fallacies, to remember the use of words and visual symbols and their meanings and identify inconsistencies in their use, to ascertain relevance and usefulness, and to integrate relevant discrete pieces of data to form concepts and extract procedures and rules.

Environmental, Social, Contextual Competencies include such factors as the lack of a traditional or accepted academic or career path and lack of public understanding of the field.

Interpersonal Competencies are the ability and willingness to establish collaborative relationships with people of different backgrounds, status, education, and expectations and skill in working with groups and being a contributing member of a team.

Information Product Development and Management Competencies focus on both project management and process management. Project management competency is the ability to coordinate and schedule activities, to control resources, and to manage and mitigate risk. Process management competence is the ability to define or design the processes required to manage and to measure the life cycle of an information product.

Self Management Competencies involve the appreciation of the importance of details affecting quality, timeliness, and goal achievement as will as the ability and willingness to be efficient and not waste time or resources.

Career Management Competencies include the willingness to stay up to date with tools, media, subject areas, and content and to invest in continuous learning; to set career goals and management personal risks; to grasp functional understanding of the technical content and user's context for applying the content; to provide leadership about professional issues; to stay involved in professional issues; and to stay aware of industry, social, and global trends.

Based on these data, program directors can review, evaluate, and reinvent their curricula in technical communication.

A New Program Design Process

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Recently, faculty at the Pennsylvania College of Technology designed a unique technical communications program which accepted its first transfer students during Spring semester, 1996. I would like to share the process and results of our program design.

The first activity consisted of a literature review, identifying professional perspectives concerning future employment and the viability of a technical communication program. Both the Society for Technical Communication ((STC)) and the Association of Teachers of Technical Writing (ATTW) periodically publish articles addressing these issues. STC has consistently reported optimistic figures for future employment in the profession and has stressed the need for institutions to establish new degree programs. On the other hand, ATTW has been equally consistent in its pessimistic outlook for the profession and the future of degree programs.

In order to resolve these divergent views, we designed a 3-part needs assessment survey, seeking information about demographics for current professionals, curriculum content of a potential program, and employment outlook. The survey received 455 responses (30.33%) from 31 states.

The survey confirmed, and in some areas supplemented, data published by STC in *Profile '92: Special Report* and in STC's *1994-1998 Strategic Plan*. The bachelor's degree is the most commonly held at 55.38%, and is the preferred degree (82.61%) at hiring or transfer into a technical communications department.

The survey provided valuable insight into the curriculum content of a potential degree program. Any new technical communication program should focus on process skills rather than product skills. Specific content areas that respondents considered " most important" are technical knowledge, audience analysis, research techniques, document design, writing strategies (as opposed to specific products such as reports, proposals, memos, etc.), collaborative work skills, and computer applications. Content areas considered of minor importance were organizational behavior psychology, business writing, and foreign language skills.

Of the 455 respondents, 209 (45.9%) classified themselves as managers and answered the third section of the survey which focused on hiring preferences and employment demographics. The results show that when considering a new hire, managers prefer the bachelor's degree (82.61%), while 10.14% of new hires have less than a baccalaureate, and only 7.25% have a master's degree. Respondents indicated a 0% preference for a new hire with a Ph.D. Managers also expressed a preference for hiring new employees with formal, academic training in technical communication (95.22%). Finally, a full 89% of managers report plans to hire one or more new technical communicators within the next five years.

Our needs assessment survey confirmed that jobs are now and will continue to be available for graduates of technical communication programs, and supports an optimistic outlook for the profession and the viability of new baccalaureate programs.

Near the end of the program design, we had the opportunity to meet with representatives from the Software Products Communication (SPC) department at Shared Medical Systems (SMS) in Philadelphia. The members of SPC confirmed that our new curriculum design meets the needs of industry for the foreseeable future. Paula Jones, the Technical Writing Manager, stated that the two most important skills for her employees are (1) audience analysis for product information needs of both individual user groups and organizations, and (2) the ability to move from a "product-based" orientation to a "user based information process." Fred Drake, the director of SPC, said that writers must have the technical background to "partner with R&D, troubleshoot product design, and develop user interface."

The baccalaureate program implemented at Pennsylvania College of Technology meets the current and future needs of the profession by allowing students to "minor" in any one of our 60+ technical programs while completing a major in technical communication.

The following pages reproduce our needs assessment survey and the results. I am indebted to Dr. Jeannette Fraser for her contributions to the analysis of the survey results.

Needs Assessment Survey Results

1) What is your job title? (by %; N=454)

Technical writer	36.78	Technical illustrator	0.44
Technical communications manager	8.15	Consultant	6.61
Publications manager	5.29	Trainer	1.32
Documentation manager	10.79	Instructional designer	3.30
Other manager	7.71	Senior executive	1.98
Editor	9.03	Translator	0.22
Graphic artist	1.32	Other	7.05

2) What is the nature of your employer/company? (by %; N=453)

Software developer	29.58	Telecommunications	6.40
Hardware manufacturer	7.73	State/Federal Gov't.	2.87
Construction equipment	1.32	Military	0.44
Agricultural equipment	0.22	Health care provider	1.99
Environmental engineering/testing	5.52	Technical documentation	5.74
Biomedical technology	1.99	Translation services	0.44
Pharmaceutical research /manufacture	3.75	Self-employed	5.74
Exporter (conform to ISO 9000)	0.22	Other	26.05

How long have you worked . . .

3) At your current job? 5.6 years

4) As a technical communicator? 10.0 years

5) What is your highest earned educational degree? (by %; N=455)

High school diploma	3.52
Associate's degree	5.93
Bachelor's degree	55.38
Master's degree	33.19
Doctorate	1.98

6) What is the major area of your highest earned degree? (by %; N=448)

English	20.76	Education	5.36
Technical communication	14.06	Computer science	3.35
Business administration	10.04	Humanities	11.16
Journalism	7.81	Art/Graphics	1.79
Engineering	9.59	Other	16.07

How do you rank the following: (by %; N=450)

	Excellent				Poor
7) Opportunity for salary increases over the next five years?	5	4	3	2	1
	12.67	33.11	38.22	13.33	2.67
8) Opportunities for vertical and/or lateral mobility within your company?	5	4	3	2	1
	10.00	24.19	29.30	21.86	14.65

9) What is your current salary? (Please give your actual salary, rounded to the nearest $1,000.)

By region surveyed:		
	South	$41,462
	PA and contiguous states	$44,699
	East	$46,609
	West	$47,095
	Midwest	$48,569

10) What benefits do you receive? (by %; N=446)

Full benefits	84.98
Partial benefits	7.40
No benefits	7.62

SECTION 2: If you are responding to the survey as a manager or supervisor, respond to the following statements in terms of how you would rank the skills when considering a prospective employee for an entry-level or non-supervisory position as a technical communicator. If you are responding to the survey as a technical communicator, respond to the following statements in terms of how important these skills were/are in gaining employment.

NOTE: RESULTS ARE REPORTED AS MEAN ON A SCALE OF 5=MOST IMPORTANT TO 1=LEAST IMPORTANT

11) Technical familiarity with your company's products/service/activities.	3.0
12) Knowledge of typical roles and role behavior within organizations.	2.9
13) Ability to identify information needs appropriate to organizational issues and audiences.	4.0
14) Knowledge of the ways in which information is superimposed on organizations.	3.0
15) A solid understanding of the impacts of technology on communication and social relationships.	3.0
16) An understanding of the effects of communication and information transfer on technology development.	3.3
17) A broad and systematic understanding of science and technology.	3.3
18) An ability to converse intelligently with technical professionals in a field of their choice and the ability to write about that field with minimal assistance.	4.5
19) A broad and systematic understanding of psychology, linguistics, and/or learning theory.	2.6
20) Research and gathering information: interviews, surveys, on-line databases, documenting sources.	4.0
21) Document design: page layout, headings, formatting, typography, integration of graphics	4.0
22) Appropriate use of graphic types or visualization of information: charts, tables, illustrations	4.0

23) Modes of written presentation: physical descriptions, definitions, process descriptions, etc. 4.0

24) Technical documents/genres: formal reports, proposals, instructions, feasibility reports, etc. 3.6

25) Business documents: memos, letters, resumes, etc. 2.9

26) Collaborative work techniques: agendas, resolving conflict, nonverbal communication, etc. 3.6

27) Oral presentation techniques: speeches, presentations, answering questions, etc. 3.2

28) Computer applications: specific word processors, databases, spreadsheets, desktop publishing, etc. 3.9

29) Media applications: CD-ROMs, video and multimedia production, hypertext, etc. 3.1

30) Foreign language skills: conversational familiarity with at least one language other than English. 1.8

31) Professional skills: listening, problem solving, team work, ethics, etc. 4.3

32) Which particular hardware or software products do you use or require for your job?

All respondents use multiple software and many use multiple hardware and operating systems. Many stated that they adapted to whatever their customer needed. Microsoft products appear to have the most widespread use but a variety of other software and Internet (or other on-line service) are mentioned repeatedly.

SECTION 3: SUPERVISORS OR MANAGERS ONLY. Please circle your responses.

33) How many people does your company employ? (by %; N=214)

1-50	16.36
51-250	24.30
251-500	8.41
> 500	50.93

34) How many technical communicators does your company employ? (by %; N=214)

1-5	42.06
6-10	16.82
11-15	7.94
> 15	33.18

35) How many technical communicators are you directly responsible for supervising or managing? (by %; N=206)

1-5	71.36
6-10	14.56
11-15	5.53
> 15	8.52

36) What is the average education level of your company's employees? (by %; N=208)

High school diploma	8.17
Associate's degree	10.58
Bachelor's degree	63.94
Master's degree	15.38
Doctorate	1.92

37) What is the average education level of employees hired/transferred/promoted into entry-level technical communication jobs? (by %; N=207)

High school diploma	1.93
Associate's degree	8.21
Bachelor's degree	82.61
Master's degree	7.25
Doctorate	0.00

38) How important is knowledge and/or expertise in a particular technical area (e.g., electronics, computer programming, etc.) when you consider employing a prospective technical communicator? (5=most important; 1=not important)

5	4	3	2	1
15.17	30.33	31.28	17.06	6.16

39) How important are technical communication skills when you consider employing a prospective technical communicator? (5=most important; 1=not important)

5	4	3	2	1
66.99	28.23	3.83	0.48	0.48

What is the average number of hours you spend each week . . .(by %; N=206)

	40) reviewing technical documents?	41) producing technical documents?
0-5 hours	19.71	19.51
6-10 hours	29.81	12.2
11-15 hours	17.31	14.15
16-20 hours	16.35	15.61
> 20 hours	16.83	38.54

42) What is your projection of your company's needs for hiring or replacing technical communicators over the next five years? (by %; N=208)

1-2 hires	33.01
3-5 hires	26.32
> 5 hires	29.67
no hires	11.00

Evolving Roles in the Workplace for Technical Communicators

Herb Smith
Southern College of Technology

In the Age of the Smart Machine: The Future of Work and Power (1988), Shoshana Zuboff comments extensively on the impact that the information age has had on corporate management. Specifically, Zuboff notes that the role of manager is likely to shift from monitor/administrator to coach/motivator. More emphasis is likely to be placed on helping a smaller workforce broaden its knowledge base by learning new skills and concepts as computers provide more avenues for learning about new technologies.

If Zuboff is correct, what impact will this change in management behavior have on technical communicators and technical and professional communication programs? My paper will speculate on some of these changes. One possible change is that technical communicators are going to be more involved in training and instructional design regardless of a company's specific product or service. Just recently a major pharmaceutical company approached my school for advice on how to design a series of skill-based modules for helping new employees learn laboratory procedures. The company wanted technical communicators to work with technical managers to develop self-paced instructional units that would help employees (new and old) keep current with changes in the pharmaceutical industry.

Are we addressing this need in our technical and professional communication curricula, particularly on the graduate level? What role will the technical communicator play in developing educational/instructional materials in a rapidly changing workplace?

What's The Purpose Of Teaching Technical Communication At GM: Reinventing Collaboration With Industry

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The title of this position paper is based on David Dobrin's 1985 article in *The Technical Writing Teacher:* "What's the Purpose of Teaching Technical Communication". The question Dobrin asks was offered, and partially answered by the article, the same year that Odell and Goswami published *Writing In Nonacademic Settings. It* seems to be no accident that inquiry about why we invoke a concept called technical communication and focus on characteristic nonacademic aspects are posed publicly almost in tandem. From the beginnings of "English for Engineers," a major concern for the establishment and maintenance of technical communication in good order among serious teachers and scholars has been to examine what, how, and why collaboration between industry and the academy takes place. Implicitly and explicitly, academically and industrially, on all collaborative occasions, the central concern is "what's the purpose."

The question of "purpose" in teaching technical communication rose with a request from Michigan Tech's Extended University Programs (EUP) to provide a technical writing component for a degree-earning arrangement for employees of General Motors. I'd done this kind of work before, in several different settings, and put my curriculum planning skills to work, already sure I knew what the purpose of my effort would be: to construct a syllabus, script a videotape, and maybe build in assessment of the degree of success to be expected from this kind of delivery. In short, I needed to "design" a technical writing course, present it to GM, present it for GM—all the answers of "what" and "how to" needed by either of us.

I knew that industry members would be competent in technology and engineering but would not be able to articulate the purpose of the genre they employ (Barabas, 1990). I knew that there would be a climate of problem-solving and goal-oriented delivery fostered by allegiance to technical disciplines (Michaelson, 1990). I knew, indeed, that I had the backing of burgeoning industry of "tech comm" programs making itself known as important to the success of modern business (Hayhoe et al, 1994). I even carefully built in explanation of the purpose of the course requirements, defining tech comm as connected to "the world of work."

But for the most part I was so busy providing answers to the GM request that I had forgotten something crucial--making sure the purpose for collaborating with industry in a technical communication course went beyond our being able to congratulate ourselves on the sophistication of our cooperation, and that the reason for its desirability was clear to all. As Dobrin predicted back in 1985, commenting that tech comm courses as they exist do not meet the needs of our future, the course did not "make" for this fall: GM was puzzled by the outcome of our best-laid plans, EUP confounded; I was resigned. Despite the hard work on both sides of the collaboration to deliver a course that was pedagogically elegant and specifically tailored to GM's requirements, the course offering had not spoken to the purposes of "why" it was proposed. The truth about collaboration had gone begging: in the face of increasing sophistication of what and how to provide technical communication instruction, we often depend on supplying answers instead of asking questions to "get the job done."

There is no lack of variation and elegance to these answers; they range from practical reasons of improving chances for a job to ideological considerations for carrying out the ethical responsibilities imposed by thinking critically about technology, technical industries, and their relationship to society. I am proposing, however, that the importance of asking the purpose, or knowing "why," is well outside both application and theory as currently invoked. The intrinsic operation of answers is to provide "news," fixes and short-term plans for building skills, increasing knowledge, and supplying trained workers/training for workers. But no argument over the ends of technical communication, advice for success in constructing collaboration, or invocation of ethical motives for presentation can survive what happens when answers come before questions and the resulting global stylization sets in.

Such stylization makes reinventing collaboration necessary because it denies the continuit of our practice and the multiple aspects of its concerns. Instead of meeting the demands for juggling content, technique, rhetorical savvy and

ethical action, providing "answers" permits treating tech comm as only one thing at a time—currently a social constructed entity. It is acceptable as long as it has the appearance of providing pedagogically recognizable and institutionally saleable outcomes. Forgetting in this way—not asking what goes with the situation, what is needed at just this time and for just these reasons—we will not be able to locate the "right" answers. We are always constrained to regard our collaboration as being for "now"—work as part of human action, requiring not grand design, but being sufficient at a given time and place, adequate until next time (Hundleby, 1996). On our side, this translates into acting in ways adequately expert (Dobrin), sufficiently analytic (Couture & Rymer), institutionally useful (Ornatowski), ably functioning in a given context (Winsor). If we do not, we mistake its ends and the ends of collaboration because we have forgotten that rhetorical concerns are our ethical responsibility. We must be committed to bringing reflection to bear on what we teach and how we teach, in order to legitimate them by means of why we teach. When Dobrin asks what the purpose of teaching technical communication may be, and advocates beginning with content, he is not betraying a lack of sophistication embarrassing in 1996, but accounting for the need for academy-industry collaboration to be continuously reinvented.

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What Can Technical Communication Internship Programs Do for Derailed and Trackless English Majors?

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Illinois State University

English majors who are not planning academic careers or careers in technical writing seldom have a sense of themselves as having obvious professional futures. Internship placement officers at the university level often fail to recognize the market value of English majors and are unable to translate the knowledge and skills acquired in an English program into nonacademic professional terms.

There is, in fact, no well-defined career track for English majors who have not made choices of technical writing, an academic career, or who are not planning a future in a field such as law or library science where an undergraduate degree in English is considered an appropriate foundation. Some of these students have simply followed their interests without thinking about their future at all; others have, for one reason or another, simply become derailed from established career tracks. Still, even derailed or trackless students often want some professional direction.

A technical communication internship program expanded to encompass the intellectual, social, and cultural interests and commitments of a wide range of English majors has potential benefits not only for the students, but for the English department and for the technical writing program. 1) It can enhance enrollments and retention in the English program as students realize that nonacademic professional opportunities are open to them. 2) It can build the credibility of the English curriculum in the nonacademic professional community as students develop a more clearly articulated understanding of their own professional worth. 3) It can enhance the credibility of technical communication within the English department as a wide range of English students are guided into professions where their courses in literature, criticism, and composition are specifically valued.

Many English majors have taken one or two technical writing courses, or if they haven't they are willing to do so when a faculty internship director points out the advantages of such courses as preparation for nonacademic professional work. Although many of the needs of nonacademic organizations are best met by students who have prepared themselves specifically for the technical communication profession, nonacademic professional opportunities do exist for students whose interests and education are in the areas of literature, composition, and literacy. Unfortunately, these opportunities are not as clearly defined as other nonacademic professions, and most English faculty are not accustomed to seeing their field as having direct marketplace applications.

Where do such jobs exist? Some of the opportunities include the publishing industry, public relations businesses and departments, social organizations where literacy and training programs are emphasized. Some students even become entrepreneurs, or design jobs for themselves within corporations, situations that did not exist until they invented them. With the help of a reconceived approach to technical writing internships, students may retain their connections to the field in which they were educated, and the field itself may increase its potential to bring about positive change in students' lives and in society.

Developing Connections: Interdisciplinary Connections

Re/inventing the Technical and Scientific Communication Wheel...

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Canberra Institute of Technology, Australia

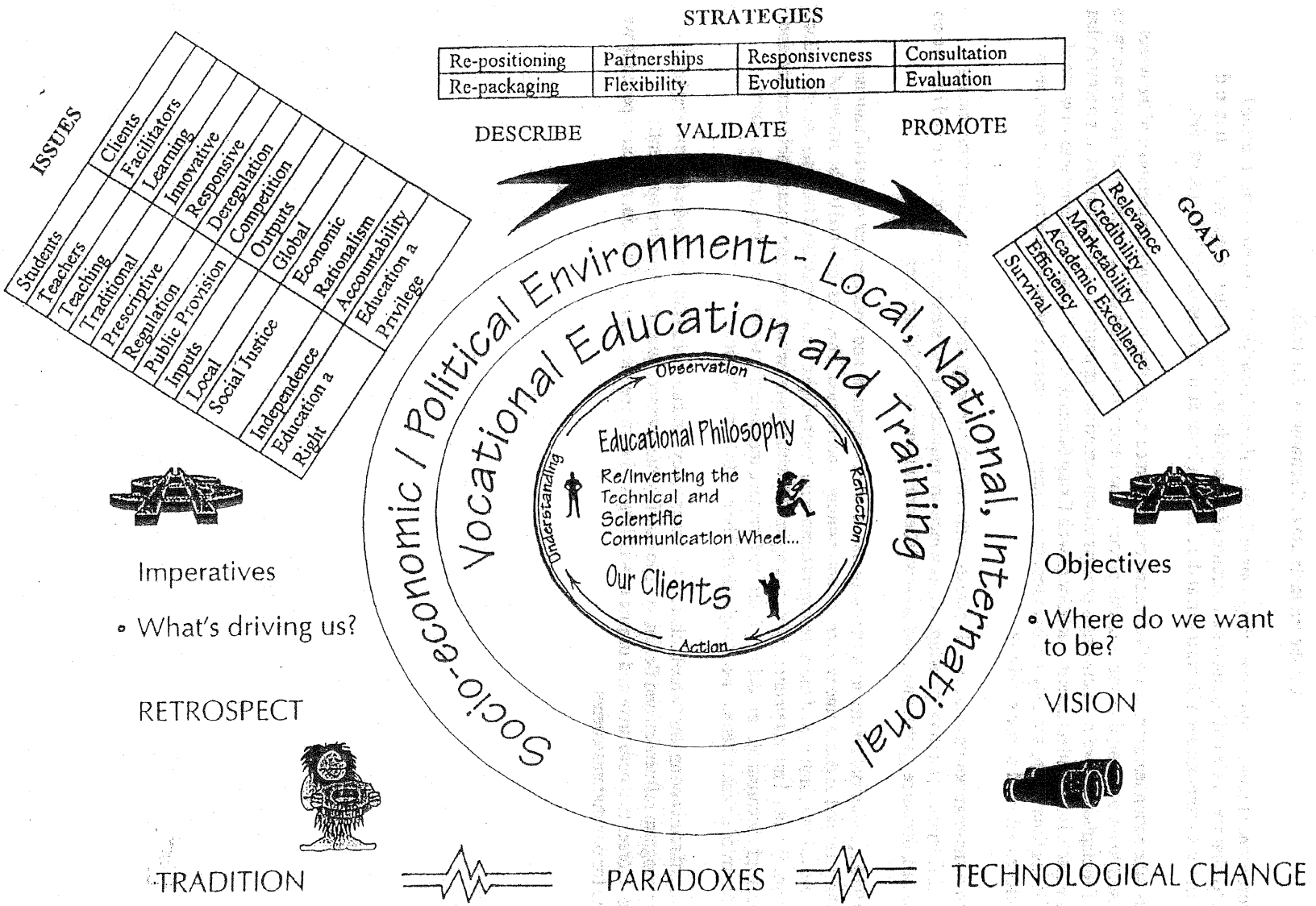
Given the conference theme, *Reinventing Programs in Technical and Scientific Communication*, it seemed appropriate to share with CPTSC members an account of the significance we attach to program invention and reinvention in the Communication Department at the Canberra Institute of Technology (CIT) in Australia.

Reinvention, like action learning, is a reflective and cyclical process, and thus it was that the metaphor of the wheel suggested itself to me as being illustrative of this process. The notion that wheels can be 'reinvented' added weight to the choice of metaphor, for we're discussing a process which sometimes appears to us as a dilemma. It's a truism that reinventing wheels is a pointless activity - it belongs with fixing things that 'ain't broke'. Is reinvention a waste of time? Or is it, as I maintain, not only not pointless to continually re-examine what we're doing, but now, more than ever before, essential to our survival?

The attached mind-map points to the broad contexts within which our program in Technical Communication is evolving at CIT, focusing on those paradigm shifts which are impacting most strongly on what we do and how we do it. The shifts are, of course, global ones, and none will be unfamiliar to CPTSC members.

In the late 1980's, industrial reform in Australia prefaced the development and endorsement of a set of national principles that are used to determine whether or not training is accredited. This was followed by the advent of competency-based assessment, and increased opportunities for 'user-choice' in a deregulated training market. Reform of public-sector financial management now sees us operating with budgets which fund only measurable outputs, and being increasingly accountable for 'delivery', the performance measures for which are no longer ours alone to determine. Many of us ask whether 'teaching' can still be said to be our 'business'.

The challenge of reinventing this 'wheel', then, is to preserve key fundamentals while responding to marketplace demands for program refinement and flexibility. The way in which we accommodate the often apparently irreconcilable forces that both drive and inspire us will largely determine the quality of the educational experience we can facilitate for our students/clients.


STRATEGIES
Re-positioning
Partnerships
Responsiveness
Consultation
Re-packaging
Flexibility
Evolution
Evaluation
DESCRIBE
VALIDATE
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ISSUES
Students
Teachers
Teaching
Traditional
Prescriptive
Regulation
Public Provision
Inputs
Local
Social Justice
Independence
Education a Right
Clients
Facilitators
Learning
Innovative
Responsive
Deregulation
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Global
Economic Rationalism
Accountability
Education a Privilege
GOALS
Relevance
Credibility
Marketability
Academic Excellence
Efficiency
Survival
Socio-economic / Political Environment - Local, National, International
Vocational Education and Training
Observation
Reflection
Action
Understanding
Educational Philosophy
Re/Inventing the Technical and Scientific Communication Wheel...
Our Clients
Imperatives
What's driving us?
RETROSPECT
Objectives
Where do we want to be?
VISION
TRADITION
PARADOXES
TECHNOLOGICAL CHANGE

New Academic Organizational Structures Lead to New Opportunities and Responsibilities for Technical, Professional, and Scientific Communication Programs

Tim Peeples
Purdue University

One of the changes that is affecting all academic areas of study, and can be seen in the rise of "programs" as those in technical, professional' and scientific communication, is the rise of interdisciplinarity. A quick look at suggested areas of proficiency and expertise for the technical, professional, and scientific communicator as argued by Donald E. Zimmerman and Marilee Long's "Exploring the Technical Communicator's Roles" and Patricia A. Sullivan and James E. Porter's "Remapping Curricular Geography" illustrates the rise of such interdisciplinarity. Similar structural changes are the case in the workplace, also. Rather than being structured within strict departmental boundaries and roles, as the modern workplace, postmodern workplaces exhibit flexible structures and roles and pursue projects through ad-hoc, project teams arranged around specific problems. (Bergquist, William. *The Postmodem Organization: Mastering the Art of Irreversible Change.* San Francisco: Jossey Bass, 1993)

The area of disciplinary crossover that interests me and that I see as both a complication and opportunity for technical, professional, and scientific communication is the crossover between management studies and rhetoric/ writing studies. In general, I argue that with the destabilization of disciplinary borders, it becomes impossible to say, "X is writing and Y is management." Instead, one must contend with statements like, "X is writing and management, and Y is management and writing." More specifically, I would like to look at some ways Shoshana Zuboff's research from *In the Age of the Smart Machine: The Future of Work and Power* offers new potentials both for management studies and for rhetoric/writing studies.

Management's Effect on Rhetoric/Writing

In Zuboff's "informated" workplace, where technologies are put to the work of generating knowledge and widening the distribution of that knowledge throughout the organization, "Work' becomes the manipulation of symbols" (23). If writing is seen as "work" and work is the manipulation and interpretation of symbols within, for, and in the name of an organizational setting -- that is, as disciplinary borders between rhetoric/writing studies and management studies begin to break down and a new vision of *writing as work* is capable of being argued - then not only do we have the opportunity but the responsibility of researching and teaching disciplinary crossovers, like the management of collaborative, organizational waiting.

Project planning has been one of the strategies used in management to orient and explore the collaborative work of the workplace. Project planning or project management takes into consideration the kind of cooperative relationships a team will/can take to complete a project, considers the role of conflict in this participation, and strategically maps out plans for completing a project. Within this structure, several of the values of contemporary rhetoric/ writing studies are capable of being explored and enacted: the ideological critique of social formations, the work of collaboration, the role of consensus and dissensus in social discourse, and the visualizing of writing in alternative maps.

I would argue that as disciplinary borders remained stiff, it was not the place of rhetoric/ writing studies to pursue the work on collaboration done in management studies. But as the disciplinary borders dissolve and get reformed and restructured into interdisciplinary spaces of inquiry, it will not only be opportune for rhetoric/writing specialists to pursue collaboration studies in management, but it will be an necessary place of inquiry.

Rhetoric/Writing Studies' Effect on Management

Under modernist management theories, like Taylorist theory, the work of the WPA in the development and management of programmatic curriculum was seen as a process of identifying what needed to be taught, writing up "the curriculum" (which was perceived as that which stood between the covers of a three-ring binder), and then using technologies like the common syllabus to enforce consistency across courses. As Zuboff argues, in the modernist approach to management, "Managers struggle to retain their traditional sources of authority, which have depended in an important way upon their exclusive control of the organization's knowledge base" (6). In this context, "managers employ the technology to circumvent the demanding work of face-to-face engagement, substituting instead

techniques of remote management and automated administration" (7). In the context of WPA work, the "technology" used to achieve this kind of top-down management is the common syllabus and the curriculum-in-the-binder approach to program administration. In this context, writing is seen not as a dialectical engagement or part of a larger collaborative conversation but instead as a tool to maintain authoritative distance from the constituencies the WPA is to manage.

When management conceives of its work as "symbolic," as in Zuboff's informated workplace, the communications, structures, and relations of management shift. Zuboff argues the following about in informated organization:

> The texualization process moves away from a conception of the information as something that individuals collect, process, and disseminate; instead, it invites us to imagine an organization as a group of people gathered around a central core that is the electronic text. Individuals take up their relationship toward that text according to their responsibilities and their information needs. In such a scenario, work is, in a large measure, the creation of meaning... (394)

What does writing a curriculum mean in this context? If we see the curriculum as that "central core that is the electronic text" and if in this context "work is...the creation of meaning," then what becomes of a curriculum? And what becomes the work of the WPA?

There are a few people working in the spaces of these questions, and each leads to the conclusion that a curriculum should not be seen as a "product" but as a social process of inquiry, critique, and reconstruction; the curriculum should be seen as an "achievement" (Prior, Paul. "Response, Revision, Disciplinarity: A Micro history of a Dissertation Prospectus in Sociology." *Written Communication* 11.4, 1994: 483-533) and as a "project" (Phelps, Louise Wetherbee. "Practical Wisdom and the Geography of Knowledge in Composition." *College English* 53.8, 1991: 863-885; Doll, William E. Jr. "Foundations for a Post-Modern Curriculum." *Journal of Curriculum Studies* 21.3, 1989: 243-253; Doll, William E. Jr. *A Post-Modern Perspective on Curriculum*. New York: Teachers College Press, 1993; Slattery, Patrick. *Curriculum Development in the Postmodern Era*. New York: Garland Publishing, 1995). In this new perspective on management, one that places "informating" and rhetorical processes at the center of management (an effect of the breaking down of disciplinary borders), "the new division of learning produces experiences that encourage a synthesis of members' interests, and the flow of value-adding knowledge helps legitimate the organization as a learning community" (Zuboff, 394).

In other words, the breaking down of the borders between rhetoric/writing studies and management studies has led to changes in management, as well as leading to the changes in rhetoric/writing studies identified above. In the new informated context of management, the manager becomes more of a facilitator of continuous inquiry and dialogue.

Curricular Interdisciplinarity of Future Programs in Technical and Scientific Communication

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James Madison University

Despite the growing need for university graduates trained in the theory and application of technical and scientific communication, current economic pressures placed on higher education today make beginning a new academic program in the field increasingly challenging. Requiring that universities and colleges scrutinize more than ever the missions, goals, and objectives of any proposed program, university and state oversight agencies demand, among other things, that new programs complement existing programs in unique ways, meet current and future employment needs of the professions, attract significant numbers of new majors to the university, deliver on promises of invigorating local and regional economies, integrate computer technologies as not only a central content area of learning but also as a primary method for delivering instruction, promote interdisciplinarity among various academic programs, and ensure that the programs remain effective and relevant through formalized assessment that promotes regular curricular revision and faculty development. Although these expectations, indeed, appear daunting, designers of new programs can do much to enhance the "salability" of their program proposals while also strengthening the programs by making them as interdisciplinary as program goals, objectives, and curricula allow.

The new B.A., B.S., M.A., and M.S. programs in Technical and Scientific Communication (TSC) at James Madison University incorporate the high degree of interdisciplinarity that future programs in the field will need to achieve. Housed in the newly created Institute of Technical and Scientific Communication, the TSC programs consists of a core cadre of four professors who teach technical and scientific writing and draw expertise of thirty faculty from nine departments, schools, and programs representing four of the five colleges of the university to teach supporting course work, including training in communication technologies (e.g., desktop publishing, Web page design and construction, on-line publications, computer graphics), technology management, logic and argumentation, and statistical research methodology. In coordinating faculty and resources, the TSC Institute functions as a programmatic "umbrella" to simplify the management of such curricular and budgetary issues as course scheduling and staffing, space allocation, computer laboratory use, and distribution of student credit hours that arise from pooling faculty members from so many fields.

The sharing of faculty, facility, and curricular resources among different colleges, departments, and programs within the university is critical to providing students with the breadth and depth of training required to compete in the technical and scientific communication profession. Curricular interdisciplinarity strengthens the TSC programs in several important ways. First, interdisciplinary teaching expertise enriches the students' learning experiences, as they are exposed to varied academic training, professional experience, and pedagogical approaches. Second, interdisciplinary instruction closely resembles the highly eclectic work world of technical communication. Third, because of their interdisciplinarity allowed them to be more efficient in using existing faculty in the nine participating disciplines, implementing the TSC programs required the hiring of only a minimum of new faculty. Moreover, the Institute's interdisciplinarity is highly cost-effective in terms of making full use of faculty across the university. Redundancy in faculty resources and curricula is avoided, allowing participating departments, schools, and programs to redirect money and positions to other areas. Finally, faculty expand their areas of teaching and scholarship through interaction with colleagues from fields outside their own. Colleges and universities would do well to place interdisciplinarity at heart of their new programs in technical and scientific communication.

In this CPTSC session paper, apart from describing the goals, objectives, curricular requirements, and areas of learning expected of program graduates, I discuss how faculty and courses shared across four colleges and nine departments, programs, and schools link the new TSC programs to what will become a progressively lengthening chain of similar programs that take advantage of the significant efficiency, practicality, and pedagogical soundness of interdisciplinary programs in the field.

TSC Program Goals and Objectives

The B.A. and B.S. programs offer students instruction in the traditional areas of technical and scientific communication—that is, the study of communication in fields traditionally associated with technical or scientific content, such as biology, chemistry, computer science, geology, mathematics, nursing, and physics. The degree programs also provide instruction in components of professional communication that are applicable to technical and scientific communication, such as document design and production, publications management, organizational

communication, and speech communication.

A range of courses in rhetoric, technical and scientific communication theory, writing, editing, and document design and production provides TSC students with advanced communication skills/training that enable them to build productive careers in business, industry, government, or academia. The undergraduate programs also introduce students to current communication technologies that not only enable them to produce documents of professional quality during their studies but also train them in the types of technological tools that they will use throughout their careers. Finally, students learn the kinds of research, analytical, and reasoning skills that allow them to become leaders in technical and scientific communication.

To achieve program objectives, the programs combine work in theory, writing, text design, and analysis of communication systems and contexts to help students acquire the knowledge and skills needed to begin careers in the field. The programs emphasize scholarly, humanistic, and social scientific perspectives on the function and application of technical and scientific communication.

The programs have three primary missions to provide students with instruction in (1) the theory and practice of writing and research in the technical and scientific fields, (2) effective communication within organizations, and (3) communication technologies. The goals and objectives of the programs, then, are to

- provide students with the instruction needed for them to become accomplished writers and editors in technical and scientific communication;
- provide students with a strong foundation in the theory and practice of rhetoric as it applies to communicating in technical and scientific fields;
- enable majors to complete concentrated studies in pure, natural, and applied sciences;
- introduce students to the most current communication technologies, enabling them to produce documents of professional quality in their studies while also training them in the types of technological tools that they will use in their careers; and
- offer students internship experiences that allow them to apply the skills learned in the classroom to work-world communication situations as they prepare for professionals in technical or scientific communication.

Essentially, the program seeks to produce graduates with the kinds of exceptional technical and scientific communication, analytical, and reasoning skills as well as sound, ethical judgment that would allow them to become leaders in their field on local, regional, national, and international levels.

Program Areas of Learning

The areas in which TSC students are expected to achieve competency before graduating from the B.A., B.S., M.A., or M.S. programs are the following:

- ability to define target audiences to ensure that a document meets the informational needs and interests of readers;
- research skills in gathering information through such means as interviewing; surveys;
- library research; on-line database searches; Internet, Bitnet, and World-Wide Web searches;
- writing and rhetorical skills (e.g., logical organization; clear and concise style; error-free grammar, usage, and punctuation);
- editing and proofreading skills;
- analytical skills to solve problems using a logical and reasoned approach;
- document design skills (e.g., page layout and format, typography, design and creation of graphics);
- production skills (e.g., paste-up of camera-ready copy, soliciting of printer bids, managing prepress duties);
- depth of expertise in a technical content area;

- interpersonal skills in speaking that would enable students to communicate effectively with technical personnel, management, and other communication personnel;
- ability to work collaboratively with colleagues to complete a document project;
- proficiency in using communication technologies (e.g., word processing programs, graphics software, desktop publishing, software, databases, multimedia software, CD ROM, Internet software, computer hardware, computer peripherals, telecommunications equipment) to make the documentation process more effective, as well as to improve the quality of the documentation itself;
- proficiency in speaking, reading, and writing in a foreign language; and
- understanding how effective communication should occur within an organization.

Student Profile

Applicants for admission into the B.A., B.S., M.A. and M.S. programs will come from diverse backgrounds. The B.A. and B.S. programs are primarily designed for undergraduates who have chosen writing, editing, or production work in technical or scientific fields as their intended careers. All students complete either a concentration or cognate in a technical or scientific field to supplement their training in writing and editing. One-half to two-thirds of students seek B.A. majors or minor degrees in TSC because of their strong leaning toward the humanities and their primary interest in writing or editing as careers. About half the students pursue a double major or a minor in allied fields (e.g., mass communication, speech communication, graphic design, business), and about one-third of students are B.S. double majors—normally seeking a B.S. major or minor in TSC and a B.S. degree in a technical or scientific field (e.g., biology, chemistry, computer science, geology, health sciences, information and decision sciences, physics).

The TSC M.A. and M.S. degrees are designed primarily for working professional communicators who seek specialized advanced education in technical communication theory and its application in work-world contexts. Apart from their earnest interest in expanding and enhancing their understanding of and proficiency in technical and scientific communication, graduate students primarily see the training as a means to advance their careers. The programs also attract recent graduates of undergraduate programs who intend to expand their communication skills and to learn communication management before entering technical communication professions. One-half to two-thirds of students have undergraduate or graduate degrees in the humanities, especially in English. About one-third of students seek the M.S. degree as they have done their undergraduate work in such fields as the physical sciences (e.g., biology, chemistry, biochemistry, physics), computer science, and applied disciplines (e.g., nursing and medical technology), and about half the students enter one of the proposed programs either immediately after or within two years after completing their bachelor's degree. About half the students have three or more years of experience working in the professions. Apart from offering students the rhetorical tools with which to excel in the professions as technical communicators, the M.A. and M.S. programs prepare graduates for continued academic studies in the field at the doctoral level.

While studies in both the M.A. and M.S. programs provide students with a sound foundation in writing, editing, and document production, the M.A. degree typically attracts students with undergraduate work centered in the humanities. Although these students often supplement their TSC degree plan with courses in the sciences, they are primarily interested in gaining extensive knowledge and practice in writing and editing skills that are not tied to a single technical or scientific field but, rather, are applicable to multiple technical or scientific areas. Conversely, the M.S. plan of study typically proves attractive to students who wish to complement their undergraduate degrees in the sciences with advanced training in communication within their fields. Such complementary training in technical and scientific communication enables M.S. graduates not only to perform more effectively as technicians or scientists but also to move laterally into writing, editing, or production positions or vertically into management positions.

TSC Program Requirements

Candidates for the B.A. or B.S. degree must successfully complete a minimum of 39 credit hours of undergraduate

course work and should work with TSC Institute advisers to design a program that fits their unique educational needs and career aspirations. Course requirements differ slightly between the B.A. and B.S. programs. All B.A. and B.S. majors must complete 9 hours of core courses, and a **concentration area** by taking at least 18 hours of lower-level courses from one or more B.S. disciplines. B.S. majors must complete a **cognate area** by taking at least 18 hours of upper-level course work (at the 300 or 400 level) in one or more B.S. disciplines. Students who double-major in TSC and a B.S. program automatically satisfy the TSC cognate requirement by completing the requirements of their bachelor of science degree. Moreover, B.A. majors must complete at least 30 hours of electives, with 18 being upper-level courses. B.S. majors must complete at least 18 hours of electives, with 12 being upper level courses. B.A. and B.S. majors are strongly encouraged to complete a 3-hour TSC internship (normally in the last semester of their degree plan).

Candidates for the M.A. or M.S. degree must successfully complete a minimum of 42 credit hours of graduate course work, which includes at least two semesters of course work completed at JMU. Students work with department advisers to design a program that fits their unique educational needs and career aspirations. Depending on students' backgrounds and on options that they might choose to pursue while in the degree program, they may decide to take course work beyond the required 42 hours to obtain additional knowledge or skills in specialized areas. For example, students may choose to take extra course work to enhance their skills in communication technologies or to deepen their academic training in the technical or scientific content areas in which they intend to work as professional writers or editors.

Course requirements differ slightly between the M.A. and M.S. programs. While students in either program must successfully complete three core courses (9 credit hours) and 6 hours of thesis hours, students seeking an M.S. degree must take at least 12 credit hours in an approved technical or scientific cognate discipline (CD): biology, chemistry, communication sciences and disorders, computer science, dietetics, geography, geology, health sciences, integrated science and technology, kinesiology, mathematics, medical technology, nursing, physics, or psychology. M.S. students also must complete at least 12 credit hours of TSC elective courses. Conversely, students seeking the M.A. degree, which does not include a technical cognate area, must take at least 24 credit hours of TSC elective courses.

Benefits of Interdisciplinary Programs

Incorporating the participation of faculty from across the disciplines provides students with access to instructors with a range of academic training, professional experience, and pedagogical approaches. Undergraduate TSC students can choose from fifty-five different courses taught by faculty from nine departments, schools, or programs—English, speech communication, media arts and design, philosophy and religion, mathematics, computer science, management information systems, integrated science and technology. Beyond the three core courses required of the major (technical writing, technical editing, and research methodologies) students are required to complete courses from diverse fields, including proposal and grant writing, medical writing, legal writing, scientific rhetoric, organizational communication, logic and argumentation, conflict and resolution, mediation, political communication, mass communication law, information technology tools, digital image processing, electronic publication, survey sampling methods, and technology management. Graduate students can choose from twenty-six courses covering a range of areas comparable to those on the undergraduate level. Providing students with academic training in such a variety of areas spanning a significant number of disciplines would be daunting, if not impossible, for the faculty and facilities of any one department, school, or program to support.

Another important benefit of interdisciplinary instruction is the preparation it provides students for the highly multidisciplinary work world of technical communication. Rarely do technical communicators pass a work day without collaborating with technicians, scientists, or managers representing myriad backgrounds in academic training or professional expertise. To be sufficiently adaptable to working with an ever-changing mix of people throughout the document design process (e.g., information gathering, drafting, graphics design, editing, production), technical communicators must possess or be able to achieve "on the fly" varying degrees of proficiency in the concepts, approaches, and terminology of numerous technical, scientific, or managerial fields. A heavy dose interdisciplinarity, carefully woven into the structure of a technical and scientific communication program gives students a head start in preparing them for a notably interdisciplinary profession.

In addition, the TSC programs' interdisciplinarity is highly cost-effective in terms of making full use of

faculty across the university. James Madison University is able to offer the four new programs consisting of eighty-one courses taught by a cadre of thirty professors from nine different departments, schools, or programs only because of the institution's commitment to dropping barriers between academic units—barriers too often founded more on anachronistic definitions of disciplines' missions, goals, and objectives; on self-justification for the continuation of academic programs and faculty positions; and on turf battles between academic units than on providing students with necessary preparation for the professions. The cost of the new programs is relatively minimal. The university added a full-time faculty position in technical and scientific communication (increasing the number of TSC professors to four, with the initial three having been moved from the English department where they had been teaching technical writing courses) and provided the TSC Institute a modest budget. In addition to housing the TSC professors and writing classes, the Institute coordinates course and faculty schedules with participating departments, schools, and programs. The high degree of interdisciplinarity at the heart of the TSC programs enables the Institute to avoid offer its majors a various repertoire of relevant courses/training while also avoiding redundancy in faculty resources and curricula.

Aside from making more efficient use of faculty expertise spread across four colleges of the university, the TSC Institute also eliminates costly redundancy in resources and curricula. Several departments and schools whose faculty teach in the programs have eliminated courses and programs that the interdisciplinary collaboration revealed to be unnecessarily redundant. The Institute also shares computing facilities with other programs to reduce the rising cost of hardware and software while also making better use of existing facilities.

Finally, by having the opportunity to teach in the interdisciplinary programs, participating faculty expand their areas of teaching and scholarship through interaction with colleagues from fields outside their own. This collaboration invariably results in faculty members' widening the horizons of their research, growing contributions by faculty to their field through valuable publications, and enhanced teaching in the classroom by faculty who are not only more current in their fields but more intellectually engaged and motivated.

Conclusion

Only the high degree of interdisciplinarity has enabled our regional, comprehensive university to propose and support the ambitious new B.A., B.S., M.A., and M.S. programs in Technical and Scientific Communication. Interdisciplinarity enables the Institute to make efficient use of faculty and facilities across the university, avoid staffing and curricular redundancy, provide students with the breadth and depth of training required to compete in the technical and scientific communication profession, and enable participating faculty to expand their areas of teaching and scholarship through interaction with colleagues from fields outside their own. Faced with growing pressure to provide our students with an increasingly better quality of education/training, current and future programs in technical and scientific communication will find that interdisciplinarity is at the heart of the solution.

(Creativity)^2: Raising Professional Writing to a New Dimension

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University of Houston-Downtown

Technological innovations challenge traditional assumptions about communication, prompting directors of Professional Writing degree programs to consider expanding the curriculum. We are establishing new relationships. Presently, professional writing classes tend to enroll majors only from the department in which the degree is housed. Attempts to introduce students to multiple discourse communities become somewhat contrived. I suggest incorporating into the curriculum a set of customized courses that provide the interdisciplinary environment characteristic of the workplace. Thus, students from different departments share in the learning experience of retrieving, archiving, and creating information for specific audiences.

Whether called professional writing or technical communication, our degree titles appear to the uninitiated to be devoid of creativity. Students often need direction in recognizing the drama of data or the metaphors of science. These insights occur naturally when students from various disciplines interact in the communication classroom, acquiring from one another unique forms of association for learning. In order to empower our majors, we must add this dimension of creativity to the curriculum.

At University of Houston-Downtown, I have developed a set of interdisciplinary courses that enroll natural science majors as well as professional writing ones. Medical writing, science writing, and environmental writing offer students an opportunity to participate in new discourse communities. Initial writing assignments and class discussion prompt them to reconsider creativity, viewing it in a broader social context than they have previously. I incorporate technology as a means of enabling students to reflect on their own learning techniques. After completing introductory assignments in our electronic classroom, they identify problems readers face in retrieving and processing information, and they develop new concepts for analyzing audience needs. This metadiscourse guides them in understanding the structure of contained knowledge and fosters an intellectual integration of disciplines.

Having initiated the process of self-reflection, students expand their audience analysis to include classmates, interacting in a multicultural setting. The humanist and the scientist recognize, often for the first time, the creativity of the other. As a discourse community evolves in the classroom, participants prepare for collaboration in both academic and workplace environments. An urban university situated in the midst of a culturally diverse city, UHD exemplifies the global marketplace. In teams representing diversity of ethnicity, gender, and major, students in our customized professional writing courses consider such issues as cognition, project management, and multimedia.

Coming from a text-based background, we professors increasingly encounter visual-based audiences. We find ourselves teaching in a computer-mediated environment where designing WWW home pages vies for attention with documenting ideas. To attempt to construct hypertext before mastering the art of linear text evokes an image of Lemuel Gulliver designing a web site before accepting his humanity. HTML coding would provide little difficulty for him inasmuch as he has demonstrated his skill with languages if not with sensitivity to human factors. To avoid graduating clones of Gulliver, we need to engage students in the instructional process, establishing a social context within which they interact.

Reinventing Communications Curricula in Engineering: An Invitation

Dianne Atkinson
Purdue University School of Mechanical Engineering

The conference theme, "Reinventing Programs in Technical and Scientific Communication ' is an opportunity to acknowledge the achievements of the past couple of decades and to identify new challenges. One index of our achievements can be found in the growth of degree-granting programs over the past couple of decades. Another index is the recent demand for technical communications in other professional curricula, especially schools of engineering. As a position paper for the 1996 CPT SC annual conference, I would like to explore the implications of "reinventing" our core curricula for engineering students.

The Accreditation Board for Engineering and Technology (ABET), the official accrediting authority for programs in the US, has recently stepped up support for teaching of communications skills as part of technical curricula. Traditionally, technical communications concerned how to do things (proposals, manuals, instructions, and reports) because the technology was centered on things, e.g., toasters. A new agenda is emerging for technical students. These students need to know how to do things with people. Emerging shifts in technology—toward information and away from things—is fueling demand for more powerful communication resources. As rhetoricians, we are uniquely positioned to respond. The pressures on technical organizations to be more innovative, more efficient, and more global now impact accrediting practices. The ABET invitation to stress technical communications is an invitation to reinvent understandings of what constitutes competence in technical communications. We now have an opportunity to incorporate more rhetorical perspectives building an understanding of communication as action, and of information as a product of interaction.

I do believe the current pressures on engineering curricula constitute an important opportunity for technical communication professionals. This June I participated in the annual meeting of the American Society for Engineering Education in Washington, D.C. and communication competency for technical students is a major issue for these educators. The accreditation board (ABET) is currently pressing for more communications in the engineering curriculum and I believe we should be alert to the opportunity to contribute to the ongoing discussion of how that is to be accomplished.

Remapping Programs
Local and Global Communities: Influences and Options

Developing Programs for the Global Community

Debby Andrews
University of Delaware

The workplace of the 21 st century will be international and multicultural. Yet many technical communication programs, if they deal with international issues at all, do so only as decoration. While developing an entire program devoted to international issues would certainly be worthwhile, many colleges and universities are unable to devote resources to such an effort. Instead, they need to integrate an international perspective within an existing curriculum.

At the CPTSC meeting, I'd like to suggest some strategies for such an integrative approach. The approach depends, first, on helping students to see things differently, that is, avoid taking U.S. practices as universal. Second, it means translating that new vision into classroom and program activities. Such activities include internships as part of study-abroad programs, Internet collaborations and research when virtual travel is more appropriate, and case studies that develop international skills in the classroom when neither physical nor virtual travel is possible. My presentation will describe some of these activities as we've been developing them at the University of Delaware—at our campus in Newark DE and through our program in London, which I directed during Fall Semester 1995.

Yankee, Leave Home!:
Reinventing Technical Communication Programs for Documentation Abroad

Bruce Maylath
The University of Memphis

Scientific and technical communication (STC) programs would do well to reinvent their programs with an eye to documentation that now travels the globe. In short, STC programs need to teach students how to prepare documents for translation. The global marketplace, catalyzed by agreements such as NAFTA and GATT, and the Information Age, epitomized by the commercial exchange of software (not to mention freeware on the Internet), have combined to guarantee that documentation is now more likely than not to be used beyond national borders. To date, however, few STC programs have taken steps to accustom their students to the procedures they must undertake and the mindset they must adopt to deal with documents proceeding toward translation, even though interviews with those in business and industry who deal with international documentation (Hubbard and Hassell, Thomson and Camm, Capaldi) demonstrate a crying need for just such training.

While some have called for an entire course devoted to translation issues within STC programs (Hubbard and Hassell, Thomson and Camm), others (Capaldi) have called for instruction and assignments to be incorporated as a short unit within already existing STC courses. Such an approach is being piloted now at the University of Memphis. The curriculum draws heavily from Hoft's recently published *International Technical Communication* as well as points discussed by Anderman and Rogers, Hardman, Kulik, McDermott, Petersen, Samuelsson-Brown, and Wright.

The curriculum focuses on four areas:

1) **Clarity,** including such features as idioms, acronyms, ambiguous antecedents, the deleted conjunction or pronoun "that," shifts in person, shifts in words (use of synonyms), adjective phrases, and gerunds;

2) **Terminology management,** including keeping a glossary of all specialized and new terms and definitions;

3) **Space and signposts,** including summaries, headings, and topic sentences;

4) **Cultural and rhetorical differences,** including humor and advertising slogans.

Such a curriculum exposes students not only to appropriate textual changes but also cultural differences and useful procedures (such as terminology management). Without such a curriculum, STC students entering the workplace are no better off than the proverbial American tourist arriving abroad who exclaims, "All them furriners talk Yankee. Ya jes' gotta talk real loud and real slow!"

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Service Learning and Projects-Based Education: Let's Get Them Out of Our classes

Deborah S. Bosley
University of North Carolina-Charlotte

Technical communication courses proliferate much of the curriculum in higher education. This presentation focuses on encouraging technical communication instructors to use a form of collaborative, service learning and projects-based education as a means of blending technical content, technical writing, and team collaboration with community awareness and involvement.

Service learning has increased steadily on university campuses as a viable means of teaching students the skills they need to learn in a professional environment within the auspices of their class. That is, unlike an internship in which students spend approximately 8-10 hours per week at a corporation or agency, students engaged in service learning work with nonprofit agencies as a function of the content they are learning in their courses. For example, students in a first year biology course might work with their local EPA to see how biological concepts inform assessments and evaluations of waste disposal.

Projects-based education means that students learn content through working with the information rather than simply learning about the information. For example, students in a technical communication course might prepare catalogue copy for an upcoming exhibit at the local science museum. Students might prepare a series of charts representing biological processes suitable for a middle-school class. In both examples, students learn content as well as interviewing skills, understanding audience's needs, a variety of document forms, etc.

Service learning and projects-based education have these elements in common: Students are responding to real audiences with real problems -many of which can be solved through the kinds of writing documentation students can provide. These curriculum changes can impact the kinds and quality of technical writing assignments because they take the writing out of the classroom and place it in the community allowing faculty to move beyond case studies, textbook assignments, and standard documents (proposals, instructions).

These kinds of writing assignments give students the opportunities 1) to gain experience in a professional environment; 2) to write a variety of documents beyond the standard kinds currently assigned in technical communication courses; 3) to learn about commitments to their community by participating in the community beyond the university; 4) to write documents that have a real purpose, audience, and impact; and 5) to gain experience working together on teams.

During the presentation, I will present the concepts and research that support this kind of approach as well as give a multitude of examples and ideas for how instructors can incorporate service learning, projects-based writing assignments in their courses.

Universities and Community-Based Literacy Programs: Connections Pushing Curricular Change in Technical Communication.

Jeffrey T. Grabill
Purdue University

In a study of Fortune 500 and Service 500 companies, Barbara Wright (unpublished) describes and categorizes the approaches of these companies to workplace literacy practices. Finding that most of these companies engage in some literacy training, usually with frontline workers, she also discovered that classes are typically taught off-site during non-work hours by either public institutions or private contractors. Wright's descriptions are confirmed, at least in part, by my own experiences working with an Adult Basic Education program and the workplace literacies taught to workers who attend classes there. The focus of my presentation is to open up for consideration how changing notions of work and workplaces (like the move from production-based industries to information-based work) broadens the range of workers who engage in technical and professional writing—in effect, broadening what we mean by professional writing. These changes in work can alter in positive ways current technical communications programs.

While there has long been work which looks at the movement of professional writers from academic to workplace contexts, this research often focuses on a rather narrow range of technical and professional writers--the engineer or manager. This results in coursework which is designed to produce students for such careers, and this makes sense. Yet little work looks at the gap between what we know about professional writing and the types of professional writing issues--writers, situations, texts--that professionals in community-based literacy programs work with. This gap is particularly important given the number of businesses and government agencies who contract work with these community programs. This gap is important to investigate because it can help improve the professional writing instruction in community contexts and universities, thereby better serving workers and employers.

My presentation examines the professional writing gap between workplace and community contexts by looking briefly at how changes in work, workers, and what counts as technical and professional communication can alter how we think about curricula and program design. I focus on three institutions: the university; the community-based literacy program; and the workplace(s) which utilize both educational institutions for me needs of their workers. My position is that changes in work alter what we mean by professional writing and therefore complicate and enrich the focus of curricula by crossing the gaps between these institutions. Crossing such gaps means changing the coursework for students in each institution, drawing on a variety of expertise and experiences and engaging in collaborative pedagogical practices. For example, university students who are being trained for positions of leadership in professional organizations can benefit from Service Learning coursework. Service learning coursework can place students in contact with and allow them to participate in community programs and workplaces where professional writing literacy needs exist, with the goal of critical inquiry into the writing and pedagogical practices at these institutions. This coursework can result in

- experience with a wider range of workplace writing than is currently taught in most technical communications courses (e.g. form-filling), important in terms of enriching their educational experiences with concrete literacy and workplace experiences
- experience with a wider range of writers and writing than normally encountered in university settings
- experience learning from their service (e.g. tutoring) as well as from more traditional assignments and practices like helping to improve the professional writing practices of an organization

Such a curricula also benefits students and workers in community programs and workplaces. In fact, it has as one of its ethical and political goals the betterment on people in these programs, not just those within universities (a key component of service learning). I hope this presentation opens new ways of thinking about professional writing as well as the connections between businesses and the community-based programs which provide literacy services.

Remapping Programs
Traditions in New Contexts

Do We Need To Reinvent Or Supplement Our Current Programs In Technical And Scientific Communication

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California State University, Fullerton

Since the academic year of 1987-1988, we have been offering a 12-unit certificate program in technical writing at California State University, Fullerton. The program begins with a core course which focuses on the fundamental aspects of scientific and technical writing. The subsequent courses are on report writing, manual and brochure writing, specification writing, and feasibility studies and proposal writing. In addition to steady growth in our core course, several hundred students have enrolled in the four other courses in technical writing. Some 150 students have successfully completed the certificate program, and many of them have become professional technical writers.

Throughout the design of our technical writing certificate program I gave special attention to the areas in technical writing which need special concentration. Every year we carefully study our student evaluations of the program, and as a result, we revise our course outlines and introduce new teaching techniques. Now after eight years, in response to the CPTSC conference theme," Reinventing Programs in Technical and Scientific Communication," I have been reflecting on the need of our students who are already technical communicators coming from local industry and business. My research shows that a majority of our students use electronic communication. In their workplace, they use on-line documentation and electronic delivery. About ten percent of our students come from such departments as English and Communications. We encourage these students to take courses in on-line documentation and other electronic delivery courses during or after their completion of the certificate program. This does not mean that we are not open to new ideas for curriculum design in scientific and technical communication for future program revision.

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Disciplinary Trends in the Illustration of Professional Scientific and Technical Discourse

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Contemporary disciplinary trends in the illustration of professional scientific and technical discourse have not been widely identified. Identifying such trends will allow technical communication teachers to create fuller disciplinary theories to present to pre-professional students. This is within the province of technical communication teachers, since, as Charles Bazerman has written, technical graphics "shift the argument into different symbolic media, but the decisions of when and where to employ them, how they should be designed and what information to include, are as much writing decisions as are word selection and organization (172). In most disciplines, print journals continue to be the most highly respected medium of discourse, creating and continuing conventions, including graphical ones.

By systematically reviewing prestigious journals from approximately 20 disciplines in three sets—one set from 1972, one set from 1992—I am working to create a short summaries of disciplinary trends in the illustration of those journals, revealing editorial preferences and responses to changing communications technologies. The journals for review were selected with assistance from professionals in each discipline. My hypothesis is that published visuals are increasing in both number and variety uniformly across the disciplines, but that distinct disciplinary representational preferences by kind remain in place in contemporary formal printed discourse.

For example, a review of issues of *Nature,* the journal for biological studies, for January 1972 and January 1992 shows strong disciplinary biases toward line drawings, tables, and photographs, and against flow charts and one dimensional bar charts. Also, neither issue contained color drawings of any sort. Such observations should provide context for classroom debate about disciplinary goals, epistemic juries, and discourse practices. They also demonstrate the increasingly graphical character of professional communication.

	Nature, January 7, 1972	*Nature,* January 2, 1992
line drawings	25	23
tables	16	28
photographs	12	34
fine chars	11	18
flowchart	3	1
bar chart	0	2
scatter plot	0	21
other graphics	13	27
Total graphics	80	144

The results of such comparisons across 20 disciplines should help technical communication instructors establish priorities for teaching technical/scientific graphics. The results should provide the basis for some discipline-specific graphical theories that can be tested by subsequent research and by student and professional practices. Such a review should help instructors demonstrate the overall importance of visuals to the rhetoric of technical and scientific communication.

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Make More Room for Ethics: Our Programs Should Address Ethical Issues Concerning Treatment of the Participants in Empirical Research and User Testing

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Miami University (Ohio)

At the Nuremberg Tribunals, twenty Nazi physicians and three other members of the Third Reich were tried for perpetrating extreme cruelties, often resulting in death, against concentration camp prisoners and other persons. They had performed these barbarisms in order to study the human response to the ingestion of poison, intravenous injection of gasoline, extended immersion in ice water and other torturous treatments. To defend themselves, the accused argued that they had merely been conducting justified biomedical experimentation. In response, the judges convicted them and wrote the Nuremberg Code, a ten-point statement of the conditions under which it is ethical to involve human participants in research. One principle states that it is "absolutely essential" that every human research participant give voluntary consent after being fully informed about the research, including its nature, duration, and purpose, as well as all inconveniences and hazards reasonably to be expected" and "the effects upon his [sic] health or person which may possibly come from his participation."

Some qualitative and quantitative research conducted by faculty and students in technical and scientific communication programs violates this principle and related provisions for the protection of research participants that were subsequently incorporated into the United States Code of Federal Regulations. U.S. regulations require that all institutions that receive federal funds for even a single study involving human participants establish a policy for protecting participants in all the institution's research, even that which is not federally funded. Most colleges and universities have adopted as their institutional policy the same evaluative criteria and procedures that are laid out in the federal regulations. These require that each human-participant project receive approval from an independent committee (called an Institutional Review Board) before the project begins. The committee assures that, among other things, the researchers will fully explain the study to each prospective participant, telling what the person will be asked to do and identifying any risks— including physical, financial, psychological, and social ones—involved with participation. Furthermore, prospective participants must be allowed to decide, free from any coercion or undue influence, whether or not they wish to participate, and those who volunteer must be free to withdraw at any time without penalty. No one can give permission on behalf of someone else, meaning that teachers cannot volunteer their students and employers cannot volunteer their workers. (Parental permission must be obtained for children and adolescents.) Certain kinds of studies are exempt from the regulation, but a recent memo from the federal Office for Protection from Research Risks advises institutions to establish procedures for verifying the eligibility of projects for which exemption is claimed; institutions should not allow researchers to declare their own studies exempt. CPTSC members ought to assure that all faculty in our programs are aware of these regulations, and we should modify our programs so that we provide instruction about the regulations to all students who are likely to conduct human-participant research (including theses and dissertations) under our auspices or in their careers.

A closely related concern is the ethical treatment of people who serve as test users in the user testing of technical communication products. Since these tests are often conducted by private organizations that have never received federal funds for human-participant research, the federal regulations usually do not apply to them. Nevertheless, we should revise our programs to include discussion of the ethical issues involved with the treatment of test users. This discussion should cover the importance and means of 1) obtaining informed consent, 2) protecting test users from research risks, 3) identifying circumstances where it would be important to maintain confidentiality of information about test users' performance, and 4) assuring that test users can withdraw from the test at any time without penalty. The discussion should also highlight the ethical problems that can arise when employers ask their own workers to participate in user tests.

Adventures in Artifice Simulating Professionalism in the Software Development Team

Anthony Flinn
Eastern Washington University

During the student presentations at the end of Spring quarter a year or so ago I was struck by the radical difference between the way my Software Documentation students and their counterparts in the Software Development class conducted themselves. The Computer Science students were buoyant and cheerful recounting engaging anecdotes about the trials, errors, and ultimate triumphs of their software development process. By contrast, my students glowered their way through, radiating a maddened depression over their experience in software documentation. Part of the contrast, perhaps, might be due to the fact that in the eyes of many, software development is and will always be infinitely more glamorous than documentation, but as I put together the pieces of their discontent, I decided that I hadn't properly addressed an unavoidable contradiction training in professional collaboration—a vital part of the curriculum—conflicts with the fact that student assessment is ultimately individual and student participation in projects ends with the term, preventing the kind of collegial commitment pursued in industry, where the length of employment is indeterminate. In this paper I'll discuss what I think the training should comprise, and then I'll suggest a response to the contradiction, that of highlighting rather than trying to obscure the artificiality of professional collaboration in the classroom.

Training in working with colleagues on a single project is not simply, or even primarily, aimed at producing more cheerful attitudes at the end of the term. Quite the contrary—I am generally heartened by student grumbling at a course's conclusion because it typically means that I exacted more effort than they had planned on. What we do want students to learn, though, is that professionally collaborative effort is not merely inevitable in the software industry, but productive and desirable. Of what should this training consist? First, we must distinguish collaborative from "group activities," which are typically lodged in the classroom and consist of students responding critically to each other's writing. Though a feature of professional collaboration, it is at most a small part. What needs to be emphasized to students is the concept of professionalism, that success comes only when all team members identify their personal interests with the interests of the group. A grading system can easily be crafted to reward successful collective efforts, but that in itself is not enough, for if it teaches at all it is only by penalizing those who too fully inhabit the role of self-involved student they've been told to occupy since age six. Students need practical exercises in the anatomy and distribution of project work, with opportunities to articulate and occupy the various roles members must play on each project team. For these exercises to be properly integrated in work on larger projects, students should create simple, documented systems that spell out each team member's responsibilities and milestone schedules. In this way students explicitly commit themselves to specific tasks, with the class as witness.

Yet even with such systems in place, there are inevitably frequent lapses from professional conduct, especially at the beginning and towards the end of work on the projects, when students' stress levels are at their highest. Unless students face the artificiality of professional collaboration in the classroom, a number of destructive behaviors burst to the surface, such as receding in the face of conflict, rescuing the passive and unsure, reluctance to listen, passive aggression, swallowing and then releasing resentment, and panicky efforts to dominate. At such points we can discuss the unprofessional behaviors and their solutions *abstractly*, as treatable phenomena rather than the results of particular students' failures, acknowledging that student impersonations of professionalism are fundamentally and institutionally problematic. This acknowledgment should help students articulate the differences between the classroom and industry, thus clarifying the ground of professionalism the sense that in industry, ethical behavior demands that workers' success is mutually implicating.

Finally, our object teaching professionalism is not to learn and embrace industry practices for their own sake, but to learn, adapt, and critique them, taking away at the very least a memory of pleasure in collaboration.

Planning for the Future
Setting Goals

Assessing Technical Communication Programs: Who Does What to Whom and Why

Meg Morgan
University of North Carolina at Charlotte

In summer 1995, I began a project that I expect will take several years to complete: the investigation of the way that program assessment is being carried out within technical communication programs throughout the country.

My research questions were these:

- What models of program assessment do administrators of technical communication programs use to evaluate their programs?
- What criteria do they establish to evaluate these programs?
- How do they measure outcomes for quality?

The first phase of my work is to survey program administrators listed in the STC, the CPTSC, and the ATTW directories and to analyze the responses to see what program assessment processes are in place.

I have partially completed this first phase: I did survey program administrators, over 150 of them last spring, and I received a small response, less than 50. However, from that response, some patterns of program assessment do emerge:

- Whether formally or informally, most program administrators who responded do some type of program assessment.
- The program administrator seems to be the person responsible for initiating program assessment processes.
- Program assessment can be a highly political process, one that can reverberate with negative consequences for the program and its participants.

In the five minutes allotted to me at CPTSC, I will describe the problems that, according to survey results, may arise from the initiation and implementation of a program assessment effort.

The results of my survey (which I am going to redistribute in a more simplified form this fall to get a better response) may help CPTSC, as it begins a program assessment effort for its members, prepare for possible consequences of assessment.

Reconceiving the Theory/Practice Relationship

Karen Rossi Schnakenberg
Carnegie Mellon University

As specialists in technical and scientific communication within the academy we face several interrelated challenges: 1) how to maintain and strengthen our position and status, 2) how to work effectively in the face of diminishing resources, expanding curriculum, and evolving technology, and 3) how to prepare our students to be skilled and flexible professionals in a constantly changing workplace.

I suggest that we can go a long way to meeting all three of these challenges by rethinking the fundamental relationship of theory to practice and the implications of this relationship for our pedagogy. We have erred, I think, whenever we have bought into the all-too-prevalent conceptions of the theory/practice relationship as either a dichotomy or a hierarchy, with theory as the valorized term and the one with which we seek most to identify. This has led, as Donald Schon *(The Reflective Practitioner,* 1989) and Carolyn Miller have argued, to a situation in which we denigrate and reject affiliation with practice in order to enhance our status within the academy while we simultaneously seek to justify our existence in terms of practical outcomes and relevance to the current workplace.

I suggest that the way out of this bind is to reconceptualize the theory/practice relationship as a reciprocal one in which both terms are necessarily coequal and present at all times and in which they consistently interact and modify each other. In this conception, theories can have explanatory and heuristic value, but this value is necessarily linked to the set of practices from which the theories are derived. Thus, theory is always grounded in both history and practice, and one of its values becomes helping us to understand specifics and differences across contexts rather than providing timeless and context-free explanations of communication strategies and effects. David Kaufer and Brian Butler *(Rhetoric and the Design Arts,* 1993) have recently argued for a conception of rhetoric as a design art in which process and product evolve simultaneously, and each step in the process provides a unique situation rather than a predictable outcome. Their definition captures a strong sense of the role I have in mind for theory within programs in technical and scientific communication. Under this conception, theory can provide concepts, heuristics, and procedures worth exploring but not guaranteed methods or answers.

This conception has important implications for our curriculums. It suggests, for example, that instruction should proceed inductively rather than deductively; that students need broad exposure to a range of real situations and practices—both current and historical—coupled with reflective analysis of the links between context and communication strategies; that coursework should feature a situational or case-based approach rather than one based on genre or language skills; that primary emphasis should be given to situational and rhetorical analysis; and that students (and effective professionals) need to know the history of communication practices as well as related theories. Additionally, this conception suggests that academic programs can have fruitful relationships with specific workplace sites- including research into current practices, student internships, and workplace partnerships without sacrificing academic standing or running the risk of developing programs that are too narrowly concerned with current practice. If we view current practice as a specific and immediate instance to be incorporated into our more general and theoretical understanding of communication practices, rather than as an end or goal, we can begin to see our curriculums as sites for exploring and expanding effective communication strategies related to science and technology.

Reinventing *Praxis* in Technical Communication: Two-Year College Programs and the Disciplinary Community

Katherine Staples
Austin Community College

Technical communication has waged a long disciplinary war over its particular definition of the practical. Tenure battles rage over the value of workplace service, and practicing professionals criticize basic research: theory independent of application, or (by definition) *praxis*. The American academy ascribes status to basic research and to such theory. Grant funding, subsidies, and, increasingly, enrollments, however, fall on the side of the applied and practical, *techne*--which remains vulgarly solvent.

It's thus easy (and common) to see two-year college programs in technical communication relegated to the practitioner category. Indeed, such programs value (and reward) active local and regional industry connections, excellence in teaching (not research), informed application of theory, and a curriculum free to evolve rapidly and with many disciplinary partners. Are these programmatic features mere mindless *techne?*

All unsuccessful academic programs are alike, but each successful technical communication program succeeds in its own way. I'd like to propose that successful two-year programs, like technical communication programs of other kinds, must balance *praxis* and *techne* to suit larger educational (not rote training) goals. Such programs take as their goal education which makes students responsible and actively contributing members of their professional community, informed political and economic decision makers. After all, two year colleges define educational goals as community ones.

But there are many communities. In the post-secondary disciplinary one, two-year college programs tend not to be active, visible, or particularly welcome. Without disciplinary support and programmatic models, such programs often founder, vanishing or succeeding in disciplinary isolation. In either case, the loss is a significant one, particularly given the rising number of enrollments in the country's 1,400 two-year colleges and the increasing need for accessible on-the-job education and for affordable transfer credits. Technical communication learners suffer far more than do programs from disciplinary isolation of two-year colleges.

In redefining praxis, then, technical communication can redefine access to membership its own post-secondary community. It's time to reconsider our common disciplinary origins in pedagogy--and in the theoretical aspects of the teaching of teaching. Likewise, the technical communication discipline fosters a complex relationship to the workplace, an evolving multidisciplinarity, openness to change, and programmatic diversity. To students and to professional communities, two-year college programs and service courses have an increasingly large role. But can the disciplinary community recognize and value that role as *praxis?* That remains to be seen.

Challenges and Risks: Teaching Public School Teachers to Teach Technical Communication

Nancy O'Rourke
Utah State University

Increasingly, state legislatures are writing and passing legislation mandating that their departments of education include technical communication in the public school. (To my knowledge, Wyoming is the latest state that successfully passed this kind of legislation.) However, generally, undergraduate programs do not include any kind of course that even resembles "how to teach technical communication." Many of our graduate programs do, and some of those graduates to find themselves teaching in public school systems. Nevertheless, for the graduate with a baccalaureate degree, a black hole seems to exist in learning how to teach technical communication in the public school system. Also, public school teachers and their students need to know how and why their students need to be literate in this genre of writing.

Thus, there are ramifications for social and workplace contexts, for technical communication programs at the two-year and four-year college level (as well as technical schools), for diminishing resources in the school systems in general, as well as for the legislation that places these ethical obligations on their state departments of education—which falls ultimately to teachers in the classroom.

Hence, the challenges and the risks.

As Celia Patterson pointed out at last year's meeting, "[In the US] we have no central planning agency, no government or national education office that disseminates information on the topic, and very few curriculum materials." It seems to me that here is an opportunity for a Writing Across the Curriculum program whereby technical communication programs could interlink with departments of secondary education as well as with discipline-specific departments on campus, and with the non-academic work places to begin forming an infrastructure. Such an infrastructure and linking activities, begun on a small scale, could prove workable and not place an undue burden on any one department or organization.

The question of availability of necessary technology for an effort of this kind looms large, in some states more than others. Utah is fortunate in that the governor and the legislature have supported a technology initiative for some time. Distance learning and satellite offices placed strategically around the state help support the state's vision of a virtual university, a space where a WAC program, such as the one I have suggested, might flourish.

Technical Communication in a Post-Industrial Age: Five Key Projects

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Technical communication, as a whole, lacks agency. Certainly we *do* things—technical communication as a genre is sometimes defined as writing that *does something*. But we don't do things, it seems, of our own volition. Our projects are defined by others, our work seen as a form of service. Our discipline is founded on the idea of fulfilling, in timely and efficient fashion, the requests made of us by engineers, by programmers, by managers, and by customers. By allowing our work to be defined in this way almost always in the service of other objectives—we allow ourselves to be devalued.

But as we enter the post-industrial age, we enter a time of great potential for revising this position. Fifty or even ten years ago, technological products generated income; in that climate, information was subordinate to industry. Today, however, we live and work in an increasingly post-industrial age, where information is fast becoming the more valuable product. Most technical communicators miss this fact, even as corporations capitalize on it: in the information age, technical communication can become *more* important than the technology. We are potentially in a time where the technologists and engineers should be supporting our work rather than vice versa.

This service orientation is doubled, fractal-like, in academia, where technical communication educators frequently find themselves called upon to fulfill wish-lists of skills to industry. This position is readily apparent in a recent issue of *Technical Communication* on education. "The role of industry" in academic/industry collaboration, argue three technical communicators, "is to lend the structure and services of the institution to a design and content shaped by industry" (Krestas, Fisher, and Hackos, 1995). Another author cites a 1969 textbook in technical communication (his only bibliographic source) to argue for technical communication as "the presentation of verifiable data" and a renewed emphasis on providing hands-on skills-based learning in "the latest automated word processing applications" (Merola, 1995). I've frequently found myself on the pointy end of such arguments, in virulent disagreements over whether I should be teaching basic rhetorical, usability, and visual design techniques or if I should be teaching FrameMaker 4.0 or Doc2Help. I've even seen *typing speed* listed as a job qualification in want ads for technical writers. These things, as you might expect, trouble me greatly.

Focusing primarily on teaching skills places technical communication in a relatively powerless position: technical trainers rather than educators. Responding to the demands of industry, almost by definition, disempowers technical communicators, relegating them to secondary roles in education, industry, and larger social spheres importance (see laments in Kreppel, 1995, p. 603; Zimmerman and Muraski, 1995; Jones, 1995; Steve and Bigelo, 1993). A number of theorists have suggested the need to move beyond our current, limited status by methods such integrating technical writing earlier into the design process (Doherty-Farina, 1992; Conklin, 1993; Horton, 1993) or by broadening our goals beyond simple skills (Selber, 1994; Southard and Reaves, 1995). These calls are useful but they do not go far enough. Although there are obvious (and financial) benefits to describing education in terms of what employees will need to do (Anderson, 1985; Roth, 1993), there are also values—extremely important values—in taking a broader view, and talking about what technical communication should be.

If we truly wish to effect change in our positions, we need to rethink our mission in more fundamental ways than how to make our current practices more efficient. Rather than respond to changes in industry, we need to begin informing those changes. I've identified with five key projects for technical communication programs as we enter the information age:

1. Connect Education to Work

I mean this in a critical rather than accommodating way. We need to investigate not only how to fulfill the traditional roles of technical communicators (which as I said above are frequently disempowered), we need to also look to the types of research going on in management theory, information management, interface design, and labor theory. Many of the most advanced and powerful work in such areas is actually technical communication. Hammer and Champy's (1993) "re-engineering", one of the latest fads in the corporate world, is at its lowest level a critical focus on the processes of communication within corporations. We need to investigate such movements and participate in them rather than be acted on by them. Hammer and Champy's work is groundbreaking precisely because most companies do not understand communication, information, and knowledge. We do.

2. **Question Educational Goals**

Similarly, we need to take on the difficult task of questioning educational goals at a variety of levels. These are questions we in CPTSC have already begun asking: should we be filling job and skill slots determined by industry? For that matter, are more corporate-oriented organizations such as STC shaping roles for technical communicators, or are they themselves filling slots dictated by industry? A more productive position (but a more difficult one) would be to take the tact described in the first project and apply it to education. We can educate, for example, technical communicators as labor theorist Robert Reich (1992) argues to be symbolic-analytic workers, skilled at manipulating information networks, abstracting and connecting disparate pieces of information in order to construct higher order knowledge. In some ways, technical communicators already do this, but they fail to value it. In hypertextual lingo, we value the nodes rather than the links.

3. **Question Educational Processes and Infrastructures**

This is one project that many of us are already beginning to undertake, albeit in a haphazard way sometimes. Computer networks provide the opportunity for nonstandard teaching, reaming, and working situations. Such situations provide students, teachers, and professionals with the opportunity to work together despite geographical and temporal differences. At the same time, this is one area in which we must exercise the most care: in the long run, some forms of distance learning may tend to isolate learners by physically separating them from their peers and mentor. Face it: paying for college is always a high burden; given the opportunity, families with the choice between sending their offspring 500 miles away and having them stay at home, many families may choose the distance education route. We need to make it clear what the benefits are of residence learning; we need to insist on defining education in broad terms that must include more than just seat time and test scores. At the same time, we need to understand ways that networked communication can positively affect education and work, and to create additional positive environments.

4. **Build Meta/network knowledge and Self-reflective Practices**

Perhaps more importantly, we must move beyond the idea that the network is a medium for transmitting knowledge. A more radical notion is that the network is also an environment for learning, working, and living. Put in a different way, we need to think about new formations for knowledge that rely on network organization, metaknowledge and metawork that act at a level above current knowledge structures. This is another way of saying we need to redefine technical communication in broader terms than functional skills: we should be *teaching* rather than *instructing*. We have already begun to research the dynamics of learning and working as a way of improving those activities in areas such as critical literacies (Selber, 1994), usability (Sullivan, 1989), and economics (Johnson-Eilola, 1995). Now we can take the next step: collapsing distinctions between teacher/student/user in an attempt to help all of us understand the potential richness of crossing over those functional roles in broad communication contexts.

5. Rethink Interdisciplinary

Finally, we must struggle to overcome disciplinary boundaries. Many of the things I've suggested here are drawn from other fields, work I've discovered by backtracking threads from popular accounts back to professional journals and publications. Our current approach is to take what we're given. The task of software documentation, for example, typically starts with the end product, a piece of late-beta or even golden master software. We build our documentation on what we're given. We are blocked out of the formative stages—where we might make productive changes in the dynamics and the form of software in order to increase usability and efficiency—because we are not able to speak the discourse of software development. It is crucial that we encourage, even require, our students to gain the fundamentals of their respective specialty fields, perhaps multiple fields. Furthermore, we may wish to require classes in rapid field learning that help students develop strategies and tactics for picking up the basics of new fields quickly so that they can enter into the formative stages of those conversations.

These five projects are ambitious and difficult ones, but they're also crucial ones in reforming our current status in both academy and industry. We are living in the information age, and we are information workers. We must illustrate why that work is valuable. Although some claim that with all this information, it is not information but attention that is valuable. But in fact information has become much like money, except that in its lowest common denominator, it's very cheap. It's as if you went to an ATM machine to withdraw a hundred dollars, and the machine sprayed 10,000 pennies at your head. Technical communication *used to* be about providing information. In an information age, *anyone* can provide information. If technical communication is even in existence in the twenty-first century, it will need to be about more than job skills and product support; it will need to be about teaching and

learning and the broadest levels, about education rather than training, and about inter- and cross-disciplinary and metaknowledge.

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Planning for the Future New Technologies: Professional, Cultural, and Pedagogical

Issues in Preparing Students to Write for New Technologies

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Technical Communication programs must begin to infuse courses in new technologies into the curriculum. For example, if you survey the skills sought by employers in recent STC job listings, you will find knowledge of on-line documentation (including Windows 95 help), World Wide Web development, information delivery issues, document management systems, computer-based training, and multimedia presentations on the list. In addition, employers are seeking experience in specific software packages, including on-line help (RoboHelp, ForeHelp, Doc-to-Help, WinHelp, NT help development), desktop publishing (FrameMaker, PageMaker, Interleaf), authoring (IconAuthor, AuthorWare), graphics (Visio, PhotoShop, CorelDRAW, HiJack), and, of course, Microsoft Office and WordPerfect.

My conclusion is that to prepare students for the job market, we must offer courses in on-line documentation, Web page design, computer-based training, new delivery media, and other new technologies. While some may argue that colleges and universities do not exist to "serve" industry, I believe that technical communication courses must balance theory with marketable job skills.

However, teaching courses in new technologies poses new pedagogical challenges for faculty. In contrast to traditional writing courses, this type of course in "electronic literacy" is comprised of a variety of technical and cognitive skills. There are also numerous practical concerns.

-FUNCTIONAL: students must learn the basic skills of good technical writing, including organization, chunking, conciseness, editing, and good grammar/punctuation. They must also learn to work collaboratively and write and edit on-line.

-FACTUAL: students must learn terminology and other factual information (e.g. HTML and Internet concepts for a course on Web page design; the way WinHelp compilers work for a course on on-line help).

-CONCEPTUAL: students must learn how to write and organize hypertext. They must then solve problems associated with nonlinear texts, including accessing information, chunking, hierarchical thinking, and problems in using traditional organizational techniques.

-GRAPHICAL: students must learn principles of good screen design and graphical user interfaces. They must also learn to design and incorporate appropriate and effective graphics, as well as understand types of graphics formats.

-TECHNICAL: students must learn how to use the computer, operating system, and then the software (such as RoboHelp, an HTML editor, or an authoring package). Student background and access to computer equipment is often so varied as to pose additional problems.

-In addition to these issues, there are numerous practical issues of money, time, and support. A fundamental issue is obtaining lab facilities and the hardware and software required for the lab, then scheduling use of the facilities. An even bigger problem is the need to constantly upgrade or even change what is taught. (For example, Microsoft has announced that the next version of WinHelp is being replaced by an HTML-based product). There is also a problem teaching all the new skills I have outlined above in the traditional 10-15 week time limit. Additional problems include obtaining good technical support and useful training materials, transferring large files, and grading and evaluating on-line documents.

Both faculty and administrators must be aware of new challenges in teaching courses in new technology.

Internet in the Professional & Technical Communication Program: Stopping, reviving, surviving

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In Australia the "stop, revive and survive" slogan reminds drivers to avoid accidents during long trips by stopping to refresh themselves. I see the slogan on the expressway sign when I drive to work. During one trip I was reflecting on the Federal government's cuts to the higher education budget and their possible effect on our professional communication program. Applied to this situation the slogan offers suggestions as to how a leader of a technical and professional communication program can help it survive the changing conditions and values in academe. Depending on circumstances the program leader may need to stop his or her colleagues' lack of interest or activity in research and scholarship, and if the program has a poor image revive it so that it is recognized and valued in the academic community. For both aims the Internet may be invaluable. As a new, hybrid medium it supports an emerging and fluid research area that has not been appropriated by a single discipline. It also constitutes a new mode of educational delivery that is attractive to universities concerned about funding.

Problems of survival in the academic community

In the 'slash and burn' mentality that often accompanies reduced funding organizations may remove anything that seems alien or retrograde to their eve activities. In Australia professional and technical communication programs may seem safe because they are so popular with undergraduates, routinely getting more applications than funded places. However they run the risk of being marginalized or even shut down if their activities appear divorced from the rest of the academic community. There are two problems that may cause a program to be perceived as an anomaly, and therefore expendable: if the area of study is not seen to produce research and scholarship, and if the teaching activities do not appear to support the university's image.

Stopping the 'no research' culture

Most of the technical and professional communication programs in Australian higher education exist in the newer universities (post-1989). These universities are no longer funded only for teaching. They are now expected to compete with the older, established research universities for funding that rewards research 'outputs' such as publications and the awarding of postgraduate degrees and research grants. For this reason the newer universities are moving quickly to develop their research and scholarship activities.

Unfortunately the general perception in the academic community is that academies working in technical and professional communication do not contribute sufficiently to research and scholarship. This view is partly because the areas is seen as being practical and thus not supporting enquiry and theorizing, and partly because many academies in this area may not be active researchers.

There are good reasons for their lack of participation. One is isolation. Many academies in this area are the sole communication person in their faculty; others comprise a small group that may be peripheral to the faculty's main research focus. As well communication programs are not widespread in Australia. As a result technical and professional communication has yet to build a critical mass of academies that can create a definable research culture that can support 'sites' of discussion and sharing, such as conferences and publications. In comparison communication academics in the media and social interaction areas work in well-established research communities that provide many opportunities for them.

Another reason for staff members' inability or reluctance to undertake research is their lack of research experience, either in general or in communication itself. Many staff working in technical and professional communication in Australia do not have a postgraduate research degree, which is the usual entry point to a research career in academe. Others are qualified but they separate their activities so that they teach communication but research in their original discipline. Without research qualifications or active work in the communication area staff may be unable to get major research grants or attract postgraduate research students, who help to construct and support a research culture.

It is becoming increasingly important for the leader of a technical and professional communication program to address

these problems and start up a research culture involving the program's staff. Is this possible? Other communication areas, such as media and social interaction, have had new research opportunities with the advent of cultural studies, an approach that has fueled new journals, conferences and research possibilities. For technical and professional communication new technology may offer a similar opening. Internet is useful in resolving one of the problems identified above. By creating what amounts to virtual staff lounges Internet supports isolated academics in becoming aware of interesting research issues, being able to discuss them worldwide, and finding out more easily about sites for disseminating their research results.

More importantly the Internet can itself be a rich and new area of research that welcomes the perspectives of technical and professional communication academics. Internet is a hybrid in that it combines different aspects of older media This quality means that it is not only open to new research problems and paths but also that it has not and probably will not be appropriated by a single discipline. In this sense it can be characterized as a borderless' research area that can and does accommodate interdisciplinary and cross-disciplinary studies. In this borderless and new research world it seems likely that technical and professional communicators can find a respected place.

In developing a research culture for professional and technical communicators who do not have a strong research background already the program leader needs to consider a number of issues. With regard to Internet research some of the issues are simply practical ones, such as providing sufficient technical training, hardware and software to support staff who wish to conduct research about this new technology. It is also important for the leader to ensure that the research activities complement the standards and activities set by the university. For example the leader should emphasize the need for accepted qualitative and quantitative studies rather than studies that are descriptive, or worse, merely rhapsodizing about the Net's power. With the academic community a program leader should also promote the program's research activities, seek funds, support collaboration where this is appropriate, and find ways to have the research group formally recognized, locally, nationally and internationally.

Reviving the program's image

The professional or technical communication program may be dismissed by the rest of the academic community if it does not appear to be a legitimate part of higher education. A program runs this risk if it is seen to concern itself primarily with career training, basic competencies, or skills that seem to be based more on intuition than a body of specialist knowledge, scholarship and research.

New technologies, such as the Internet, can revive a communication program in the eyes of the academic community by putting paid to the view that its teaching is reductionist, old-fashioned or out of sync with current pedagogical trends and concerns. Academics working in technical and professional communication programs are at the forefront in integrating the Internet into educational activities. As early adopters of this technology they are more likely now to be valued in the university as educational innovators. Universities are interested in their expertise because Internet delivery of courses is seen to offer cost-effective programs that attract both the full-fee paying students from overseas and the local students whose work and family commitments make on-campus attendance difficult. It can mean access to new markets because students' physical proximity to a university becomes more irrelevant. As an example, Nepean's Professional Communication Research Group used the Internet to deliver a writing subject to an overseas institution. Its success has led to the group now offering two more Internet-based subjects to local students. The group's efforts have been widely publicized by the university as proof that it is pursuing innovative approaches to teaching and learning.

When incorporating the Internet into a program staff again need to be critical. It is not enough to use the new technology. Part of our role as educators is to analyze the changes that the Internet makes to different aspects of the learning experience, and reflect on both the short-term and long-term advantages and disadvantages of these changes.

Surviving

In Australia technical and professional communicators who are adept at reading the changing climate of universities are pursuing two important goals: to develop a supportive research culture for their colleagues and themselves, and to become known as educational innovators. These goals may best be reached by using the Internet, both as a topic of research and as a flexible mode of educational delivery.

The Internet offers a new and borderless area that can be useful for early adopters who use it for research and education. It offers an rich opportunity to undertake activities that can revise misperceptions about technical and professional communication, thus providing a way for the academics in this area to be seen as legitimate and valued members of the academic community. As academe becomes more competitive and less well-funded, addressing these issues of legitimacy and value are becoming increasingly important for a communication program's survival.

Professional Identity and Professional Values, Now and in the Face of an Uncertain Future

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Faced with a wide field of prophetic visions describing problems and solutions for the next century of technical communication practice, curriculum developers must balance excitement and fear with academic indifference. Educators point to myriad influences on their work, including but not limited to cultural movements, economic trends, employment statistics, industrial cooperatives, ecological phenomenon, and technological developments. At the same time, technical communicators seek ways **and means of securing** a more clearly defined professional identity and locus for professional values. Over time we can trace the development of a basic technical communicator tool kit that takes shape in response to professional prophecies and that represents a close approximation of our profession's values.

Among scholars, "identity" and "values roughly correspond to "ethos" and "ethics." Technical communicators have dealt with ethos and ethics at several levels: at the level of the individual communicator and the profession as a whole; at the level of everyday professional practice and of pedagogical practice. Taken in the context of technical communication students and curricula, ethos and ethics take on very specific meaning for me here. As identity, ethos is the reflection and projection of student and faculty attitudes, values and habits into professional culture. As values, ethics is the reflection and projection of curriculum values through students and faculty into professional culture. (See Table 1.)

Table 1: Ethos and Ethics as Reflection and Projection

Ethos	Identity	Self reflection and projection
Ethics	Values	Curriculum reflection and projection

Using this interpretation of ethos/identity and ethics/values, I want to shift the focus of this discussion to curriculum development, faculty-student relationships, and the technical communicator tool kit. I will examine briefly the impact of a single curriculum influence—developments in computer technologies— on the identity and values of students and faculty in technical communication programs.

There is a pedagogical basis for expecting students to produce documents with the aid of computer based document design tools. The easy justifications follow:

- Revision capabilities make this practice expedient for teaching document process.
- Employers demand a range of software expertise from technical communication graduates, so we need to prepare students to meet such demands.

But the pedagogical value goes deeper than these reasons. Computer-based document design gathers together and takes its place among several tools from the technical communicator tool kit, including expertise with software and hardware, with layout and design, and perhaps as well with writing, editing, and client communication. Though taken as a whole any curriculum might value all of these tools, individual faculty do value some tools more than others. This creates problems, both for students and the program.

Within a single program, we are likely to find tremendous variation among students, among faculty, and between students and faculty in the level of experience and expertise with computer-based document design technologies. Ten years ago, students were rewarded if they used the palatino typeface instead of a typewriter, or if they used clip art instead of hand-drawn sketches or cut-and-paste photoreproductions of graphics. Technology advances, coupled with an increasing level of sophistication and knowledge of computer use and graphic design have given students the power and capability to make documents look more professional. Although some faculty are still impressed by clip art, others seem to need a 3 D animation before they'll take notice.

By navigating the expectations of a series of faculty in their programs, students begin developing a sense of their professional values, even if they don't necessarily think of it in that way. Students can come to represent the values of individual faculty as well. Students begin to get conflicting messages at the same time. Because of the tremendous difference in expertise and expectation among faculty, students can find themselves in a position where their values are called into question by the people who ought to be responsible for guiding those values.

Let me provide two examples that in my experience are not isolated, although I cannot say with any solid grounding are standard either. Keep in mind these are not examples for conjecture They are real.

Consider the experience of a student who excels at visual design Every document she turns in demonstrates her ability. She has reached the point where she can easily visualize layouts and produce beautiful, professional looking documents quickly. She encounters a faculty member who demands a high level of textual facility from his students, though he also expects at least some measure of skill in visual presentation. He believes that content is the most important aspect of any document and is suspicious of documents that look "too good." To him, this is an indication that the content must have suffered in the time dedicated to the assignment he judges her prose more critically than he does that of students who demonstrate visually where their priorities lie.

This student was caught in a value-judgment crossfire. Because she entered a course having mastered previous lessons valued by one faculty member she drew a suspicious eye from another faculty member who had different professional values. There were immediate consequences for the student. Further, the situation created suspicion between faculty members about what is valued in different classrooms, and about what those value differences might mean in terms of the quality of the program's graduates.

Consider another example of a faculty member who responds to the prophets by teaching, computer intensive courses. Unconvinced that there is a significant return for his students for their participation in such a course, he is nonetheless convinced that there are payoffs in terms of his own professional stature. Teaching with technology has its rewards, even if they might not be anything more grand than notice from administration. Technology also provides a useful excuse for the drop in student evaluations that results in the transformation of his classroom but not his pedagogical approaches.

These examples are perhaps simplistic, but indicate in a general way the implications for students and faculty of what can happen when there is a significant difference in the way the technical communication tool kit is valued across the curriculum. Having said that, let me also say that I don't think it is possible for there to be agreement across any curriculum to the way that communicator tools are valued. But there must be some constructive resolution to this predicament.

I will offer two recommendations here:

1) Faculty ought to be engaged in constant reflection and reevaluation of the content of their program's technical communicator tool kit. That is, they need to ask the questions: Why have these tools become part of our program? and Why have they come to be valued the way they have?

2) Faculty ought to engage students in these discussions whenever possible. Some students may be able to contribute from their own professional experience. All students would benefit from having faculty members explain and demonstrate the values that underlie their pedagogical practices. Students ought to know why we value the tools we do. How can they evaluate those tools critically if we haven't shared our values with them openly and overtly rather than covertly?

I don't mean to suggest that these recommendations are not in practice now. I would suggest however, that these recommendations are not often practiced consistently in every program and that they are not always implemented programmatically. This kind of program-wide reflection is key to understanding the identity and values we project to and through our students.

Technologies, Cultural Representations, and Technological Literacies

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The importance of technological literacy for technical communication professionals is largely undisputed. Technical communication programs routinely integrate computer-mediated communication technologies and pedagogies into their curricula, often, however, without articulating how influences such as cultural expectations, assumptions, and representations inform such curricular decisions.

Popular media representations are one of the influences that shape our expectations of computer expertise. For example, in 1996, *Time* and *Newsweek* magazine both featured on their covers, and therefore valorized, computer wizards such as Microsoft's Bill Gates *(Time,* September 16, 1996), Netscape's Marc Andreessen *(Time,* February 16, 1996), and the consummate computer geek, cartoon character Dilbert *(Newsweek,* August 12, 1996). Technology is clearly their job, and they excel at it. Meanwhile, a mid-September cartoon in the *Chronicle of Higher Education* caricatures the computer expertise expectations we have of college faculty. An older college professor sits at his desk in his book-lined office, his face fixed in a stubborn expression befitting a two-year-old, while a much younger, more technologically-adept female colleague attempts to cajole him into using "Mr. Mouse" to edit the scathing political commentary for which is famous. Unlike Gates, Andreessen, and Dilbert, this political science professor and his English faculty colleagues described by Hass and Neuwirth[i] contend that "computers are not our job," implying that professors can concentrate on teaching, research, and service, leaving the work of technology to the experts.

As someone who lives on the borderland—part technology specialist, part teacher/scholar—I've grown increasingly dissatisfied with the division of labor that is played out in contrasting cultural images like these. They call attention to an unsettling "value gap"[ii] that absolves faculty of responsibility for understanding technological systems, because computing is not their job, while departmental technology specialists see no need to understand the disciplines for which they provide technological support, because computing, and only computing, is their job. The following are results of that value gap.

- *Faculty can't effectively teach with or about technology if we don't know how to do it ourselves.* Although this is the standard technocentric argument, and an important issue, it is not the most crucial for me, because I don't believe that computer literacy should be "taught" in the same way that disciplinary knowledge is "taught."
- *Faculty can 't influence the future directions of technology without understanding how it was designed to be used.* Again, this is a common, but technocentric argument, and still not the most crucial.
- *Faculty can't maintain control of the development of our disciplinary knowledge bases if we don't take equal responsibility for the use and development of technology within those disciplines* This, for me, is the real issue. When computers are used in our disciplines, in any capacity, they influence how knowledge is formed. If those of us who are credentialed members of those disciplines are satisfied that "computers are not our job" we, in effect, abdicate responsibility for the development of our disciplinary knowledge bases.

Academic departments and individual faculty can take several steps toward successful, critical integration of technology. I offer the following admittedly idealistic recommendations from my vantage point as a border-straddling, technology-using scholar/practitioner.

1. Construct curricula around a definition of technological literacy that combines the following expectations.
   - Skillful, critical technology use that is contextually integrated into every class, not relegated to so called "computer-literacy" classes, which necessarily decontextualize technology use.
   - As students develop facility with the features and configurations of technologies, concurrently and continuously engage them in critically examining how such features and configurations affect their work and thinking processes.

2. Encourage faculty to skilfully use a variety of technologies to participate in and extend the knowledge making practices of their respective disciplines. Possible outcomes include

- Individual faculty committed to educating themselves about the technologies on their home and office desktops and in student labs.
- Institutions committed to faculty technology support aimed at in-depth curricular and disciplinary applications, as well as the acquisition of more broad-based technology skills and knowledge.
- Institutions committed to providing tangible rewards for faculty technology initiative, include financial compensation as well as tenure and promotion considerations. Institutions need to be aware that a long-term expectation to assist others with technology turn into a disincentive for even the most enthusiastic and knowledgeable faculty member, unless appropriate compensation is provided.

3. Engage technology specialists as partners in disciplinary knowledge-making, instead of merely the people whose job it is to take care of the computers. This can be achieved by means of

- Individual faculty who take the time to explain their disciplines' concerns and knowledge making practices, so that the technology specialists can provide informed support. Departments that recruit and hire technology specialists who are interested in and value the diverse knowledge-making practices of the disciplines within the department.
- Institutions that value technologists' total range of expertise, so that technology specialists routinely participate in curriculum development, shared governance, budget development, and grant writing, as well as providing guidance and support for computing.

In short, computing everyone's job. Computing will—in fact, already has—changed disciplines. Likewise, disciplines can change computing. The responsibility for computing, needs to be shared throughout our institutions. My recommendations, although idealistic, can serve as guidelines for curricular and institutional integration of technology.

[i]Haas, Christina and Christine M. Neuwirth. "Writing the Technology That Writes Us: Research on Literacy and the Shape of Technology." In Cynthia L. Selfe and Susan Hilligoss, editors. *Literacy and Computers: The Complications of Teaching and Learning with Technology*. New York: MLA, 1994.

[ii] This expression was coined by Bill Williamson in a paper presented at the 1996 CPTSC.

Technology and Technical Communication Instruction: Technical Literacies for Future Professionals

Allan Heaps
Michigan Technological University

As technical communication instructors, most of us feel the unmistakable tug of the marketplace, demanding that we teach future professionals a set of quantifiable skills that will enable them to compete in the job market. The need to infuse computer-related technology into our teaching practices fits neatly into this skills-driven rationale as word processing, page layout, and even HTML coding have come to define the necessary skills our future professionals need to dispatch their communication opportunities with speed and efficiency. But a practice that fits so neatly might bear closer consideration. What are we teaching when we teach with technology? What kind of jobs are we preparing our future professionals to fill? What kind of agenda are we supporting?

Technology in the technical communication classroom can be problematic in that the students want to quickly equate what they need to learn with the surface of the assignments in the course. A technical communication class can quickly disintegrate into an applications course for the students, resembling in their minds the C++ course taught in computer science or the PageMaker course offered by the school of business if we do not actively resist that move in our technology enhanced teaching. Communication proficiency transcends both technology skills AND traditional technical communication forms. Yet we could cause our students to think that since they know HTML and two report formats that they are qualified professionals who have "been there and done that" More tragically, the marketplace could come to expect that kind of training and attitude in our graduates.

At last year's conference in Houghton, Johndan Johnson-Eilola highlighted the present service orientation of the technical communication field through relating a nightmare in which he hands over a finished piece of documentation and says to the unnamed customer "Ya' want fries with that?" (58). In truth, many of us are teaching now because we are at some level frustrated with the Mickey D mentality of what it can mean to work as a technical communicator. As one colleague who presently teaches at New Mexico State University puts it. "[o]f the several jobs I held..., not one could I imagine still being interesting five years down the road... Technical writers [are] often seen as interchangeable cogs, and to large extent the cheaper the cog the better" (Wilson, 3). So we come to the academe with hopes of making a better world—more immediately for ourselves and in the long run our graduates.

I recently talked to a former student who has remained a good friend. Upon graduation this budding professional took a job with a firm as "the PageMaker guy." I remember his excitement at getting the job offer—after all, he had loved using that program in our class. After 3 years he has been unable to move from formatting documents in PageMaker to project management or anything else—even though he has trained 3 or 4 other employees and project managers to use the program. Ultimately he will have to quit the firm and try working somewhere else. What kind of jobs are we preparing our future professionals to fill? Using Robert Reich's ideas in *The Work of Nations: Preparing Ourselves for 21 Century Capitalism*, Johnson-Eilola pushes us to recast ourselves as "people who analyze and arrange symbols" (58). I can't help thinking that this kind of rearrangement is exactly what "the PageMaker guy" needs at this point in his career, but how do we teach students to do that using technology and help them resist and move beyond the confining labels that can accompany computer-related technical literacies?

The appeal of technology in the marketplace lies chiefly in the ability it offers us to work both more quickly and cost effectively, thus we fed a demand in the academe to train our future professionals with technology skills. Stephen Katz reminds us in his haunting article entitled "The Ethic of Expediency: Rhetoric, Technology, and the Holocaust," of what is at stake when speed and efficiency go unchecked by humanitarian concerns such as critical insight and social responsibility. In this article he shows how "technological capitalism" with its roots firmly planted in the same "ethic of expediency" makes it seem rational for us to "accept high insurance costs on plane crashes rather than improve the safety of planes; ...decide ...it [is] more cost-effective to incur the law suits (and loss of life) caused by the placement of the gas tank on the Pintos rather than fix the problem..." and refer to employees as "human resources... with the metaphorical implications that they (we) can be used up and disposed of or replaced when need be" (272). Integrating seamless uses of computer-related technology into our technical communication classrooms can only allow business as usual to go on unchecked and prepare our future professionals to be at the mercy of this dog-eat-dog economy.

The question for us should be a reflective one. "How does my use of technology in the technical communication classroom allow for critical insight and teach social responsibility?" In her 1990 CPTSC paper entitled

"Models for Educating Technical Communicators," Marilyn Cooper asks us to re-construe what we do as an activity of "working together to create common interests, to construct the ideals of our society, to examine the ends of action" (12). Therein lies the power of the classroom. Instead of simply teaching forms and technological proficiencies we need to find ways of using technology that "examine the ends of [communicative] action" and prepare our future professionals with the humanitarian insights that will check and balance the ethic of expediency.

Works Cited

Cooper, Marilyn. "Models for Educating Technical Communicators." *Proceedings, CPTSC 16th Annual Meeting,* 1990.

Johnson-Eilola, Johndan. "Technical Communication as Symbolic-Analytic *Work*: Possible Futures in Technical Communication." *Proceedings, CPTSC 22nd Annual Meeting,* 1995.

Katz, Stephen B. "The Ethic of Expediency: Rhetoric, Technology, and the Holocaust." *College English 54* (1992): 255-75.

Wilson, Greg. "Post Modern Technical Writing Pedagogy." Unpublished Transcript.

23rd Annual Business Meeting

Business Meeting Agenda
Council for Programs in Technical and Scientific Communication

23rd Annual Meeting
Sat. Sept. 28, 1996
Oxford, Ohio

1. Approval of minutes for 1995 business meeting (C. Rude)

2. Report of Publications (M. Cooper)

3. Secretary's report (S. Bernhardt)

4. Treasurer's Report (H. Shirk)

5. Report: ATTW, including the "Mega Conference" (S. Little)

6. Report: NCTE (K. Staples)

7. Report: STC (K. Rainey)

8. Report: The program Review process (B. Karis)

9. Report: Web Page and Listserv (B. Williamson/S. Selber)

10. New Business
    a. selection of site and dates for 1998 meeting
    b. small groups to make recommendations on issues an topics
    c. join the International Council for Technical Communication
    d. thanks

11. Report of Election Committee (D. Riordan/S. Zappen)

12. Invitation to Austin (K. Staples)

CPTSC

Minutes of the Business Meeting at the Twenty-third Annual Meeting

September 28, 1996
Oxford, Ohio

The business meeting was called to order by Dan Riordan at 9:00 a.m. at the The Marcum Conference Center, Miami University.

1. **Approval of Minutes:** The minutes were distributed, read, and approved.

2. **Publications:** Marilyn Cooper reported that we had published the Proceedings and one issue of the newsletter during the previous year. It was agreed that we should publish two newsletters, that the fall issue should include a wrap up on the meeting and a preliminary announcement of the next meeting, and that the spring newsletter should contain the call for proposals for the annual meeting. Members are encouraged to submit items for the newsletter.

3. **Secretary's Report:** Steve Bernhardt noted that he would soon pass the file for letterhead and brochures to the new secretary, so they can be updated and printed. He also thanked Carolyn Rude for acting in his place as secretary during the previous year.

4. **Treasurer's Report:** In Henrietta Shirk's absence, Dan Riordan reported good financial health for CPTSC and presented a budget summary (attached). Membership stands at about 90. The treasurer should continue the practice of follow-up letters to those who do not respond initially to the letter early in the year concerning renewing memberships.

5. **Report ATTW and the "Mega" Conference:** Sherry Little reported that a group had met at CCCC in Milwaukee (1996) to discuss a conjoined meeting of groups concerned with professional communication to explore the idea of a combined conference. They will meet again at CCCC in Phoenix next March and welcome interested individuals to join the discussion. The consensus of CPTSC is that we are not interested in opening our meeting format to radical alteration, though we are very much interested in pursuing and supporting the conjoined meeting. It was variously suggested that the meeting could be held every few years, be international in scope, take place alongside the Forum meetings on international technical communication held in Europe every few years, be attached to regional meetings of MLA or ABC, focus on teaching, and include representatives from IEEE, ATTW, ABC, ADE, STC, and CPTSC.

   The ATTW call for papers for MLA 1997 is posted on their web site. Papers are sought on Environmental Discourse and Instructional Design.

6. **Report NCTE:** Katherine Staples reported that NCTE had sponsored successful workshops to help high school and community college teachers prepare to teach workplace communication. She also suggested that Mark Reynolds, editor of Teaching English in the Two-Year College (TETYC), be asked to include notice of our call for papers and annual meeting, along with an organizational description of CPTSC.

7. **Report STC:** Ken Rainey described a range of STC activities that should interest CPTSC members and their institutions. Specifically, Ken called upon CPTSC members to promote the Sigma Tau Chi honor society, identify needed entries to the bibliography of theses and dissertations, encourage applications for scholarships, and promote conference participation, especially via the student conference and graduate student forums. He noted the funding for research grants (up to $10,000) frequently goes begging, and that STC had plans for the coming year to fund curriculum development projects that have a broad effect on how technical communication is taught across institutions. Several members voiced concerns about STC's lack of response to requests for research proposal guidelines and Ken said he would follow up. Ken reminded the members that they could check out STC activities at the website: http://www.stc-va.org.

8. **Program Development Advisory Board:** Bill Karis noted that we had not reviewed a program during the year as we had anticipated, so to date we have reviewed only Michigan Tech. Carole Yee suggested that New Mexico Tech would be interested in a review during the coming year. All agreed that the review is worth maintaining. Bill noted he would be revising the self-report form somewhat in response to feedback from Michigan Tech, but that he would wait until the next program was ready for review. We should make sure that program review information is available at the website, in the brochure and newsletter. It was pointed out that the self study document, which is printed in the 1995 Proceedings from Houghton, could be useful to those beginning new programs. We should alert WPA (Writing Program Administrators) to the service and work toward a rolling three-year plan of review, so institutions have time to prepare. A motion was passed to approve the current guidelines until next year.

9. **Website and Listserv:** Bill Williamson of Michigan Tech described the progress he and Bill Sewell had made with the development of the CPTSC website, indicating that Todd Heinrichs (under faculty supervisor Craig Waddell) would be taking over duties. The website has been up for six months, and Todd has ideas for expansion, including on-line forms for membership, sign-up routines for the listserv, and built-in links to related websites.

Using a series of brilliant flip charts, Stuart Selber described the CPTSC listserv, noted it was still supported by Clemson, and encouraged additional subscriptions to this open, unmoderated list serving 142 subscribers.

Dan Riordan spoke to the importance of the membership using both the website and listserv. The organization thanks those who help maintain CPTSC's electronic presence.

10. **Location, Format, and Theme of 1997 and Future Annual Meetings:**

Austin will be the site of the 1997 meeting, on October 16-18 at the downtown Marriott. The "Texas Partners" who have agreed to co-host under Katherine Staples' leadership include Austin CC, North Texas State U, U. Houston-Downtown Campus, Texas Tech, and Texas A&M.

After some discussion, it was decided to accept Debby Andrews" offer to host the 1998 meeting in Delaware on the shores of Chesapeake Bay. Carole Yee suggested a meeting in Santa Fe in 1999, which was endorsed, and it was agreed to explore the possibility of meeting in Europe in 2000, perhaps as part of Forum or as part of an expanded international conference.

11. It was discussed and agreed upon to join the International Council for Technical Communication

12. **Suggestions for CPTSC:** Dan Riordan moderated a discussion of what we should do as a group. The following suggestions emerged (not ranked):

- Pursue greater involvement and outreach to community colleges and high school programs; encourage efforts to conduct workshops for secondary school teachers; Nancy O'Rourke indicated an interest in helping with this initiative.
- Engage in more outreach efforts to the public on issues of technological literacy
  Seek to establish regional consortia and collaboration across programs
- Consider using the surplus in our account to support program development initiatives
- Work to increase membership
- Contribute to the listserv to make it more active, beginning with comments after this meeting to share what went on with those not present

13. **Nominating Committee:** Dan Riordan noted the good work of the nominating committee which Jim Zappen chaired. The election results are as follows:

President	Steve Bernhardt
Vice President	Carole Yee
Secretary	Jennie Dautermann
Treasurer	Henrietta Shirk
Member at Large	Deborah Bosley
Member at Large	Carolyn Rude
Member at Large	Stuart Selber

The meeting was adjourned at 12:00 noon.

Respectfully Submitted,

Stephen A. Bernhardt,
Secretary

Note: These minutes are written, submitted to the Board, and printed in the Proceedings in draft; they are approved at the annual Business Meeting the following year.

attachment: Financial Report, 1995-96

CPTSC Financial Report
September 29, 1995, to November 1, 1996

BALANCE FROM SEPTEMBER 28, 1995			6,117.86
CREDITS/INCOME			
Interest on Checking Account (9/95 through 10/96)		70.00	
Memberships -- 1996 (98 @ $20 each)		1,960.00	
Income from 1995 Conference		556.32	
	Total:	2,586.32	2,586.32
			8,704.18
DEBITS/EXPENSES			
Printing (Stationery, Brochures, etc.)	134.90		
Newsletter -- Spring 1996			
Paper	14.31		
Printing	79.40		
Postage	58.96		
	152.67	152.67	
Proceedings -- 1995			
Printing	1,312.30		
Envelopes	33.50		
Postage	107.90		
	1,453.70	1,453.70	
Miscellaneous Administrative Costs:			
Printing	27.47		
Office Supplies	10.48		
Exec. Comm. Meeting	90.15		
Postage (Mailing for Renewals, Ballots, etc.)	47.36		
	375.46	375.46	
Deposit for 1997 Conference		400.00	
	Total:	2,516.73	-2,516.73
	BALANCE:		$ 6,187.45

Respectfully submitted,

Henrietta Nickels Shirk
CPTSC Treasurer

October 1, 1996

Executive Committee Meeting

CPTSC

Minutes of the Executive Committee at the Twenty-third Annual Meeting

September 28, 1996
Oxford, Ohio

The Executive Committee met over dinner at 5:30 p.m. at the Marcum Conference Center, Miami University. Bob and Evy Johnson hosted the group. Present: Dan Riordan, Steve Bernhardt, Deborah Bosley, Carole Yee, Jennie Dautermann, Carolyn Rude, Stuart Selber, Katherine Staples (1997 host).
Absent: Henrietta Shirk.

1997 meeting: Katherine Staples described plans for the 1997 meeting in Austin, suggested "Partnerships" as a theme (global and local), with encouragement from the committee to somehow "spice up" this theme. Various partnerships were suggested: intellectual, disciplinary, classroom, programmatic, workplace. Katherine will pursue Lester Faigley as keynoter, and Nell Ann Pickett as wrap-up commentator, with Nell Ann a possible keynote backup for Lester. It was agreed to continue the practice of executive committee members serving as panel moderators. Katherine will check on the availability of having three breakout rooms in case we have an abundance of strong proposals. Suggestions were also made to consider a roundtable session and to consider a panel of grad students
reflecting on programmatic concerns. It was agreed that it is desirable to plan an outing that does not require lots of driving time.

A major focus of discussion was procedures for accepting papers and planning the program at the annual meeting. While agreeing that the meeting's welcoming inclusiveness is a value we wish to preserve, Carolyn and Katherine both pointed out that their experience as program chairs pointed to the need to be selective and to refuse weak or unsuitable proposals. It was agreed that we should be clear in our call for proposals that papers should focus on programmatic aspects of technical and scientific communication, and that proposals should be evaluated against the thematic and programmatic criteria established in the call for proposals. It was agreed that where there was doubt as to the strength or suitability of a proposal, a second or third reader would be called upon to help make the decision, so it does not rest on one person's judgment. In general, the Executive Committee believes that a quality program must be the goal of the program chair, even if it means occasionally risking someone's not attending because of not having a speaking role. It was noted with irony that we had arrived at the same decision the previous year and had voted on a motion at the executive committee meeting to be selective in accepting proposals! It was also agreed that the program chair is expected to work with the proposers to fine tune their proposals.

The consensus decision of the Executive Committee is to appoint Stuart Selber as program chair, working with Deborah Bosley, with Carolyn Rude serving in a consultative role. Dan Riordan agreed to serve as a reader to help make decisions about rejecting proposals. Duties of Committee Members: Steve Bernhardt distributed descriptions of duties and briefly reviewed each position. Items of pressing business fall to the secretary, Jennie Dautermann, who must update the brochure and letterhead and write a piece on the annual meeting for the newsletter; and to the Vice
President, Carole Yee, who will need to begin working up a fall newsletter, with help from the Executive Committee Members.

After expressions of thanks to Bob Johnson, Jennie Dautermann, and the faculty and students of Miami of Ohio for the fine hosting of the annual meeting, the meeting was adjourned at 7:45 p.m.

Respectfully Submitted,

Stephen A. Bernhardt,
Secretary

Appendices

Appendix A:
CPTSC 1996 Conferees

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Appendix B:
Annual Meetings, Sites and Dates

1st	University of Minnesota	St. Paul, MN	1974
2nd	Boston University	Boston, MA	1975
3rd	Colorado State University	Fort Collins, CO	1976
4th	University of Minnesota	St. Paul, MN	1977
5th	Rensselaer Polytechnic Institute	Troy, NY	1978
6th	Oklahoma State University	Stillwater, OK	1979
7th	University of Central Florida	Orlando, FL	1980
8th	University of Washington	Seattle,WA	1981
9th	Carnegie-Mellon University	Pittsburgh, PA	1982
10th	University of Nebraska	Lincoln, NE	1983
11th	La Fonda	Santa Fe, NM	1984
12th	Miami University	Oxford, OH	1985
13th	Clark Community College	Portand, OR Vancouver, WA	1986
14th	University of Central Florida	Orlando, FL	1987
15th	University of Minnesota	Minneapolis, MN	1988
16th	Rochester Institute of Technology	Rochester, NY	1989
17th	San Diego State University	San Diego, CA	1990
18th	University of Cincinnati	Cincinnati, OH	1991
19th	Boise State University	Boise, ID	1992
20th	University of North Carolina-Charlotte	Charlotte, NC	1993
21st	New Mexico State University	Las Cruces, NM	1994
22nd	Michigan Technological University	Houghton, MI	1995
23rd	Miami University	Oxford, OH	1996

Appendix C:
1994-1996 and 1996-1998 CPTSC Officers

1994-1996 CPTSC Officers

President:	Dan Riordan	University of Wisconsin-Stout
Vice-President:	Marilyn Cooper	Michigan Technological University
Treasurer:	Henrietta Shirk	Boise State University
Secretary	Steven Bernhardt	New Mexico State University
Members at Large:	Deborah Bosley	University of North Carolina-Charlotte
	Carolyn Rude	Texas Tech University
	Katherine Staples	Austin Community College
Past President:	James P. Zappen	Rensselaer Polytechnic Institute

1996-1998 CPTSC Officers

President:	Steven Bernhardt	New Mexico State University
Vice-president:	Carole Yee	New Mexico Institute of Mining and Technology
Treasurer:	Henrietta Shirk	North Texas State University
Secretary:	Jennie Dautermann	Miami University
Members at Large:	Deborah Bosley	University of North Carolina-Charlotte
	Carolyn Rude	Texas Tech University
	Stuart Selber	Texas Tech University
Past President:	Dan Riordan	University of Wisconsin-Stout

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CPTSC List of Members

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Appendix E:
Previously Published CPTSC Documents

The Tables of Contents of previous CPTSC *Proceedings*, CPTSC Program Review Application and Guidelines for Self-Study to Precede CPTSC Visit, and The Constitution of the CPTSC were last published in the 1995 *Proceedings* of the 22nd annual meeting.