Programs in Context

Past, Present, and Future

Karen Rossi Schnakenberg
Carnegie Mellon University

This keynote was presented at the 2008 annual meeting on October 2, 2008, at the University of Minnesota in Minneapolis, Minnesota. The meeting's theme for that year was "Programs in Context: Past, Present, and Future."

In keeping with the conference theme for this 35th anniversary meeting, my presentation today focuses on key issues that have had and continue to have relevance to the development and administration of programs in technical and scientific communication. Although 90 minutes is a good chunk of time for any presentation, winnowing options has been a daunting, albeit interesting, task for a number of reasons: the breadth of possible topics, the difficulty of prioritizing them, and the depth of expertise in the field represented by the people in this room. What gave me the courage to move forward was the knowledge that what I needed to do—make choices, set priorities, and defend those choices—is exactly the kind of thing that we as program administrators do daily and weekly and year-in and year-out. Thus, I see my role not as providing the last or even, perhaps, newest word on any of the topics I'll discuss this evening, but rather as a reminder to all of us of the broad connections between our history and our current moment to set a context within which our more detailed discussions can continue over the next couple of days.

In deciding on an organization for this talk, I considered several frameworks, most notably the time periods involved and significant issues, but found that the project kept growing tentacles. What finally gave me focus was the primary goal that we share as program administrators, notably to produce well-educated, ethical professionals with the skills needed to move smoothly into today's job market and to prepare for meeting the future challenges that we know will come, even if we don't know what specific form they will take. Everything else we do as administrators (such

as program development, staffing, and curriculum) goes back to two fundamental, although not at all simple, questions:

- What are the core skills students need for the current and future workplace?
- What do our courses, curricula, and programs need to look like to adequately address and develop those skills?

I see these two questions as all-encompassing because the core-skills question leads us quickly to look at changes and trends in technology, in academic and disciplinary arenas, and of course, in the workplace, both nationally and internationally. From this set of categories, we can develop both a comprehensive sense of the skills and directions as well as the contextual knowledge that can help us prioritize those skills. And the questions about course, curricular, and program foci lead us quickly from wish lists and possibilities into a host of administrative issues and their enabling and constraining characteristics, including our academic homes and disciplinary allegiances, resources, staffing, and students, our academic careers and those of junior faculty, and so on.

Because it's obviously impossible to cover all these topics over the last 35 years as well as future projections, I'll proceed by focusing on three points in that time span: the founding year for CPTSC in 1973, the 1990 midpoint between that founding and today, and the topics and issues prominent in 2007 and 2008 that promise to challenge us as we move forward. As we transition from period to period, we'll look at some significant dates in the timeline of technology, which has assumed increasing importance in our programs as it has in our lives. For each of the periods, I'll then turn to discussing core skills and the related issues I mentioned. Along the way I'll make a few detours to talk about the history and developments in our program at Carnegie Mellon that are relevant to the discussion. I'll also be using the contents and images from *Technical Communication* and *Intercom* as a shorthand reference to events and trends.

Before looking briefly at 1973, however, I'd like to move back a few years to note that the first technical writing course we're aware of (thanks to Robert Connors' 1982 archival work) was offered in 1904**,** and the first technical writing textbook we're aware of was published in 1911. It was not until 1958**,** however, that the first technical communication undergrad degrees were established in the United States.

In a 1973 article in *Technical Communication*, "University Programs in Technical Communication," Thomas Pearsall indicates that he was able to locate only three graduate programs in technical communication or technical jour-

nalism—at Boston University, Illinois Institute of Technology, and Rensselaer Polytechnic Institute, with RPI's being the oldest—and nine undergraduate programs—Arizona State University, California State University Fullerton, Carnegie Mellon University, Colorado State University, Georgia Tech, Michigan Tech, University of Minnesota, and South Dakota State University. Pearsall indicated that Colorado State, founded in 1958, was the oldest of these undergraduate programs. Although I greatly respect Tom Pearsall's work as one of the founders of the field and of CPTSC, I do have to set the record straight on one point: my recent research into the CMU archives indicates that our bachelor of science in Technical Writing & Editing degree was also founded in 1958. To give you a sense of what things seem to have been like at that time, I'd like to share with you an article from the October 3, 1958, edition of *The Pittsburgh Press* reporting on our new major.

First, however, a bit of context. Carnegie Mellon was then Carnegie Institute of Technology, and the English Department was a unit within the Department of General Studies that offered literature courses to engineers and a bachelor of arts in English Literature to the women of the then Margaret Morrison Carnegie College for Women (MMCC). Erwin Steinberg, whose work in plain anguage and style many of you might know, and who recently retired after 60 years of active teaching and administration at CMU, was then Head of the Department of General Studies as well as a writing consultant to local technical industries such as Westinghouse. Drawing on that industrial consulting experience, he began offering courses in technical report writing to MMCC students and in 1958 instituted the bachelor's of science in Technical Writing and Editing. All serious stuff when told this way, but *The Press* article gives you a sense of then-current perceptions of technical communication and of women as professionals that are a bit different from our perspectives today.

As I hope you can see in this not-very-good copy of a microfiche image of the article (see Figure 1), Erwin and a group of his students are sitting around a table examining what looks to be a collection of reports. You'll note that the article appears on the "Women's Pages." The caption formally describes this activity, but the headlines and the lead paragraph provide a somewhat different perspective. The headline reads, "Wanted: Writer for Outer Space Job," and the subhead, "Tech Can Supply Just [the] Right Girl." In case you miss the general drift, here's the lead paragraph:

> Five pretty freshmen of MMCC get drooly when they think of writing about the newest medical discoveries, jet flights that tablehop from continent to continent or even to the moon and back. They tingle at the prospect of writing about the most exciting scientific doings in the world. Or another world. Or outer space. Dr. Erwin R. Steinberg, their BMOC, professor-wise . . . says that

> he can teach them to do those things—to write and edit technical articles, reports or manuals; coordinate technical information, or be whiz-bang successes in public relations, advertising, or sales promotion.

The gender roles are pretty clear, and Steinberg is portrayed as the mastermind of the new curriculum, which the article describes as involving a number of departments—the basic sciences, math, English, social studies, and design. Two quotes by Steinberg are worth citing:

> Technical writing is an obvious choice for women who like science. It's a growing profession in which a woman can make a beginning salary of from $350–$400 a month [$4200–$4800 per year]. Women aren't discriminated against particularly. After marriage, the hand that rocks the cradle can pursue technical writing part-time.

And the final sentence of the article:

> I don't expect our girls will have any trouble finding jobs.

Although the general tone of the article and the final quote from Steinberg seem patronizing to our ears today, it's clear that Steinberg had developed a serious and noteworthy program and that his goal was to address a real need in industry while providing substantive careers for women students. One interesting side note is the obvious assumption that there would be stability within the profession and that the focus of technical writing would involve engineering and manufacturing firms. As a second interesting side note, I looked back at that earliest curriculum, fully expecting to see a basic literature degree with a few technical communication courses tacked on, and while I did find that this was the case in 1957, when students interested in technical communication were urged to add some courses in

Wanted: Writer For Outer Space Job

Tech Can Supply Just Right Girl

By JOAN HERROLD

Five pretty freshmen at Margaret Morrison Carnegie College get simply when they think of writing about the newest medical discoveries, how flights that take-hop from continent to continent or even to the moon and back.

They tingle at the prospect of writing about the most exciting scientific doings on this world. Or outer space.

Dr. Erwin R. Steinberg is their BMOC (big man on campus) professionwise. Dr. Steinberg says he can teach them to do those things—to write and edit technical articles, reports or manuals; coordinate technical information or be whiz-bang successes in public relations, advertising or sales promotion.

As head of the department of general studies at Carnegie Institute of Technology, of which Margaret Morrison is a division, Dr. Steinberg is master-minding the latest addition to Tech's power-packed scientific program.

The course draws on the experience of faculties of five schools and colleges at Tech. The largest percentage of study is in basic sciences and mathematics. English language, writing and literature, social sciences and arts.

In addition courses in graphic arts processes, layout and design, typewriting and technical research and report writing are included.

On Nov. 17 and 18 Dr. Steinberg will address the National Society of Technical Writers and Editors at the Shoreham Hotel in Washington, D. C.

"Technical writing is an obvious choice for women who like science. It's a growing profession in which a woman can make a beginning salary of from $350 to $400 a month. Women aren't discriminated against particularly. After marriage, the hand that rocks the cradle can pursue technical writing part-time."

Dr. Steinberg declares, "The preparation of literature has taken too much time of trained technical personnel whose research skills are currently in short supply."

Dr. Steinberg and Dr. William M. Schutte of Tech's English department have just proofread copies of "A Guide to Effective Communication in Business and Industry," which they wrote. It will be released by Henry Holt and Co. next spring, perhaps, in three different editions, for trade, industry and college use.

Technical writing dates historically to papers scientists used to write to tell about their discoveries and observations. Those who were the best writers got the biggest hearing and the greatest slice of fame—like Galileo, Newton, Franklin and Darwin.

"I don't expect our girls will have trouble finding jobs," Dr. Steinberg maintains.

The Pittsburgh Press Women's Pages

TRAINING FOR CAREERS in technical writing includes evaluation of current company reports. Nancy Ferree, right, gives her verdict to group including Ellen Brady, Sara Shook, Sally Connon, Janis Ceisle and Dr. Erwin R. Steinberg, department head.

Figure 1. *The Pittsburgh Press* article reporting on CMU's bachelor's of science in Technical Writing and Editing.

report writing and complete an internship in industry to prepare for TC careers, I was quite surprised at what I found for the degree in 1958. The degree had 25 specific requirements, only three of which were literature courses. Six courses focused on technical communication skills and communication, including a requirement in the psychology of industrial behavior, two in design (Graphic Arts Production and Layout and Design), and 13 were in science and math. The final course was Typing. As you can see, the degree was substantive and interdisciplinary.

Snapshot of 1973

Before turning to 1973, let's take a look at some important technological changes taking place that soon, and ever more quickly, affected the profession. The timeline I'm about to show you (see Table 1), and those scattered throughout the talk, are drawn from a number of secondary sources, most notably Katherine T. Durack's 2003 *Technical Communication* article, "From the Moon to the Microchip: Fifty years of *Technical Communication*" and Thomas J. Bergin's 2006 word processing timeline from the *IEEE Annals of History of Computing* as well as bits and pieces from other sources. Given the secondary nature of the sources, this timeline is not definitive, but for my purposes here it's sufficient for getting a sense of the pace of change and the ways technology has influenced communication.

Table 1: Timeline 1953–1973

1953	RPI offers masters degree in Technical Communication; first graduate degree in 1955.
1954	IBM's first mass-produced computer, which ran business and financial applications, becomes available.
	Newly founded Society of Technical Writers publishes the first issue of Technical Writing Review, the predecessor of Technical Communication.
1956	Concept of AI (Artificial Intelligence) is formulated.
1958	Colorado State & Carnegie Mellon begin first undergraduate technical communication degrees.
1961	IBM Selectric is introduced.
1964	IBM introduces the term word processing to describe its new version of the selectric typewriter with a magnetic tape drive that provides document storage (referred to as "memory") and thus the first means of editing text without physically changing a paper document.
	First proprietary Computer Assisted Design (CAD) programs are developed in a joint project between General Motors and IBM.
	Prototype of a dot matrix printer is developed.

1965	Rudimentary predecessor of email built at MIT using hard-linked machines.
1966	First practical modems are introduced.
1967	First laser printers are introduced.
1968	Computer mouse invented.
1969	Introduction of Unix and prediction that all future programs would be Unix-based.
	Arpanet established to link research institutions.
early 1970s	Word processing systems existed but were or hard-wired systems used by newspapers, printers, and large organizations that produced commercial publications (the systems were specialized, dedicated, and proprietary and cost around $10,000).
1971	First text message sent over a network.
1973	Founding meetings of CPTSC and ATTW.

I'll intersperse just a little personal history here. In 1967, I was a junior majoring in English at MMCC and taking a programming course. I don't recall my motivation for taking the course, but I vividly recall using punch cards and programming in a language called ALGOL on a mainframe computer that was so large it required a new building to house it. We would write out our programs, generally designed to carry out relatively simple mathematic procedures, and submit them to be run by the technicians in charge of the machines, coming back a day or two later to learn whether we'd succeeded in our appointed task. In education, and in industry during this period, computers were used mainly for computation. The communication aspects of the technology were just beginning to emerge.

To provide a convenient overview of the status of the field of technical communication in 1973, we'll take a look at the covers of the four issues of *Technical Communication* published that year (see Figure 2).The first and fourth covers feature images of word processing and computer-aided design; the middle two have obvious travel in outer space themes. The fourth issue has a special focus on word processing and begins with Benjamin Piscopo's (1973) article, "Word processing—New Approach to Corporate Profit." The article indicates that most companies were then using electric typewriters and urges adoption of word processing to increase efficiency and thus profit.

The first issue of 1973 includes Tom Pearsall's article on university programs, indicating that most programs were located in communication or humanities departments and featured a combination of science, engineering, and humanities courses with little explicit teaching of professional

Figure 2. Journal covers from 1973 *Technical Communication*, published by the Society of Technical Communication.

genres and a general assumption that these applications would be learned via internships or job experience. Given what I'd discovered about the MMCC program in 1958 and its clear difference from the general curricula Pearsall was describing in 1973, curiosity led me back to the archives to look at CMU's 1973 curriculum. Surprisingly, it had changed considerably. Whereas the 1958 version had 25 requirements, the 1973 had only eight. Four were literature courses, and four represented a sequence in exposi-

tory writing, which included two courses in academic and popular expository writing, one in technical writing and editing, and the fourth was a required internship as the fourth course. In addition, students were "urged" to include science, math, and design courses among their free electives, and most strongly urged to take the elective typing course. In retrospect, this change was not really surprising. We know from various academic histories that the late 1960s and early 1970s was a period of upheaval at universities, with many moving toward less specific degree requirements and more elective choices. In keeping with this more generalist bent of the period, Pearsall (1973) noted that 208 of 226 technical communication majors that he was able to locate were enrolled at Colorado State, with most of them going into technical journalism. Another article by James M. Lufkins (1973) makes clear that whether technical writing could or should be taught in the university versus being learned on the job was also an issue.

We get something of a sense of what the technical communication profession looked like at this point from a survey done by Austin C. Farrell published in *Technical Communication* in 1971. Farrell surveyed the Society for Technical Communication's 4,386 members and had 1,874 (43%) return but for simplicity analyzed only 1,250 returns: 1,000 from men, 250 from women, average age of 44, with women entering earlier in their careers and dropping out for a period in the middle. The most frequent job titles included editor (33%), writer (26%), and manager (17%). Salaries had changed a bit from the under $5,000 that Steinberg talked about in 1958, but not significantly, ranging from a low of $5,000 to a high of $25,000, with 61% reporting earnings between $10,000–$16,000. The professional genres in which technical communicators reported working on most frequently were manuals (35%) and engineering reports (20%). Only 2% of the respondents reported working in the software industry. As other articles from the 1971–1973 period as well as the previous timeline suggest, computers were not entirely absent, but appear to have resided primarily in large organizations such as JPL, which used them for design, and the United States Naval Ordnance Laboratory, which worked on a project to program a computer to translate technical manuals into Vietnamese.

Although the specifics of this 1971 survey indicate some differences from today, other articles suggest that a number of the issues we face today were very much a part of the profession during that period. A 1972 article by Louis Perica, "Honesty in Technical Communication," warns against the deceptive practice of airbrushing photographs for publication. Another article mentions a panel at the 1972 conference on "Sexual Politics

in Industry." Other article titles, "The Visual Effect of Printed Matter" and "A Project Management Model," suggest these issues were also of concern.

Snapshot of 1990

Before turning to 1990, I return to the timeline for a quick overview of the period from 1973–1990 (see Table 2).

Table 2. Timeline 1973–1990

1973	Meetings of CPTSC and ATTW are founded.
	First plain paper (Xerox) and color (Canon) copiers are introduced.
1974	First WYSIWYG word processor built at Xerox PARC introduced.
	Wang 1200 Word Processor linked to IBM Selectric that could store up to 20 pages of text.
1975	First widely available laser printers.
1976	Apple founded.
	ELECTRIC PENCIL, the first word processing program for personal computers, became available.
1977	Microsoft was founded.
	Apple II, the first PC with color graphics, hits the market.
1979	WORDSTAR was introduced @ $495 + $40 manual.
1980	First hard disks for PCs were marketed by Seagate.
1981	First successful "luggable" computer, the Osborne, which was the size of a small suitcase and weighed 20+ pounds, is introduced.
	The IBM PC and MS-DOS debuted.
1982	WORDPERFECT with WYSIWYG editing interface and keyboard shortcuts for the PC became available.
1983	Arpanet connected 213 United States universities.
	Microsoft WORD debuts.
	Apple's Lisa, the first PC to use a GUI interface and feature the desktop metaphor, mouse, icons, and pull-down menus, hits the market.
	FCC approves mobile phones and first commercial cell phone call is made. The first commercial cell phone, the Motorola DynaTAC8000x (aka "the brick") weighed 28 ounces and retailed for $3,995.
1985	The first commercial desktop publishing program, Aldus PAGEMAKER for the Mac, debuts along with the Apple LaserWriter, the first desktop laser printer to use PostScript.
1985–1986	The first hypertext application, ZOOMRACKS, a shareware database management system used a card-file metaphor for displaying and manipulating data, becomes available.
1986	SGML is adopted as an international format standard.
1987	POWERPOINT 1.0 debuts for Mac, but is soon purchased by Microsoft.

1988	HYPERCARD for Mac becomes available.
1989-90	The World Wide Web debuts and consists of only one server housed at CERN, a text-based browser, and one webpage describing the Web. The system goes public in spring 1991.
1990	The first commercial search engine, Archie, hits the market.
	HTML is introduced.

Once again we turn to covers from *Technical Communication* from the year in question (see Figure 3). I've presented only two of the four covers for 1990 because all have the same look. One possible reason is suggested by a series of four articles in the February issue that focus on desktop publishing, explaining how to use computer technology and software in "processing documents" and "retrieving information." The discussion makes clear that there is great ferment, although few standards, and that there's more than a little tension between early and later adopters. Arguments against the software included concerns about who will do document design, what is lost when drawing, and illustration is abandoned in favor of grids and text-dominated designs.

One surprise in the topics covered in 1990 was the clear presence of concerns about internationalization, including a recurring column by Fred Klein on "International Technical Communication." Interestingly, all issues for that year include ads for various translation services, suggest-

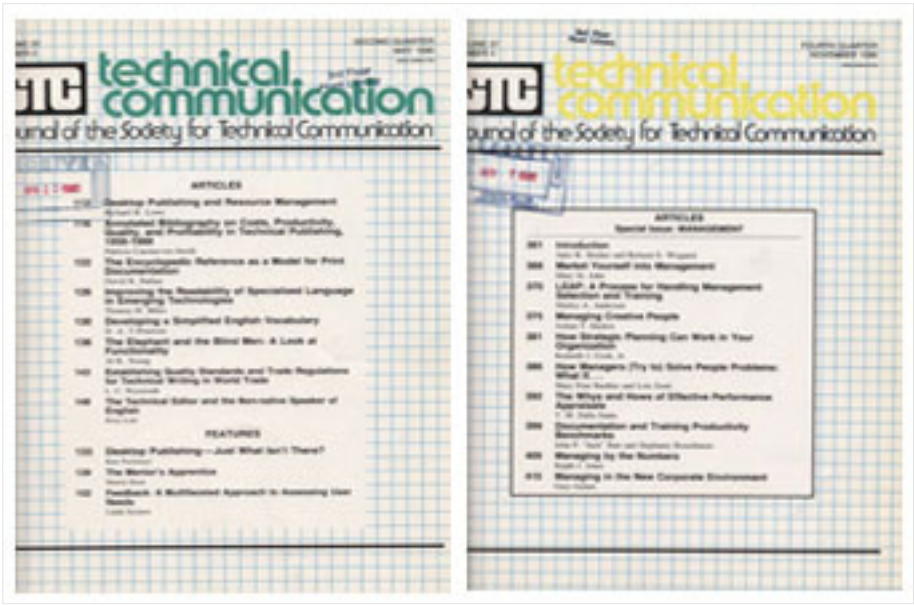

Figure 3. 1990 journal covers from *Technical Communication*, published by the Society of Technical Communication.

ing that such work was being done, but not by technical communicators themselves. And although the ongoing discussion in Klein's column is consistently enthusiastic about the possibilities for working internationally enabled by the new technologies and equipment, it is also clear about the complexity of doing so when the available communication tools involve complex linkages of PCs, fax machines, modems, scanners, courier services, electronic bulletin boards, electronic mail, satellite communications, multilingual terminology databases, and a CompuServe service called the Foreign Language Education Forum (FLEFO) that links computers in 95 countries.

We get a sense of change in the profession from a 1990 article by Lauren Livo on "What We Call Ourselves," which provides an overview of the job titles of 397 presenters at the 1988 International Technical Communication Conference. Although the number and sample are not large enough to compare directly with the Pearsall report of 1971, what's interesting is the broad range of titles emerging among the group that in Pearsall's survey was covered mainly by the categories of "editor" and "writer." In the group Livo examined, variations on technical writer or editor were most common, accounting for 55% of the group. Another 20% self-identified as "information developers" and 10% as "documentation specialists," both categories not seen in the earlier survey. The remaining 15% included 28 different titles covering specialties such as audio/visual production, electronic publishing, text management analysis, marketing, and public relations. From these categories alone, we get an impression of the kinds of changes taking place in the field and the kinds of challenges academic programs preparing students for this marketplace were experiencing.

Interestingly, the Carnegie Mellon technical communication curriculum of 1990 had returned to a model that resembled the original 1958 model more than the much looser 1973 model. In 1990, the degree had 21 specific requirements. The four literature courses from the 1973 model are still present, but the four-course writing core now features courses with a specific technical communication focus. There's been a return to including two courses in design, and the "suggestion" for math and science courses of 1973 has become a requirement for 11 courses in math and the sciences, including at least one course in statistics and one in computer science.

In the period between 1990 and now, the pace of technological developments in communication media quickened dramatically, moving, for example, from the introduction of Google in 1998 to its celebration of achieving the benchmark of one trillion pages indexed by its tenth anniversary in 2008. Table 3 provides a quick look at the major communications innovations in this period.

Table 3. Timeline 1992–present

1992	Apple's pocket-sized PDA, the Newton, is introduced.
1993	Mosaic, the forerunner of Netscape and the first GUI web browser available.
	First Adobe PDF is available.
1994	Yahoo! aunched.
1995	Amazon.com debuts.
	FireWire and USB make it easier to connect devices.
	CPTSC has first website and listserv.
1996	XML developed.
	Hotmail, the first free web-based email provider.
	Browser wars between Microsoft and Netscape lead to practice of quarterly releases of software.
1998	Google launched.
	Open source coined and open source consortium formed.
	First iMac G3 ("i" for Internet) with USB ports introduced.
	WWW Consortium published first recommendations for XML.
1999	Blackberry introduced.
2000	First exclusively e-book, Stephen King's *Riding the Bullet,* is released.
	Single-sourcing and knowledge management are hot topics.
2001	iPod introduced.
2002	Wireless networking becoming more available.
2003	MySpace and Mozilla debut.
2004	Gmail becomes available.
2005	YouTube debuts.
2007	iPhone debuts.
2008	Google celebrates 10th anniversary and hits one trillion benchmark for number of pages indexed.

Before moving to contemporary issues, I'll make a slight detour to 1997 and to successive covers for the May and August issues of *Technical Communication* because the redesign that occurred that year is emblematic of changes in publications and publication software and their implications for technical communication curricula (see Figure 4). The clear difference between the May cover that closely resembles the covers from 1990 and strongly suggests a focus on content and text, and the August 1997 cover that re-introduces color and images suggests a shifting focus to document design even as it celebrates the tradition of hand lettering.

Contemporary Issues & Core Skills

In this final section, I examine current issues and conceptions of the core and supplementary skills students need to have and our curricula need to

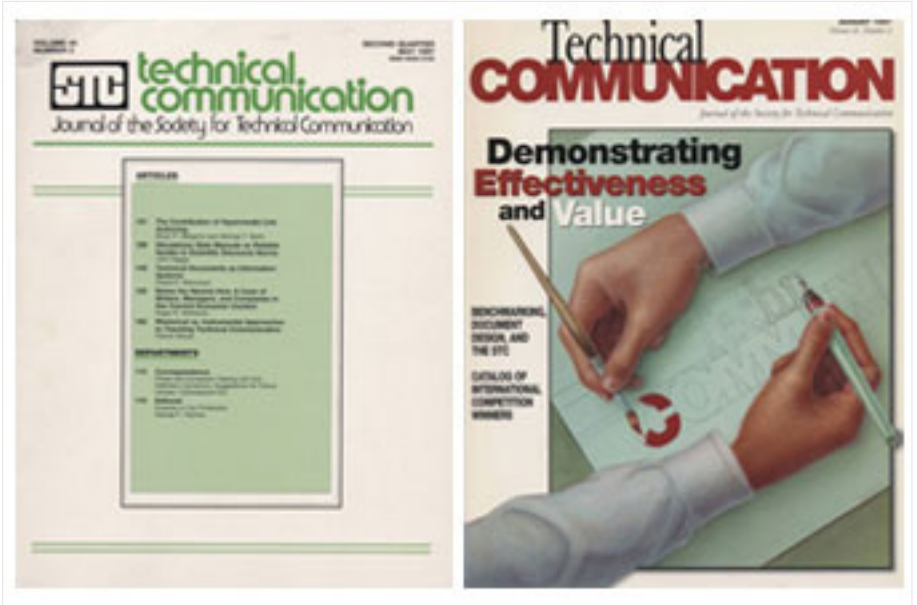

Figure 4. May 1997 and August 1997 journal covers from *Technical Communication*, published by the Society of Technical Communication.

consider. In discussing core skills, I'll focus on both the fundamentals and the areas of change and growth with some discussion about which we should bet on as we make necessary curricular changes. Interestingly, both industry and academia agree on the fundamentals, although this agreement is changing somewhat with the proliferation of possible topics and skills. The two groups do not agree, however, on the details or the priorities. As we move into the areas of change and growth, we very quickly see considerations of changes in technology and the workplace, both nationally and internationally, and we encounter significant differences concerning which directions to bet on. As a shorthand for looking at contemporary issues and priorities, I turn to selected covers from *Technical Communication* and *Intercom* from 2006–2008 and their topics of focus (see Figure 5). For anyone working in the field, the issues represented by these covers don't bring any startling revelations, but they do point to areas that have particular salience at the moment and that also offer challenges to us as program administrators as we work to keep curricula current. The focus on academic program review and assessment reminds us as well that although we have strong responsibilities to adapt to changing needs within the profession, we are also ultimately academic programs that exist with the world and standards of academia and professional accrediting bodies, and it is these procedures that exert the most important, and increasingly proactive, shaping influences within which we work.

Figure 5. Select covers between 2006–2007 from *Technical Communication*, published by the Society of Technical Communication.

Two consecutive *Technical Communication* covers from 2008 nicely illustrate the continuing currency of traditional skills such as copyediting of print documents and the more recent addition of sound, color, animation, and movement to the skill repertoire expected of technical writers today (see Figure 6).

Figure 6. The 2008 May and August covers from *Technical Communication*, published by the Society of Technical Communication.

The *Intercom* covers of the same period show a similar range, although it's interesting to compare the *Technical Communication* 2006 cover on International Communication that features the American flag at the center and suggests a strongly positive future with the United States in the lead, with the February 2007 cover of *Intercom* with a much less positive focus on "Protecting Yourself from Offshoring." The March 2007 issue on content management features a similarly defensive and somewhat gloomy tone indicated by the cover question: What's Become of the Tech Pubs Department? As the professional magazine of the field, *Intercom* is naturally concerned with both preserving and enhancing the profession and keeping its readers up-to-date on the latest industry trends and their implications for technical writers. Not surprisingly, seven of the 14 covers from this period focus on intra- and internets, Web 2.0 software, e-learning, netnography (online ethnography), and animation. At the same time, we see traditional concerns with translation, usability, and building effective business cases (see Figure 7).

It's also interesting that the more object-based covers of 2007 are followed by 2008 covers in which the technical writer is much more physically present but portrayed in a variety of roles (see Figure 8). Images of control—the hand harnessing the power of the Internet, the puzzle/problem-solver, and the conductor—dominate, and although imagery also conveys challenge, the technical writers appear to be up to the task. But there's also

Figure 7. Select covers between 2007–2008 from *Intercom*, published by the Society of Technical Communication.

obvious concern and ambivalence, most specifically in the image on the May 2008 cover in which the writer, working with pen and paper, appears to be overshadowed and overwhelmed by an anthropomorphized piece of software. The July/August cover with what look to be supplicant hands pleading for money and the somewhat whimsical September/October cover in which the bride is abandoned and clearly about to slip over the edge as "good projects go bad" suggest some troubled waters. It's possible, of course, to read too much into these images, and I know we'd need to find corroborating evidence to make any interpretation stick, but there is a clear sense of change and challenge and multiple new skills to learn represented in these various images.

This sense of multiple options and foci coupled with lack of agreement on priorities is repeated and reinforced by the overviews provided in recent publications and the newly developed Society of Technical Communication's Body of Knowledge (BOK) project,[1] the first systematic attempt to gather and prioritize the skills and abilities considered essential for TC professionals. The goal of the BOK project is to provide one-stop shopping for all things related to technical communication, first by pointing interested parties to existing knowledge and then by developing a portal website as a means of expanding and tracking knowledge in the field. The first step has been to seek agreement from both professionals and academics on what the major "knowledge do-

Figure 8. Select covers between 2006–2008 from *Technical Communication*, published by the Society of Technical Communication.

[1] See ‹http://stcbok.editme.com/›.

mains" are and then to ask experts in each domain to populate the categories. The current configuration features 11 knowledge domains, beginning with the catch-all first category, "About TC," and including topics as diverse and varying in breadth as management, information design & development, tool knowledge, collaboration, deliverables, research & practice, business knowledge, technical communication standards, professional development, and, last but not least, at least to us, academic programs.

The BOK project is still in a draft phase and features a process under which each domain is developed by separate drafting committees. Not surprisingly, this process encourages both spread and inconsistencies in the topic categories and hierarchies. For the academic programs category, the current draft was developed by Nancy W. Coppola, Marjorie Davis, Sandi Harner, Norbert Elliot, David Dayton, and Tommy Barker based on their extensive knowledge of existing programs, including feedback received about the original overall map be presented at the STC Annual Summit and International Professional Communication Conference (IPCC). Harner will be presenting a session on the BOK project in general and the academic programs domain in particular session tomorrow [October 3, 2008] to solicit feedback.

Some other recent and useful sources for examining trends and directions in the field include special issues of the lead journals, including the *Technical Communication Quarterly* January/March 2008 special issue on "Content Management and Technical Communication," the summer 2007 special issue of *Technical Communication* on "Technical Communication in the Age of Distributed Work," and a recent *Intercom* issue focusing exclusively on Darwin Information Typing Architecture (DITA). The last few years have also presented us with academic collections focusing on these issues, including Barbara Mirel and Rachel Spilka's 2002 *Reshaping Technical Communication* and Mark Zachry and Charlotte Thralls', 2007 *Communicative Practices in Workplaces and the Professions*. Both collections provide a similar sense of the current range of topics and specialization within the field.

At Carnegie Mellon, our sense of these evolving changes led to a major revision of our technical communication degree. The redesign involved a move from the flexible, generalist curriculum developed over 30 years ago to a more specialized and specified curriculum that both updates the curriculum and aligns it strategically with related Carnegie Mellon programs. The newly redesigned degree, which went into effect in fall 1999, includes two main tracks, one in Technical Communication (TC) and one in Scientific and Medical Communication (SMC). We revised the core to add a course in style and to require both document design and online information design. For each track,

we created a distinct set of relevant core electives. Finally, we revised the former requirement for 11 courses in science and math, so that the TC degree now features more work in computer science but doesn't require work in the natural sciences, and the SMC degree requires work in both computer science and the natural sciences. In place of science courses, the Technical Communication track includes electives in business, technology, and communication.

As the various sources indicate, it's easy to generate ideas for possible directions but much harder to answer the question of where to place our curricular bets. As we work through these questions, we naturally consider questions such as what to include in our curricula and what amount of time and attention to give to each. Of course, we also need to consider the constraints of individual situations, particularly with regard to staffing, funding, and what's possible in the short term. All these considerations shape our thinking and immediate decisions, but we all also need to address the important question of what direction(s) to head in (or speed toward) for the long term.

This last consideration is necessarily influenced by current and projected trends including what's happening in technology, in the workplace (United States and internationally), in the broader world around us, and within academia itself. With regard to technology, I'm sure I don't need to remind this group of the many challenges we face in terms of keeping our programs, labs, and courses (as well as instructors) up-to-date as technologies proliferate, costs escalate, and both students and employers push us to include all the latest developments in our programs. Within academia, there's much current discussion, for example, about using the various interactive platforms known collectively as Web 2.0, while industry is quickly moving forward from the social networking aspects of Web 2.0 toward the Web 3.0 platforms that will support the interactive development of knowledge and provide more flexible and easier-to-use platforms for both individual research and collaboration across distances. As these new technologies develop, they naturally affect user expectations. A recent presentation that Stephanie Trunzo of the IBM Information Architecture Group (one of our MAPW alums) for Carnegie Mellon students brought this clearly into focus when she showed us the following slide (used with permission) of what they see in terms of the evolution of online help (see Figure 9).

Working back from the slide to curriculum, we can see that we're quickly into requirements for Web, online, and multimedia production software along with the alphabet soup of new mark-up and authoring tools including XML, CSS, CMS, and DITA. These changes obviously put pressures on curricular content, but they also, and importantly, facilitate distance learning and thus are a factor in the increasing pressures many programs feel to put some, or much, or all, of their curriculum online. Although all these changes are important as

well as significant influences on the decisions we make as program directors, it's equally important for us, and not unrelated, to consider current trends in the workplace.

My recent review of the literature (see Appendix) brought up four trends of particular interest. First are the shifts occurring in types of industries and in relationships between organizations and their clients or customers. We've heard much, of course, about the shift from product-based to service-based and then to information-based organizations (see, e.g., Faber & Johnson-Eilola, 2002), but Pine and Gilmore (1999) take these ideas one step further by suggesting that experience-based and transformation-based services are the wave of the future. These assessments are also supported by recent trend data from the Bureau of Labor Statistics (BLS) as shown in Figure 10. This seemingly simple picture is confounded, however, by a recent analysis by Richard O'Sullivan for STC published in the September/October 2008 issue of *Intercom* also based on BLS statistics. According to O'Sullivan's analysis, technical communication employment has increased most in manufacturing and decreased in the software industry and, not surprisingly, in the financial services field.

The second trend concerns a shift in the structure of organizations and the role of technical communication within organizations. Shifts to intra-company and across-companies teaming and to distributed and virtual

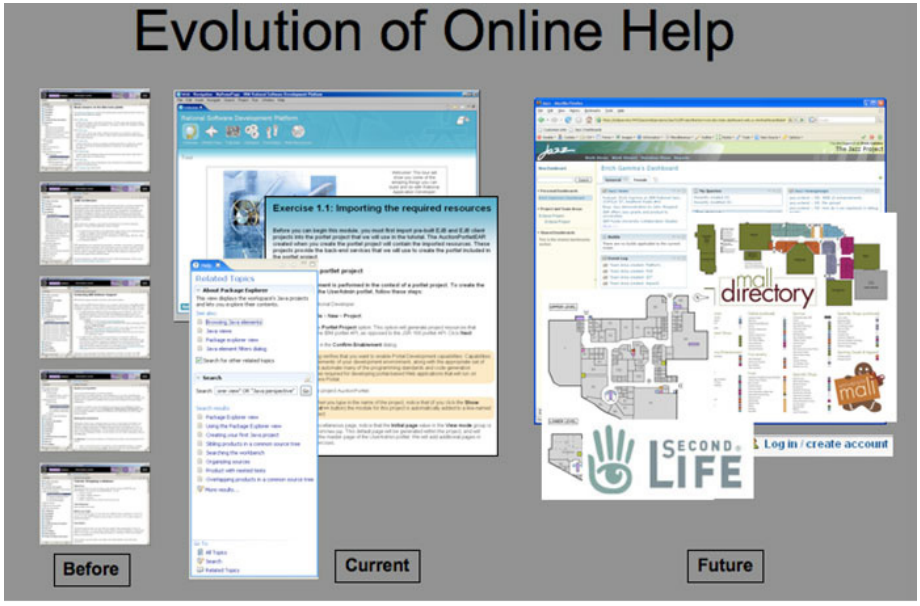

Figure 9. IBM Information Architecture Group's presentation of the evolution of online help systems.

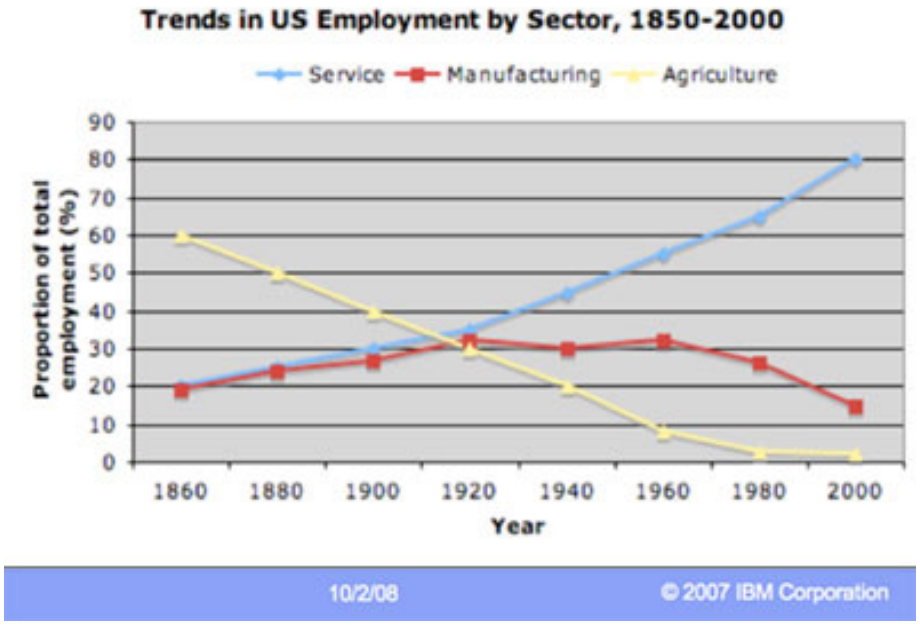

Figure 10. Data display from the Bureau of Labor Statistics, used with permission from IBM.

work environments are occurring across all workplace sectors, particularly prevalent in service- and information-based organizations. Jennifer Ciroli, an information manager for IBM, recently showed internal IBM reports that predict that by 2010 the average knowledge worker will have days divided up something like this: 30% working alone (office or telecommute), the remaining 70% spent on a variety of team arrangements: 5% in same time/place, 40% with different time and space, and 25% with different space and same time. The potential impact on curriculum is obvious; what we can and should do about it is less so.

The third workplace trend is an increasing demand for accountability and measurement of value and a related demand that incoming employees have some knowledge of business models and a focus on contributing to the overall financial health of organizations through individual and unit efforts. This trend is most common in the corporate world, and we're all certainly aware of it in journalism and in publishing. It has, however, also made inroads into nonprofits and academia, as we all know from recent pressures for outcomes-based evaluation of programs and institutions. In terms of curriculum, this trend implies the need for more organizational and financial acumen as well as an understanding of tools needed for measurement and arguments for value when no clear metric is available.

The fourth workplace trend is the gorilla, or perhaps more accurately, the trio of gorillas in the room: outsourcing, internationalization, and

globalization. The challenges here are multiple. At a minimum, graduates clearly need to have intercultural awareness and communication skills. But at what level should we address these issues in curriculum. Should we teach general principles of the relationship between language and culture? Simplified English? World Englishes? Writing for translation? Or translation itself? Should we develop partnerships with international companies or partner with instructors or institutions in other countries to develop projects in which students work on teams with international counterparts? Should we develop study abroad programs and exchanges? Should we seek out (or perhaps even require) internships with an intercultural focus? Should we develop tracks or specializations in these areas within programs? Can we partner with other departments at our universities to make such tracks feasible without needing to invest in new faculty positions? Should we be requiring or teaching second languages? And if we do, which language(s)? And as we consider adding these elements to our programs, what do we take away? As with the changes in technology, an additional challenge is that to add any of these elements to our programs, we ourselves need to have the requisite knowledge and skills.

A number of recent articles (see Appendix) have addressed some or all of these issues, and several panelists listed in the conference program will be presenting information on their initiatives. We also have the first book on the subject making its debut tomorrow, the 2008 volume, *Designing Globally Networked Learning Environments: Visionary Partnerships, Policies, and Pedagogies*, edited by Doreen Starke-Meyerring and Melanie Wilson. What the literature suggests, and what Starke-Meyerring in particular has strongly advocated, is that what's needed (and most effective) is not the piecemeal addition of an intercultural component or course here or a short study abroad experience there, but rather a close integration of global experiences into overall curricula. The general sense is that intercultural communication, like document and web design, is destined to become central to our programs. As we contemplate this possibility, it's sobering to consider comments Starke-Meyerring made in her 2005 *Journal of Business and Technical Communication* article on "Meeting the Challenges of Globalization." In that article, she describes both current projects in technical communication programs and technical communication professionals' interactions with international counterparts in the workplace as consisting primarily of work in global virtual teams or with clients or customers in other countries. In addition to pointing to the various literacies involved in these exchanges, she also brings up the critically important point that these interactions take place within a framework of an often conflicting

network of customs, laws, and national and international regulations as well as often-conflicting ideologies—all suggesting that in addition to intercultural literacies, students (and we as instructors) need critical literacies and an open-ended (and open-minded) inquiry-based approach to such interactions.

Although this characterization might seem overwhelming, several resources and opportunities are becoming available. Starke-Meyerring predicts, for example, an increasing demand for technical communication teaching and programs for international students in India, China, other Asian nations, and Eastern Europe, with the proviso that much of this instruction is likely to be done via distance education. Additionally, many institutions are encouraging such connections and even making some funds available to support such initiatives. Many are also supporting various initiatives, majors, and minors involving globalization, and it doesn't seem too crazy to see a role for our programs in these initiatives. With regard to the integration of foreign languages into the curriculum, the State Department and other federal agencies are working to encourage such interaction and have limited funds available, particularly for those languages considered to be strategic. Finally, we have at least anecdotal evidence that such connections can have a recruiting advantage.

Like most of the topics I've touch on today, this one is vast, so I'll just do some hand-waving here and point you in the direction of a few things to consider. The first is the CPTSC annual meeting, which will be held in Denmark in August 2009 to overlap with the European Symposium of Languages for Specific Purposes (which considers technical communication to be one of its special purposes). The conference will feature the pioneers working at the intersection of technical communication and international communication and offers a good opportunity for networking with European colleagues. Another good resource is a 2007 article in *Technical Communication* by Doreen Starke-Meyerring, Ann Hill Duin, and Talenee Palvetzian, who overview 15 existing programs and point to eight programs in the planning stages. I'd also point you to a number of people in this room, including Bruce Maylath and Dale Sullivan, from North Dakota State University (NDSU), who have developed partnerships with European universities; the faculty from Southern Polytechnic, which has Chinese students coming the United States to study technical communication; the University of Washington with its well-established program in Japanese technical communication; and Maylath's work on the changes taking place at the intersections of translation and documentation.

Although this topic is far from exhausted, I turn to the final area of consideration, academic and disciplinary trends and the ways in which they

influence us as we prioritize and implement new directions and priorities. One trend that has become increasingly evident on our campuses is the proliferation of specializations that both compete and interface with technical communication (e.g., information design, interaction design, usability, information systems, multimedia production, and so on). In our case at Carnegie Melon, for example, five of the seven colleges offer courses in web design. A similarly common trend is the development of interdisciplinary fields that blur the question of who does what and who can create tensions about accountability and how teaching and scholarship are measured. They can also, of course, provide some interesting opportunities. My institution, for example, has programs in Engineering & Public Policy and Social & Decision Sciences that include work in organizational and crisis communication. Statistics is involved with data visualization. And then there are the broad interdisciplinary fields such as global studies, international relations, and green curricula.

Another influence is seen in expanded definitions of literacy at the general education level. Various universities have established, or are considering establishing, requirements in technological, media, visual, and intercultural literacies among other possibilities. The University of Iowa and Syracuse University provide good examples, but they're certainly not alone, and the links both programs forge between their entry-level courses and required upper-level courses that feature communication within specific disciplines are also becoming increasingly common.

Finally, I'll turn to just mentioning some of the factors affecting curriculum and program development. I've mentioned some of these already in passing but they're significant enough factors in our lives to bear repeating. Resources and resource constraints obviously need to be mentioned, as do staffing, and staffing constraints. There continue to be more positions than qualified candidates coming out of doctoral programs, with areas such as new media experiencing particular shortfalls, as Carolyn Rude (2004) and Kelli Cargile Cook (2004) and those who have studied the academic job market as well as the first-hand evidence we all have from various faculty searches supports this observation. This situation has created a thriving market for those already in the field but certainly introduces challenges to us as program directors seeking to maintain strong and stable faculties and move in new directions.

Another challenge is posed by a convergence of academic trends, at least some of which have conflicting aims. One I've encountered in recent reading and heard already today at the start of this conference discussed being in not-too-hushed terms is the increasing focus on developing rev-

Figure 11: August 2008 cover from *Technical Communication*, published by the Society for Technical Communication.

enue streams in the form of fundable initiatives, technology transfer, and university-initiated start-ups. Thomas Barker (2007) has recently described this trend as a shift from endowment-funding models to models based more on market economics, which produces increasing pressure for technical communication programs to align themselves with both industry and institution's strategic plans. Another challenge putting pressure on programs and resources is the push for distance, online, and networked classrooms, all of which require substantial investments of time, labor, and equipment. At the same time, programs, like universities in general, are coming under increasing pressures from accrediting agencies and state agencies to provide evidence of outcomes-based planning and assessments. Taken together, these trends both impact existing programs and not infrequently energize the long-standing debate about the appropriate academic home for technical communication programs. It's much too late in the evening to jump into those waters, so I'll end here with one final image from *Technical Communication* and the hope that my comments this evening will prompt more detailed discussion over the next few days (see Figure 11).

References

Barker, Thomas. (2007). Trends in academic technical communication: A complex picture. *Intercom, 54*(1), 25–28.

Bergin, Thomas J. (2006). The proliferation and consolidation of word processing software: 1985–1995. *IEEE Annals of the History of Computing*, *28*(4), 48–63.

Durack, Katherine T. (2003). From the moon to the microchip: Fifty years of technical communication. *Technical Communication, 50*(4), 571–584.

Faber, Brenton, & Johnson-Eilola, Johndan. (2002). Migrations: Strategic thinking about the future(s) of technical communication. In Barbara Mirel & Rachel Spilka (Eds.), *Reshaping Technical Communication: New Directions and Challenges for the 21st Century* (pp. 135–148). Mahwah, NJ: Lawrence Erlbaum.

Farrell, Austin C. (1971). A membership profile of the Society for Technical Communication. *Technical Communication, 18*(4), 4–8.

Herrold, Joan. (1958, October 3). Wanted: Writer for outer space job. *The Pittsburgh Press*.

Klein, Fred. (1990). International technical communication. *Technical Communication, 37*(1), 71–72.

Livo, Lauren. (1990). What we call ourselves. *Technical Communication, 37*(1), 51–55.

Lufkin, James M. (1973). The case against teaching technical writing in college. *Technical Communication, 20*(1), 5–6.

Mirel, Barbara, & Spilka, Rachel. (2002). Appendix: Proposed research agenda for technical communication. In Barbara Mirel & Rachel Spilka (Eds.), *Reshaping Technical Communication: New Directions and Challenges for the 21st Century*. (pp. 197–201). Mahwah, NJ: Lawrence Erlbaum.

O'Sullivan, Richard. (2008). Feast or famine: TC employment in 2007. *Intercom, 55*(8), 16–18.

Pearsall, Thomas. (1973). University programs in technical communication. *Technical Communication, 20*(1), 2–6.

Pine, B. Joseph, & Gilmore, James H. (1999). *The experience economy: Work is theater and every business a stage*. Boston, MA: Harvard Business School Press.

Piscopo, Benjamin P. (1973). Word processing: New approach to corporate profit. *Technical Communication, 20*(4), 2–5.

Starke-Meyerring, Doreen. (2005). Meeting the challenges of globalization: A framework for global literacies in professional communication programs. *The Journal of Business and Technical Communication, 19*(4), 468–499.

Starke-Meyerring, Doreen, & Wilson, Melanie Wilson. (Eds.). (2008). *Designing globally networked learning environments: Visionary partnerships, policies, and pedagogies*. Rotterdam, The Netherlands: Sense Publishers.

Zachry, Mark, & Thralls, Charlotte. (Eds.). (2007). *Communicative practices in workplaces and the professions.* Amityville, NY: Baywood Publishing.

Appendix

Programs in Context: Past

Adams, Katherine H. (1993). *A history of professional writing instruction in American colleges.* Dallas, TX: Southern Methodist University Press.

Anderson, Paul. (1984). Introduction to *Technical Communication*: Education [Special issue]. *Technical Communication, 31*(4), 4–8.

Antoine, Valeria. (1985). The software documenter: A new specialist. *Technical Communication, 32*(3), 16–18.

Burnett, Rebecca. (2003). A farewell. *The Journal of Business and Technical Communication, 17*(1), 3.

Charney, Davida. (1998). From logocentrism to ethnocentrism: Historicizing critiques of writing research. *Technical Communication Quarterly, 7*(1), 9–32.

Connors, Jennifer J. (1991). History of the study of technical communication in Canada and the United States. *IEEE Professional Communication Society, 34*(1), 3–6.

Connors, Robert J. (1982). The rise of technical writing instruction in America. *Journal of Technical Writing and Communication, 12*, 329–352.

Cunningham, Donald H. (2004). The founding of ATTW and its journal. *Technical Communication Quarterly, 13*(1), 121–130.

Dicks, Stan. (Ed.). (2001). [Special Issue]. *ACM Journal of Computer Documentation, 25*(2), 29–65.

Eisenberg, Daniel. (1992). Word processing (History of). In *Encyclopedia of Library and Information Science, 49*. (pp. 268–278). New York: Dekker.

Frederickson, Lola. (2003). Fifty years and growing. *Technical Communication, 50*(4), 445.

Goldstein, Jone Rymer. (1984). Trends in teaching technical writing. *Technical Communication, 31*(4), 25–35.

Green, Elwin. (2008, October 13). After just 25 years, cell phones own us. *Pittsburgh Post-Gazette*, pp. A1, A6.

Hayhoe, George F. (2003). A golden opportunity. *Technical Communication, 50*(4), 439–440.

Henderson, Allan. (1983). The care and feeding of the then non-captive reader. *Technical Communication, 31*(3), 57.

Hibbard, Jeffrey. (1990). Document processing by computer: Some generic models. *Technical Communication, 37*(1), 13–21.

Kynell, Teresa, & Moran, Michael G. (Eds.). (1999). *Three keys to the past: The history of technical communication*. Stanford, CT: Ablex.

Lay, Mary M. (2004). Reflections on *Technical Communication Quarterly*, 1991–2003: The manuscript review process. *Technical Communication Quarterly, 13*(1), 109–119.

Longo, Bernadette. (2000). *Spurious coin: A history of science, management, and technical writing*. Albany, NY: SUNY Press.

Lowe, Richard. (1990). Desktop publishing and resource management. *Technical Communication, 37*(2), 112–115.

Malone, Edward A. (2007). Historical studies of technical communication in the United States and England: A fifteen-year retrospection and guide to resources. *IEEE Transactions on Professional Communication, 50*(4), 333–351.

Miller, Carolyn R. (1990). Some thoughts on the future of technical communication. *Technical Communication, 90*(2), 108–111.

Nielan, Cate. (Ed.). (2003). A brief history of STC. *Intercom, 50*(6), 8–9.

Parker, Ian. (2001, May 28). Absolute PowerPoint. *The New Yorker*, 76–87.

Pearsall, Thomas E., & Warren, Thomas L. (1996). The Council for Programs in Technical and Scientific Communication: A retrospective. *Journal of Technical Writing and Communication, 26*, 139–146.

Perica, Louis. (1971). Honesty in technical communication. *Technical Communication, 15*(1), 2–6.

Selber, Stuart A. (1994). Beyond skill building: Challenges facing technical communication teachers in the computer age. *Technical Communication Quarterly, 3*(4), 365–390.

Staples, Katherine. (1999). Technical communication from 1950–1998: Where are we now? *Technical Communication Quarterly, 8*(2), 153–164.

Staples, Katherine. (2000). Technical communication from 1950–1998: Where are we now? In Teresa Kynell (Ed.), *Writing in a milieu of utility: The move to technical communication in American engineering programs, 1850–1950*. (2nd ed.). Norwood, NJ: Ablex.

Team Digit. (2007). *Fast Track to Computing—Ages, Events, Evolution*. Jasubhai Digital Media.

Warren, Thomas L. (1996). An informal survey of technical writing textbooks: 1950–1970. *The Journal of Technical Writing and Communication, 26*(2), 155–161.

Zuroski, Kenneth. (2001). *The rhetoricity of manufacture: Rhetorical practices at Westinghouse Electric Corporation.* (Doctoral dissertation, Carnegie Mellon University, 2001). 121–123.

Programs in Context: Present

Allen, Nancy, & Benninghoff, Steven T. (2004). TPC program snapshots: Developing curricula and addressing challenges. *Technical Communication Quarterly, 13*(2), 157–185.

American Council on Education. (2008, February 25). In spite of global uncertainties, student interest in study abroad and international learning ranks high. Retrieved September 29, 2008, from ‹http://www.acenet.edu/AM/Template.cfm?Section=HENA&CONTENTID=25785&TEMPLATE=%2fCM%2fContentDisplay.cfm&utm_source=Publicaster&utm_medium=email&utm_campaign=HENA_022608›

Brumberger, Eva. (2007). Visual Communication in the workplace: A survey of practice. *Technical Communication Quarterly, 16*(4), 369–395.

Cargile Cook, Kelli. (2002). Layered literacies: A theoretical frame for technical communication pedagogy. *Technical Communication Quarterly*, *11*(1), 5–29.

Carliner, Saul. (2001). Emerging skills in technical communication: The information designer's place in a new career path for technical communicators. *Technical Communication, 48*(2), 156–175.

Emanuel, Richard. (2007). Communications: Humanities' core discipline. *American Communication Journal, 9*(2). Retrieved October 9, 2008, from ‹http://acjournal.org/holdings/vol9/summer/articles/discipline.html›

Dayton, David, & Bernhardt, Stephen A. (2004). Results of a survey of ATTW members, 2003. *Technical Communication Quarterly, 13*(1), 13–43.

Harner, Sandy, & Rich, Ann. (2005). Trends in undergraduate curriculum in scientific and technical communication programs. *Technical Communication, 52*(2), 209–220.

Hart-Davidson, William. (2007). Web 2.0: What technical communicators should know. *Intercom*, Sept/Oct 2007, 8–12.

Hart-Davidson, William. (2001). On writing, technical communication, and information technology: The core competencies of technical communication. *Technical Communication, 48*(2), 145–155.

Hayhoe, George. (2006). Education for the global future. *Technical Communication, 53*(3), 261–262.

Institute for International Education. (2008). *Open Doors*. Retrieved September 29, 2008, from ‹http://opendoors.iienetwork.org/?p=113249›

Jaschik, Scott. (2008). *Graduate enrollments are up, but uneven*. Retrieved September 16, 2008, from ‹http://insidehighered.com›

Jaschik, Scott. (2008). *Redefining the gender gap*. Retrieved October 13, 2008, from ‹http://Inside higher ed.com/news/2008/10/13/gender›

Johnson-Eilola, Johndan, & Selber, Stuart A. (2004). *Central works in technical communication*. New York: Oxford University Press.

O'Sullivan, Richard. (2008). Feast or famine: US technical writer employment, 2007. *Intercom,* Sept/Oct 2008, 16–18.

Rainey, Kenneth, & Turner, Roy. (2004). Certification in technical communication. *Technical Communication Quarterly, 13*(2), 211–234.

Rainey, Kenneth; Turner, Roy; & Dayton, David. (2005). Do curricula correspond to managerial expectations? Core competencies for technical communicators. *Technical Communication, 52*(3), 323–352.

Struck, Doug. (2007, January 13). Canadians fear fallout of US passport rules. *Washington Post Foreign Service*, p A16. Retrieved September 29, 2008, from ‹http://www.washingtonpost.com/wp-dyn/content/article/2007/01/12/AR2007011201926.html›

Whiteside, Aimee L. (2003). The skills that technical communicators need: An investigation of technical communication graduates, managers, and curricula. *The Journal of Technical Writing and Communication, 33*(4), 303–318.

Yates, JoAnne, & Orlikowski, Wanda. (2007). The PowerPoint presentation and its corollaries: How genres shape communicative action in organizations. In Mark Zachary & Charlotte Thralls (Eds.), *Communicative Practices in Workplaces and the Professions* (pp. 67–91). Amityville, NY: Baywood Publishing.

Zachary, Mark, & Thralls, Charlotte. (Eds.). (2007). *Communicative practices in workplaces and the professions*. Amityville, NY: Baywood Publishing.

Programs in Context: Future

Anschuetz, Lori, & Rosenbaum, Stephanie. (2002). Expanding roles for technical communicators. In Barbara Mirel & Rachel Spilka (Eds.), *Reshaping Technical Communication: New Directions and Challenges for the 21st Century* (pp. 149–164). Mahwah, NJ: Lawrence Erlbaum.

Association of Teachers of Technical Writing. (2008). 2009 conference call for papers: Beyond work? Retrieved September 24, 2008, from ‹http://cms.english.ttu.edu/attw/conference/2009-conference-cfp›

Barnum, Carol. (2006). If I had a crystal ball… . *Technical Communication, 53*(3), 283–285.

Lederman, Doug. (2008). Spreading the gospel on student learning. Retrieved October 13, 2008, from ‹http://www.insidehighered.com/news/2008/10/13/teagle›

Mirel, Barbara, & Spilka, Rachel. (Eds.). (2002). *Reshaping Technical Communication: New directions and challenges for the 21st century*. Mahwah, NJ: Lawrence Erlbaum.

Prensky, Marc. (2001, October). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1–2.

Starke-Meyerring, Doreen; Duin, Ann Hill; & Palvetzian, Talene. (2007). Global partnerships: Positioning technical communication programs in the context of globalization. *Technical Communication Quarterly, 16*(2), 139–174.

Author Information

Karen Rossi Schnakenberg is a teaching professor of Rhetoric & Professional Writing at Carnegie Mellon University where she directs the undergraduate degree programs in professional and technical communication and the MA in Professional Writing. Her work focuses on the question of how best to communicate specialized information to non-experts and includes technical and professional communication, instructional design, and the history and theory of writing instruction. She has served as CPTSC Treasurer and Executive Board member since 1998 and in 2006 was awarded the CPTSC Distinguished Service Award for her contributions to the organization and the profession.