APPLIED RESEARCH

SUMMARY

- Reports on interviews with five master's program graduates about their varied career paths and the skills they use in their jobs
- Discusses current issues facing technical communications programs—the variety of jobs available to graduates and the skills required

Fitting Academic Programs to Workplace Marketability: Career Paths of Five Technical Communicators

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INTRODUCTION

The current strained economic conditions across much of industry, especially in high technology areas, make those of us responsible for preparing future technical communicators stop and pay attention. As the job market becomes more competitive, it seems that the ethical and practical pressures to send out students who are well trained in the right skills also increase. In an effort to review and update the program here at the University of Memphis in Tennessee, we elicited feedback from former students who had successfully navigated careers in technical communication. The twists and turns of their career paths from graduation to current situations and the kinds of skills they found most useful both in securing and then flourishing in their jobs formed the profiles presented in this article. We also refer to current discussions in the profession concerning the fit between academe and the workplace.

Prior to these interviews, we had noted that our graduates were entering a wide range of jobs, from editing professional journals to online information development to teaching. Since technical communicators change jobs at a rate on par with general industry averages, we were curious about graduates once on the job—what it took to advance, qualify for other jobs, or otherwise grow in their careers. We wanted to answer questions any prudent review of a program would ask: How well did we prepare our graduates for their careers? What courses have been useful? And, in light of changes in the profession, how can we best prepare them in the future?

We do not claim that the situation at the University of Memphis is directly applicable to other institutions or locales, but, we believe that our program and the city of Memphis share many characteristics in common with other programs and cities across the globe. Frankly, we are not a prestigious, well-established program yet, but instead, a bread-and-butter program at a state institution, juggling the demands of growing and improving our program's standing, along with meeting the needs of a steady regional population. As a mid-sized city, Memphis enjoys its share of large, international corporations, is home to a growing medical research and healthcare community, and although not an area saturated in technology industry, is lively with technology that has revolutionized business here as it has almost everywhere else.

The basic problem and the need in technical communication

The quickly evolving state of the technical communication field ensures excitement and ongoing intellectual challenge—a strong draw for students. However, rapidly changing conditions also make the task of designing effective educational programs something akin to trying to hit a moving target. The very advances that make the profession exciting also make it difficult for educational programs and the faculty teaching them to stay current (Wright 1981). And programmatic changes are notoriously slow in academe.

But keep up we must. In the 2001 *STC technical communicator salary survey* (Society for Technical Communication 2002a), all 792 respondents self-reporting education data claimed bachelor's degrees and above, and in the 2001

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STC independent contractor/temp agency survey (Society for Technical Communication 2002b), over 85% of respondents reported degrees beyond high school. These reports suggest our field is a well-educated one in which job qualification standards are high. Faber and others (2002) recommend we adopt the value added process-based assessment strategies used in corporate settings to improve academic programs, in particular, applying return-on-investment (ROI) measures to academic program features. Katherine Staples (1999) reports that although the discipline has developed significant professional stature since the mid-20th century, we still face challenges to further growth.

Rapid changes in the field

Much of the research on technical communication education has concentrated on the gap between academic programs and real world needs (Selfe and Hawisher 2002). To establish quality in workplace documentation, Rachel Spilka (2000) suggests that technical communication academics need to partner with industry, arguing that the two have become so distant from each other that academe has little impact on workplace writing (p. 218). Forging such a partnership may enable students to qualify for good jobs and, once there, to better perform their jobs. Spilka believes that writers with knowledge of a specific industry's writing needs would have a greater chance for promotion and higher status within industry (p. 219).

Like Spilka, Willard Dagget (1994) also believes that quality of education suffers from a gap between the knowledge graduates need in the job market and the knowledge they possess. He claims that this gap exists not because U.S. schools are failing to deliver good teaching, but because they aren't keeping pace with the rate of change. Both Spilka and Dagget suggest that colleges and universities reassess their curricula according to the needs of the job market.

Dagget claims that educators must focus on the future, anticipate changes in the field, and determine whether or not their programs need to change to keep up. On the other hand, calling it a "fool's game" to attempt to focus on a particular market or trend in the corporate world, Stephen Bernhardt recommends a broad-based grounding in rhetoric and technical communication, as opposed to niche-marketing programs toward specializations (2000). He argues that conditions and trends in business and technology "morph" quickly; thus, a program should continue to deliver a foundation whose content will transcend changes, allowing graduates to adapt to changes. Similarly, Boiarsky and Dobberstein recommend procedural knowledge to help students adapt and solve problems (1999).

Many of the solutions recommended to correct the mismatch between industry and academe tend to fall into two camps: We should teach technological competencies or we should not. Some educators believe that acquiring computer skills in the classroom is as vital as acquiring writing skills, while others perceive it to be secondary to other skills such as self-management and analysis. Still, while most of the research shows that technology is—at the very least—necessary for technical writers, technological skills do not emerge as more important than writing skills, nor are writing skills useless without technology. With some scholars leaning toward technology and others dismissing it as something to be learned outside of technical communication programs, one might wonder what the right mix of technology and other skills might be, and whether or not existing programs are successfully training students for the 21st century job market.

We should teach technological competencies

From the proliferation of articles and ads highlighting technology, students have figured out that the "sexiest" jobs in technical communications involve cutting-edge technology. No one in our field would deny the overshadowing position that technology fills as both tool and defining factor in the work we do and in our work environments.

Many of us already immersed in our careers work hard to keep up with technological developments; professional journals and textbooks examine, critique, and promote awareness of different technologies; the media touts technology as part of the overall culture; and employers advertise technological skills as requisite for getting in the door. A recent study examining entry-level job advertisements found that 87% of professional and business advertisements include technology competencies as part of their application requirements (North and Worth 2000). As a result, it is not surprising that our students press for training in the latest technologies and software applications.

Partially triggered by lagging international standing in the sciences and technology, Dagget argues that educators must teach what students need (p. 9), and what students need is computer literacy. He is not alone in that opinion. Nagelhout (1999) defines computer literacy in the technical communication classroom as "developing the interface capabilities necessary for success in a post-industrial, information laden, linguistically diverse society" (p. 290).

Michael Carver (1998) supports this position, emphasizing that the mastery of up-to-date technology constitutes professional currency for technical communicators. At the same time, Carver observes that different ideologies and values put the cultures of academe and industry at odds with each other in their approaches toward research, theory, and curricula. Typically, the academic culture places more value on pure research and theory, both of which are necessary for establishing a discipline and enhancing its standing in the university culture. In the long run, these

measures of a discipline determine the discipline's status and effectiveness among other disciplines.

Business values, on the other hand, are shaped by practical necessities of the marketplace—pressure to produce tangible, competitive products that will gain companies healthy market shares and profits. Since job marketability has been one of the profession's strengths for a long time and has been used to attract students to enter the major in the first place, are we justified in our surprise when students ask for technological skills that, reinforced by the job ads, they perceive as necessary for the job market?

When asked, former students have often expressed their wishes for more practical support: Both Coon and Scanlon's survey of Rochester Institute of Technology alumni (1997) and Kalmbach and others' survey of Michigan Technological University alumni (1986) confirmed that students want less theory, more practical skills emphasizing writing, real-life writing experiences (assignments as well as internships), and familiarization with technology.

We should not teach technological competencies

Given the weight of pro-technology evidence, why do so many scholars oppose teaching technological competency at the university level? The first technical communication myth of Geoff Hart's top ten list is the belief that it is necessary to teach "knowledge of specific tools." Although Hart recognizes that some managers don't want to wait for a new employee to be trained in a technology, he claims that, "hiring on the basis of 'tool skills' ignores the fact that the ability to format text is a very small part of our value as technical communicators." Instead, according to Hart, employers should seek these qualities in job applicants:

- The ability to understand products and communicate that knowledge to customers
- The ability to take apart a product and document it
- The ability to empathize with the audience and understand their needs (2000, p. 291)

In fact, Hart claims that most technical writers have learned enough skills on their own such that they are able to master new software in a matter of weeks. Thus, Hart suggests we shift priorities: "Ask yourself this: would you rather read well-written documentation, or documentation produced by someone who can make Word 97 jump up and dance?" (p. 292).

In another critique, Killingsworth (1999) fears we put too much faith in technology because of an overly simplistic belief that computers empower students. However, we could get past that if we would simply admit that technical communication programs are heavily influenced by the needs of corporate culture. Instead, we should incorporate computers into classrooms simply because using computers helps prepare students for the workplace. In the end, Killingsworth further argues, the push for souped-up classrooms is too often driven by a desire to profit from online textbooks and course offerings, which ultimately limit access by contributing to the cost of education.

Jack Bushnell (1999) concurs, fearing we are far too influenced by corporate paradigms and values when educating students, thus compromising our ability to teach critical thinking. Overall, he cautions that educators themselves be critical in evaluating standards of technical communication education.

We should teach other skills

By more closely examining and better anticipating employer expectations in the near future, students may begin to determine what skills they should master for their careers. North and Worth (2000) looked at patterns in job advertisements, and noted that the high technology demands of today's job market seem to be declining while interpersonal skills are becoming increasingly important: In 1998, the rate at which interpersonal skills were requested in job advertisements rose to 38%, falling behind technological skills by only 12%.

Other research supports the belief that students need more than technological skills: Freya Winsberg (2000) thinks that by and large, employers would rate a job candidate fluent in the latest version of FrameMaker as an excellent choice; however, she insists that the skills that can ensure good work in the long run are

- Organizational and interpersonal skills for gathering information from domain experts and learning new products
- Analytical skills for discerning how much information users need or don't need, and for reframing information in understandable ways
- Writing skills for producing technically sound documents that meet standard English and company formatting requirements

In a study of management and leadership opportunities for technical communicators, Corey Wick (2000) argued that technical communicators should define themselves by the competencies they use to create, rather than by the products that they create (p. 515). Employers and educators should shift the emphasis from computer skills and products to the knowledge framework that enables writers to create. Like Hart and Winesberg, Wick identifies core competencies that will position technical communicators as facilitators of knowledge management and thus promote higher wages and opportunities for advancement (p. 524).

Finally, Bushnell (1999) and Wilson (2001) recommend that we help students develop more pointedly critical, cultural analytical skills so that they can become more cognizant participants in workplace and industrial cultures.

Through these skills, they will gain a greater awareness of the power of language to shape the world and coupled with improved writing skills, will also become more effective professionals.

Wilson describes the problem of developing relevant technical communication pedagogy as a "multifaceted oxymoron: designing a structure to teach a structureless approach to the structured description of structured systems" (p. 72). Beyond practical skills, he argues we should teach students as symbolic analysts, as agents in representing technologies, rather than as merely scribes—instead of simply transcribing information, they should contribute to the technological tools and to the larger social spheres they inhabit: their professional communities, the business world, and other economic structures.

Another area of proficiency has been noted by Kramer and Bernhardt (1996), who argue that general design expertise now forms a necessary part of the technical communicator's repertoire. Teaching skills traditionally taught in art or design schools reflect the growing reliance on graphical means of communicating, in both online multimodal interfaces and in hardcopy visual-verbal texts. Some of these skills, such as typography and layout, originate from publishing and typesetting professions, which, since the onset of desktop publishing technologies in the 1980s, have been taken on by technical communicators. Other skills such as general composition and color theory, and the rhetoric of design (Buchanan 1989) emerge from art, design, and architecture traditions.

Once exclusively in the realm of foreign language specialists—at least in the U.S.—translation and international communications skills are becoming increasingly necessary for technical communicators. Programs outside the U.S. have long addressed these issues (Alred 2001), but as technology and global business structures continue to blur geographical distinctions for technical communicators, U. S. programs will likely need to implement these studies into the curricula.

How to teach—plus internships and apprenticeships

Beyond the question of what to teach, we must then ask how? Technical communication pedagogies have been discussed at some length in the professional journals and at conferences. For some educators the environment in which the learning will take place is critical, and many believe computer environments can offer an edge over traditional classrooms. In their model of an effective computer-writing environment, Bisallion and others (1999) integrate five cognitive activities and their theoretical explanations, with examples and practical exercises. In an effort to create an effective environment for students to learn to write, Bisallion and colleagues incorporate the technological tools necessary for students to produce the best possible documents. Further, they believe that by creating an environment closer to a workplace environment than to that of a traditional classroom, computers can help students understand the critical differences between academic and workplace writing and thus better prepare students for the working world.

Some research advocates the integration of computer skills into existing courses rather than the creation of separate courses that teach only technology. According to Michael Eisenberg (1995), "Teachers and administrators are recognizing that computer skills should not be taught in isolation, and that separate 'computer classes' do not really help students learn to apply computer skills in meaningful ways" (p. 1). For these skills to become meaningful, they must relate to the content area curriculum and be tied into the class assignments. This approach requires that instructors be competent in computer skills, particularly for the computer-assisted or total computer classroom environments.

Internships, an additional strategy to immerse students in workplace settings, have been considered in other school-to-work research. Internships have proven useful and have become standard in most technical communication programs outside the U.S. (Alred 2001), but not all U.S. programs offer them or make them mandatory for graduation (Norman and Stohrer 1990). Students can be highly motivated to participate in internships, eager to apply their academic knowledge in "real-life" settings, gain work experience, make contacts, and possibly get paid for their work. Students often hope for a foot in the door of an organization through an internship.

Companies that offer them benefit from the access to technical communicators who are knowledgeable in recent research and theory, and are usually available at low rates and sometimes at no cost. In the best of situations, the employer can develop relationships with good students, who also benefit from the opportunity to learn workplace culture, gain business experience, and make good names for themselves with the potential employer. On graduation, interns often become employees.

Whereas U.S. students must generally pursue postsecondary education to qualify for technical jobs, graduates in Europe and Asia finish high school with a minimum of four years of technical reading and writing, and are reputedly better equipped for technical jobs sooner. Apprenticeships, rarely used in the U.S., offer benefits similar to those gained from internships. In a survey of German students entering the workforce, Rainer Winkelmann (1996) found that those who were trained through apprenticeships exhibited less of the "job shopping" behavior common to

new graduates, and spent less time unemployed than those who trained through secondary schools, universities, or vocational schools. He concluded that apprenticeships can be a successful means for teaching, arguing that through apprenticeships, students learn more than situation- (or company-) specific skills. Although support for this claim is limited in the technical communication literature, both apprenticeships and internships offer students potentially richer or more relevant educational experiences and should be explored further.

As a counterbalance to the highly corporatized training challenged by Killingsworth and Bushnell among others, Sapp and Crabtree (2002) recommend service learning as a means for students to gain hands-on, client and workplace experience. Sapp and Crabtree's suggestion challenges students to shift their focus from industry to the nonprofit sector and practice skills for good citizenship and community action.

Given the changing nature of the discipline and the incomplete, often conflicting views of what and how technical communication programs should be taught, we decided to inform ourselves about the current and future needs for our students and program. In the next section, five former master's students share their experiences in facing the professional demands of careers in the mid-south region of the United States.

METHODOLOGY

In selecting our interviewees, we asked a senior professor familiar with many former students of the professional writing program to recommend five graduates who met the following criteria:

- Excelled as students
- Graduated five or more years ago
- Represent a variety of technical communications specialties

These five participants, all white females ranging in age from their early thirties to late forties, were practical choices as well—they were willing and able to meet with an interviewer in person to share their experiences and answer questions from a 24-item questionnaire covering education, past and present jobs, job responsibilities and requirements, computer experience, and courses they had found most useful (see Figure 1). Interviews were tape-recorded. From the tapes and notes taken during the interviews, we created a narrative description for each participant. In a practice common to qualitative research, each respondent reviewed her transcription for accuracy (MacNealy 1998).

Although we do not intend to generalize about the entire field of technical communications from these five writers, we think that they offer value as glimpses of actual careers. We can see how individual students have successfully navigated careers since graduation, particularly ways in which their academic training did or did not prepare them to face challenges they encountered in the workplace. From these observations, we suggest directions for further study and develop questions program designers should ask in reviewing their programs.

Interview Questions

Begin each interview with a friendly introductory conversation, in order to establish rapport and relax the respondent. Then, before asking open-ended questions, ask simple, specific questions to direct the interviewees towards the area of discussion and let them warm up.

1. What year did you graduate?
2. What was your first job after graduation? Please list any other jobs you have held since then:
3. Where are you working now?
4. Generally, what are your responsibilities in your current position?
5. Do you use a computer?
   - ☐ Yes
   - ☐ No
6. How often do you use your computer
   - ☐ rarely - a few times per week
   - ☐ moderate– a few times/day, mostly email, wordproc'g, occasionally other apps
   - ☐ heavy – sev'l times/day, email, heavy wordproc'g/layout/other apps,most work accomplished online
7. What programs, if any, are you required to use?
8. What programs do you use most often?
9. How did you learn to use these programs?
10. Tell me about your first experience working with a computer?
11. What kind of computer did you first use?
12. How did you first use it?
13. Today, how would you rank yourself as a computer user? (novice, moderate user, expert)
14. Did you train on computers through your job(s), are you self-taught, or what, if any, computer courses have you taken?
15. What courses from the graduate program did you find useful in helping you to land a job?
16. What courses were useful to you once you were on the job?
17. What skills do you believe your employer valued the most when hiring you?
18. How did you acquire those skills? (Classes, internship, research/teaching experiences)
19. Are there any other skills or courses that might have better prepared you for work? Why?
20. Please describe a typical workday.

Figure 1. Questions asked during interviews with participants.

PROFILES IN TECHNICAL COMMUNICATION

The following descriptions of our five respondents were drawn from the interviews and demographic items in the questionnaire. Note that names of all individuals and companies are pseudonyms.

A technical position: Patricia Craig

With a BA in literature, Patricia earned her MA in professional writing in 1991. She worked for a few months at a temp agency, and then took her first professional job at an engineering firm. While there, she also taught part-time and later accepted a full-time instructorship teaching undergraduate technical and professional writing courses and first-year composition. After five years she returned to the

business world as a technical writer at E-Telephony Systems, a local company that creates communications systems for business.

At E-Telephony, Patricia not only writes and edits software documentation, but as senior technical writer, she also represents the department on a product development team and serves as a mentor to other writers. During her workday, she researches, writes, edits, works on page layout, and communicates via e-mail.

An editing position: Katie Wingard

A science background and an MA in professional writing helped Katie to land an assistant editor job at Medical Publications, which publishes a major medical research journal and other research-based communications. In addition to her education, however, Katie made and maintained personal contact with the publishing firm throughout her graduate studies, even working on one of the journal's articles for a class project. Now, as senior editor working with a staff of 25 writers, editors, and layout designers, Katie shoulders various responsibilities: laying out their flagship medical journal and its companion publication, editing articles, guiding the assistant editors, and generally managing and coordinating work when the editor-in-chief is gone.

A wearer of many hats: Ann McWain

Ann completed a BA in English with a concentration in British literature, and a master's with a concentration in professional writing. After her graduate degree, Ann went to work for a software company that relocated out-of-state about a year and a half later. Then Ann went to work at Chemicals on Call, where she has worked for the past four years as a training media specialist. Unlike the rest of the respondents, she is the only writer at her company.

Ann calls herself a "hodge-podge person," who was hired to do one thing, but actually does many more. She was hired initially to document proprietary software programs for internal use, and found herself working at the help desk to investigate problems she needed to address in her documents. The project mushroomed as she created customer-specific versions of the software manuals for external use. Now, in addition to her support and writing duties, Ann can also take support calls when needed.

A corporate position: Belle Marine

Currently, a senior business applications analyst at World Wide Transport, Belle earned her MA in professional communication in 1991. Although her first job after graduation was writing job manuals for the University of Tennessee Medical Center, she soon shifted to industry. Her current employer, an international shipping company, locally employs over 100 technical writers.

Belle's job in revenue systems involves much writing and other communication tasks; however, her title is not "technical communicator." Although she has written developers' manuals, she also spends much of her time managing documentation projects, in some cases initiating the projects herself. Whenever a writer in software development at WWT works on a project, documentation is required to show what was done and why it was done.

Managing a documentation project includes scrutinizing initial project characteristics in an online system, bringing them to the lead developers, setting priorities, and preparing them for development. This document not only tracks actions, but it supports risk management. Belle also develops requirements templates of the features generally included in projects. These templates work like a checklist for employees and also provide an explanation of procedures, both of which help eliminate risk and ultimately make Belle's job less stressful. Finally, Belle has to make sure that the project meets standards and company policies. In making technical work understandable, Belle notes a basic skill to "take the raw communication and transform it into something much more usable so that readers can get the information they need without having to read irrelevant material."

A freelance position: Penny Howell

Penny earned her MA in professional writing in 1994 and immediately began working as a contract writer. She wrote brochures for a risk management company for about a year, and soon after, returned to the university to teach part time while doing freelance work in her spare time. Penny wrote brochures, and worked on projects for a graphics company and a software company before going to work at Innovative Electronics in 1996.

Penny's branch of Innovative Electronics is mainly concerned with the research and development of electrical products. Her job responsibilities as a technical writer are to write manuals for clients. She has also written service manuals for repairing and maintaining products.

IMPLICATIONS

Again, we do not wish to suggest that the five professionals here fully represent the population of technical communicators; however, students seeking guidance in their academic and professional lives, as well as program designers may gain insight from their experiences. In this section, we have made observations across the five cases and compared them to the current thinking on the topic, distilling areas of program-to-job characteristics that need further examination. Finally, from the observations and discussion, we suggest directions that larger-scale, systematic studies of the discipline might take that would inform and help improve program design in technical communications.

Responding to market changes, unclear career paths, and the question of skills

The first observation we made was that only one of these five writers went directly from graduation to a full-time position. Possible explanations range from a competitive job market to unclear career paths, or mismatched skills for the marketplace. All of these potential explanations are concerns for both students and academic programs.

Agility in responding to change and unclear career paths Conditions in the job market can vary widely, affecting how quickly graduates can find jobs. This is a variable of the profession over which academic programs have the least control, and it might seem reasonable to discount it when evaluating and developing programs. However, that very unpredictability argues for helping to cultivate a mental agility in students that will enhance individual adaptability.

Teaching problem-solving and analytical skills will not only help students to become better writers and communicators, but if students apply those same skills to their careers, they will be able to position themselves as well as possible when the job market shrinks. Giving students the training and the opportunity to turn the rhetorical skills they've learned toward their professional identity seems like a responsible and potentially powerful thing to do.

A second explanation for delayed employment might be that new graduates are unsure about which path to take in the technical communication field. The interdisciplinary quality of technical communication that makes this profession attractive to students also results in multiple, varied, and less clearly defined career paths. Unlike older professions—academe, accounting, or law, for example—in which the job search processes are structured through professional conferences or regular campus recruiting at specific times of the year, technical communication graduates may be more on their own when it comes to finding jobs.

Depending on what you read, job search experts commonly advise that rather than finding jobs through publicized means—job ads in newspapers and trade journals, as well as the Web and job boards—anywhere from 60% to 80% of jobs are secured through the hidden job market—the job hunter's network of personal contacts, professional associates, friends, and family (Mornell 2000). If even the most conservative estimates are near the mark, skills in networking, job searching, interviewing, professional presentations, and the opportunity to participate in internships may be areas that should be emphasized more strongly. Ensuring that students are aware of the nature of the profession and preparing them to be proactive in their own passage from classroom to the job will reinforce other job-hunting skills. This preparation may be particular helpful to those who choose to consult or be self-employed.

Domain knowledge and cultural familiarity Finally, some job seekers may be unqualified for the jobs they want. Katie Wingard was one such case: When she finished her BS, she knew that she wanted to go into scientific writing and recalls that although the bachelor's degree didn't quite get her there, "it's interesting because the science background is what got my foot in the door." Katie's eventual employer found her domain knowledge of science and her writing skills more important than computer skills. He suggested that she pursue her master's degree in writing before they could hire her as an editor, so Katie returned to school, and one-and-one-half years later, she was hired as an editor. She also found that she needed to strengthen her grammar skills and hired a tutor to hone them.

Domain knowledge or experience may be especially important when a student wants to specialize in a particular area, such as healthcare, scientific research, business, or technology. Some institutions, notably, here in Memphis, an internationally renowned medical research institution, require a PhD to qualify for higher level editing or communications positions. If not specifically required, familiarity with a discipline can help the candidate understand the culture of that community: organizations, practices, values, expectations, and so on.

The importance of other skills

Although the presence or lack of computer skills was not the only factor in our graduates' job search processes, these days students need to master some level of technology as an expected standard literacy. However, the specific tools they need to know may vary depending on the particular job or area of technical communications. Although not a representative sample, for all five of our graduates, knowledge of specific applications was never a barrier to qualifying for a job, and four of the five use technology heavily in their jobs. The editing job, since it is separated from production, was the least "technical" of the five. Since these interviews, however, Katie's group has begun to use Microsoft Word's online editing feature. Thus, even the least technological work is becoming increasingly dependent on technology.

The renewed importance of audience awareness As part of the standard toolkit taught in writing classes, students may think that teachers teach audience awareness to death; however, all five of the graduates interviewed mentioned it as one of the key skills for doing their jobs well. Patricia Craig, who works at one of the most technical jobs of her cohort, reported that her employer appreciates most her ability to envision a project's intended audience and

make design decisions based on their characteristics and needs.

Belle Marine, in her busy job at World Wide Transport, also noted audience analysis as a critical skill in her job. She specifically mentioned that rhetorical analysis in general was a routine part of work she performs, saying it helps her to develop business projects and documents that must meet the needs of multiple audiences. Belle remarked that the courses that covered human learning and reader behaviors were more helpful to her on the job than any of the technical courses that she had taken, and that they enriched her ability to determine the needs of her audience.

Learn and transfer Initially, Ann's employer saw evidence of her computer skills from her portfolio; however, in the job interview the employer focused on determining her other writing-related abilities. Closely related to audience awareness, learn and transfer is the ability to encounter a new product, understand it thoroughly, and then transfer that knowledge to a novice user by designing an appropriate presentation of that product. Doing so well requires the communicator to synthesize and hierarchize complex information to discern which information a user needs. Although Ann McWain's education did not center around technology, once on the job, she found herself working on an important project in which she became expert in her company's proprietary systems and then documented them in different ways for various audiences.

Persuasive writing skills Persuasion is also related to audience analysis because it enables the communicator to discern the most effective logical, ethical, or emotional appeals to make to an audience. Another theoretical and practical cornerstone of writing programs, such rhetorical skills enable communicator-managers like Belle, who works with clients and proposes multiple projects, to shape work effectively for different audiences—to get that OK for a special project, or to persuade an employee to follow her guidelines.

When asked what skills her employer found most valuable when she was hired, Belle listed persuasive writing skills, as well as her ability to simplify, her creativity, and her leadership. Then she said, "I think the graduate program provided the groundwork, and what I saw play out in my professional career validated what I learned in graduate school." Clearly, even though Belle mentioned at one point that she was a bit of a computer whiz and her computer was her "everything" tool, she and her employer found her rhetorical skills superior to her computer skills. "They would have hired me just knowing MS Word and Excel."

Project management Skills that fall under the rubric of project management also emerged in interviews: A combination of problem-solving, organizational, communication, and interpersonal skills are necessary for professionals who often work independently on a project-by-project basis, rather than in a daily routine. They need to self-regulate and motivate themselves, set internal deadlines, and keep their projects on schedule, and since managing collaborative projects means that the work is also *inter*dependent, technical communicators are often responsible for ensuring that other writers are also on schedule. Falling behind may throw off an entire team of writers, editors, or other project experts or engineers.

Katie Wingard must perform a number of tasks in her publishing job, including editing articles, answering questions, corresponding with writers and other editors, working on layouts, and handling advertising arrangements. In short, Katie must orchestrate the many parts of the entire project. Managing projects forms a large part of Belle's and Patricia's jobs as well. Freelancer Penny Howell manages her own clients, accounts, and projects in an interwoven project management scheme.

Good student skills Beyond entry-level qualifying skills and knowledge, businesses anticipate both their new and seasoned employees will need to continue to learn during their careers with them. Recent trends in business have shown dramatic increases in ongoing training offered in the workplace (Caudron 2003), and some companies develop their own software. As protected assets, these must be learned on the job. Although Ann McWain noted that the training she received at Chemicals on Call was not very effective, with so much more research and knowledge being produced now than in the past, implications of this trend are worth considering, one being employees who are good students.

The employer anticipates a learning curve before new employees are fully functioning in their positions. Once established, changes in technology, in business plans, and in the organization will require additional training. Because training is costly, the question of how much training should be done before and after hiring, as well as how to show the effectiveness of training on achieving strategic goals, are questions that businesses are interested in answering.

Although from our interviews, some applications seem to be more universal than others, aside from word processing and e-mail, the technology requirements varied from job to job. Of course, our interviewees were purposely selected because of their diversity of job types, and it would be quite useful to more closely examine technologies that may be prevalent for types of jobs. In editing, for example, Katie uses PageMaker, whereas Patricia, who works for a high-tech company, uses many more and a wider variety of technologies.

Finally, all five writers use different operating systems at home than they do at work. It may be entirely coincidental, but this versatility does underscore the relationship between technological skills and the profession.

The experiences described here highlight individual abilities to handle different kinds of jobs based on rhetorical, analytical, and writing abilities more than specific computer expertise. Patricia, the one graduate who went to a high-tech firm, relates a longtime interest in computers: "We had one of the earliest home computers, a Commodore VIC 20, on which we played adventure games that consisted of typing in commands on a plain white screen and receiving responses in lines of text—no graphics whatsoever." The word processor on that computer was such a simple program that the programming code for it came printed in the Commodore user's magazine. She said, "I typed in the code myself, saved the file, and could then run the program."

Other graduates seemed to learn most of their specialized computer skills either on the job or on their own. Katie who now is quite proficient in PageMaker, quickly picked up the essentials through trial and error (and the help of friends) while in graduate school.

Logically it would seem that new employees who come into a new job with previous computer skills are better candidates because they will be easier to train than candidates with limited computer skills. When computer technology first became available in the workplace, the learning curve may have been steep because long-time employees simply lacked experience with the new tools and environments and may have been intimidated by the complexity of the equipment. However, as access to computers has increased, new employees and students in higher education typically have had more exposure to computer technology.

Belle Marine likened learning computer programs to learning a new language: once you understand the logic behind the way they are designed and operate, it becomes less difficult to make your way through new programs. If this healthy trend toward equalizing access to technology continues in the future, it appears that writers will be even better prepared to unravel the mysteries of new computer programs.

In contemplating education in design, Dan Boyarsky predicts that "not all learning will take place in schools; courses will be of drastically different lengths; learning will not end with a diploma; there will be less structured and codified ways of delivering education; there will be unique cooperation between academia and industry with new and continuing education as the goal. The design of life-long learning is the issue at hand" (1998).

WHAT MIGHT THIS MEAN FOR THE FUTURE OF TECHNICAL COMMUNICATION PROGRAMS?

Four of the five respondents pointed out that instead of specific software proficiency, it was their grounding in critical thinking and in general writing skills that enabled them to be successful on the job and, over time, to learn the software applications used on the job. The exception was Penny, the self-employed graduate, who believed she needed to be able to "hit the ground running" to sell her services to a client. Although technology is an integral part of the profession and the professional's toolkit, it appears at least as important for students to be able to think critically and independently, to cope with change and ambiguity, and to become proactive in their careers.

Because we face continued change in economic climate and technology, so we should expect change will have an impact on the future of technical communication programs. Beyond the changes that we face collectively as a discipline, different programs must determine different solutions that will meet the needs of their students, their programs' areas of specialization, and their communities. As educators and program designers, we need to do a better job of learning and then identifying for our students the different routes that a technical communicator might take, and which skills are necessary to them.

Katie Wingard, who realized on the job that she needed training in grammar, would have been better prepared had she known that she needed this knowledge before she graduated. Likewise, people like Belle, Ann, and Katie could benefit from taking a management course in the business track. Or a student who would like to target technology jobs might want to take programming, Web development, human-computer interaction, or HTML-XML courses.

We also need to promote our discipline. This may sound simple-minded, but we are often surprised that students can be in the same building with us for four years (or more) and not hear about technical communication as a possible area of study. As much as we work at and think we are promoting our discipline well, many of us recognize the new student still rapturous for having "discovered" us. Promoting the discipline could mean something as simple as developing better program materials that are updated regularly, or informing academic advisors and other faculty. More complex solutions might involve partnerships between the academic department and the industries that hire technical communicators. Certainly internships, if managed well, can be a powerful site of contact and cross-communication.

The experiences of the five writers interviewed in the study give us only a few glimpses of the technical communication world; however, this information may help designers of technical communication programs by contributing to our understanding of changes in the field as well as its enduring features. It may also inspire more cross-fertilization between industry and academe in developing better academic programs. Further, more systematic studies

will be necessary to pinpoint skills that may be particular to different areas of technical communication and to help us to better prepare students and minimize the learning curve for new employees. We know of analytical and rhetorical skills that seem to transfer well across technical communication jobs, but we have not, perhaps, always done a good job of advertising them. To do so can only improve the status of the technical communication field.

It seems reasonable to speculate that technical communication graduates who are most familiar with industry needs will have the greatest chances for success in their careers—both at securing positions and, once in them, at developing successful careers. Technology certainly plays a large part in what we do, but it appears that technical communication programs are not solely charged with teaching that technology to our students. Our five graduates learned applications and learned about computers in general from the full range of possibilities: on their own, out of an overriding interest in technology; on the job; and as part of a technical communications program.

It also appears that rhetorical skills that foster analytical agility so that practitioners can confidently approach different problems, projects, and jobs will help students in managing their career paths as well as accomplishing their work. As professional communicators, we need to regularly ask ourselves what repertoire of skills supports our work. And as educators, we need to regularly question why we teach students the skills we do and determine whether or not we are preparing our students in the best possible way for the demands of the current and future profession. T**C**

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