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COLLABORATING WITH STUDENTS

Technology Autobiographies in the Classroom

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A STORY

As this volume suggests, all sorts of instructional innovations are possible. As a result, it is sometimes hard to tell which way to move. Where should we put our energies, limited as they are? In this chapter, I suggest that we might go about productively innovating our technical and professional communication pedagogy and curricula by paying attention to students' literacy skills as they come into our classes and programs. In particular, we might want to attend to their technological literacy skills, attitudes, and approaches to learning. A short anecdote might be instructive.

My observations of student's technological literacies and their impact on technical communication (TC) courses are reflected nicely by the experiences of one of my former colleagues at Michigan Technological University, Dr. Dale Sullivan. Sullivan was teaching a Web design class in the spring of 2000 when he commented on an unexpected turn the class had taken:

> I discovered that the coding ability of the students tended to be very advanced. The problem is that we don't know where students are, and one class in Web design will attract a very wide array of abilities. For 80 [percent] of the class, I should have been teaching perl and cgi script applications and xml and asp. For 20 percent I should have been teaching very basic html and how to put a Web page on a server. . . . So I simply resorted to teaching basic principles of user-centered design, architecture, navigation, user interface design and user testing, and turned the class into a group work operation. (Email correspondence, May 5, 2000)

This chapter suggests that the flexibility and nimble curricular redesign that Sullivan was able to manage in this class is becoming more

and more the state of affairs in many technology-rich TC courses.[1] His note caught my attention because the experience so closely matched my observations: there have been surprising fluctuations in technological skills, approaches, and attitudes in student population over the past several years.

PRACTICING WHAT WE PREACH

It's a good day when students write back to their home institution and let teachers know how their lives are going. Several years ago, one such message came across my screen, and I've used it ever since in all of my TC courses. It came from a young woman who had graduated a few years before and for whom I had great respect. I asked her about the most important three lessons she had learned in her tenure as a technical communicator. She said, "Know your audience; know more about your audience; and really get to know your audience." I've used her quote many times in the classes I teach.

We ask students to know their audience at every turn in the technical communication curriculum, occasionally providing them with methods for such analyses. In light of the changing technological experiences that Dr. Sullivan encountered in his course and the obvious need for communication specialists to know their audiences, I began to realize that I should have been following my advice. After all, as a teacher, I am continually constructing learning "interfaces" for students: interfaces that consist of online environments, content material, composing processes, in-class activities, and so forth. It occurred to me that I should also be making a stronger effort to know these students and to construct learning experiences *with* them, not just *for* them.

This chapter proposes a method—an autobiographical assignment focused mostly on past technological experiences—that might well benefit students and our class and curricular planning. As assignments, technological autobiographies (TA) are wonderfully functional. They provide an interesting glimpse into the attitudes, experiences, learning strategies and levels of expertise that students bring with them into our classes. They are writing samples; they are introductory narratives that help form our understandings of each other as people, workers, and learners. They help us and students get to know, know more, and "really" know an audience that we often use in our TC classes: the class members themselves.

But, in addition, these assignments can be part of a participatory design "method": technology autobiographies are windows into student lives in an age of rapidly changing technologies, technologies that have become central to our educational and professional endeavors on and off campus. I am certainly not the first to claim that we need to adopt and adapt user-centered, participatory design methods to the design of classes (Soloway 1994). In his article about designing online courses, Stuart Blythe (2001) makes it clear how difficult the academic setting makes this method. His solution to these difficulties comes in two forms. First, we have to imagine, as usability advocates have for years, that end-user (student) participation in the design of our classes is ongoing and formative. It should be an expected component of the ongoing redesign of our classes, not a one-time usability event. Second, he provided opportunities for each generation of students taking his class to choose the focus of projects in its class. Thus, his "assignment" becomes part of a participatory design method that will inform not only the class at hand but also the next improved, technology-rich, instructional experience that he helps construct.

THE TECHNOLOGIES IN OUR DISCIPLINE

But students' changing technological literacy practices aren't the only reason for adopting participatory design methods. As I've suggested in other publications, our culture is currently experiencing an overdetermined state of technological change. This change is particularly true in our discipline (see, for example, R. Selfe 1998). One graphic method of characterizing the overdetermined nature of this state of affairs is through the guillotine chart originally constructed by IBM in 1979, then revised by Dwight Stevenson in 1984 and Roger Grice in 1987. No doubt the blade has gotten longer and sharper since then.

Roger Grice, in his 1987 dissertation *Technical Communication in the Computer Industry: An Information-Development Process to Track, Measure, and Ensure Quality,* describes how in 1979 the IBM Human Factors Task Force met in Atlanta, Georgia, to "discuss and chart future actions" (50). Among other actions, they defined the role of technical communicator as "information developer" and created a guillotine chart much like the one presented in figure 1 that shows the growing responsibilities included in that role. In 1979 only the first four columns were represented. In 1984 Dwight Stevenson's prescient expansion of the chart showed the

Information Development Job Description and Direction

1960 — 1985

	Designed After	*Designed With*	*Designed as an Integral Part*	*Systems Design*
Purpose	Product Description	Functional Description	Task-Oriented Use Description	Process Design and Description
Development Emphasis	Content	Development and Schedule	Field and Customer Cost	Product and Process Evolution
Objective	Completeness	Technical Accuracy	Ease of Use and Total Cost	Efficiency, System Optimization
Product	Books	Libraries	Information	Information, Especially Electronic
Volume	Low	Medium	High	High in Volume, Complex in Nature
Skills	Document Writing / Editing	Computer Hard/Software Engineering Writing Editing Planning Graphics Text Management Testing for Accuracy	Retrievability Writing Editing Planning Graphics Management Text Management Testing for Accuracy and Usability Audience Definition Measurement Financial Human Factors Media Packaging Distribution Publishing Task Definition	Substantive Editing Substantive Writing Graphics Layout and Production Video and Film Training Interpersonal Communication Organizational Behavior Planning Text Management Computer Text Production Testing Financial Analysis / Management Product Distribution Product Development Online Documentation Computer Graphics Information Research Database Design and Management Legal Protection Cross-Cultural Communication Software Development Software Management Public Policy Research Design Research Synthesis

Figure 1. Grice Guillotine Chart (adapted from Stevenson 1984)

technical communicator "moving into the area of system design, especially design of the user- system interface" (Grice 54). It's hard to argue that Stevenson wasn't entirely correct in his assumptions that information developers would soon be engaged in video and film production, product development, database design, and software development, to name just a few of the additional "skills" suggested by his chart. And this, of course, was before the meteoric rise of the World Wide Web as an interactive, multimedia information delivery device.

PARTICIPATORY DESIGN AND THE TC CURRICULUM

If anecdotal evidence (Sullivan and Blythe, for example) suggests that changing technological literacies will or should change the courses we teach and if the increasing technological complexity of the discipline itself will encourage us to adapt our courses, one might then ask, "What do we mean by participatory design?" I would suggest that it is more of an attitudinal change than any one particular method. That attitude will then lead us to innovative pedagogical approaches and implementations. In a special issue of *Human-Computer Interaction* on "Current Perspectives on Participatory Design" (PD), Randall Trigg and Susan Anderson (1996) suggest a common theme among the many approaches found in this design rubric. In PD, there is "a fundamental respect for the people who use technology and for the right of people to have a direct influence on decisions that affect their lives" (181). Changing technological literacies are so fundamental to the TC curriculum that we will probably find traditional usability methods—focus groups, questionnaires, controlled usability testing—useful but "not sufficient to the development of genuinely *useful* systems [in this case, educational systems]" (Blomberg, Suchman, and Trigg 1996, 239). As we design technical communication programs or classes, we are in essence aiming at a moving target, one moving on several dimensions at once. At least two of those dimensions seem obvious: students bring a rapidly changing set of technological literacies practices into our classrooms each term, even as the technologies we are asked to use change around us.

As a result, we need to rethink our relationship to students. They are, after all, the workers in an educational system, a system that is, in my experience with the program at Michigan Technological University over the past fifteen years, constantly in the process of being redesigned. TC academics face a growing list of skills designated by commercial

representatives and changing theories of the communication process. One might reasonably ask, then, another question: "Isn't it enough that TC teachers and curricula designers consider the suggestions of theorists, industrial advisory boards, employers, and technology experts in the redesign of our programs and classes?" The answer for those working on technical literacy projects is, of course, "No."

In a research report submitted to the Society for Technical Communication in March of 2000, called "Studying the Acquisition and Development of Technological Literacy," Cynthia Selfe and Gail Hawisher summarized the problem we face this way:

> So, here is a problem: We know very little about how and why particular individuals acquire and develop, or fail to acquire and develop, technological literacy.
>
> And, here is another problem: We know very little about how large-scale historic, cultural, economic, political, or ideological movements act and interact to shape individuals' acquisition and development of technological literacy[3]—or how individuals' literacy practices and values help constitute these macro-level trends.
>
> And here is a really big problem: Despite our lack of knowledge about these important matters, literacy experts, educators, and policy makers continue to set standards for technological literacy (*National Educational Technology Standards for Students,* 2000; *Standards for the English Language Arts,* 1996), create educational and workplace policies about technological literacy (*Getting America's Students Ready for the Twenty-first Century,* 1996); and design programs and curricula that teach technological literacy in schools and in the workplace (*National Educational Technology Standards for Students,* 2000). In sum, we're basing big decisions on minimal information. (1)

As suggested in Selfe and Hawisher's comment, TC curriculum designers, myself included, have habitually relied on system-centered approaches as they face the escalating curricular requirements driven by diverse skill sets like those represented in Grice's guillotine chart (see figure 1). We attend to our favorite theorists, available industrial representatives, and technology specialists, but rarely the student populations who inhabit our programs. We "black box" their changing literacy practices at the risk of becoming increasingly irrelevant or at least disconnected not only from students and their learning habits but also from the youth culture in general.

THE AUTOBIOGRAPHIC ASSIGNMENTS

The story that Dr. Sullivan tells about his Web design class strikes a chord with me because my ability to predict what students will bring into the class has likewise been unsettled. I have clearly overestimated and underestimated their abilities in the past. At the same time, literacy scholars like Deborah Brandt have come to some interesting conclusions about changing literacy expectations. In "Accumulating Literacy: Writing and Learning to Write in the Twentieth Century," Brant (1995) interviewed sixty-five participants with the goal of discovering the "institutions, materials, and people" that inform the acquisition of "practices that haunt the sites of literacy learning" (651, 661). One of her findings suggests that there is an increasing "escalation in educational expectations" on literacy practices both in the home and in the workplace (650) as a result of recent, incessant technological "innovations." The technology autobiography and related assignments developed in this chapter are generally beholden to scholars like Brant. More specifically, they have been developed in detail and practice by my colleagues Karla Kitalong and Michael Moore. In a forthcoming publication, we speculate that "these heightened expectations [are] articulated by a wide variety of educational stakeholders, including the media, state legislatures, industry, and any number of special-interest groups." Our approach highlights "the contradictions and ambiguities between institutional goals and the communicative acts and literacy practices of students, articulated in their own words" (Kitalong, Selfe, and Moore forthcoming).

In the following section, I discuss how I instituted versions of the autobiographical assignment in classes with two different populations of technical communication majors: one set of assignment responses came from junior and senior undergraduates and the other from masters-level graduate students in a different professional communication program. In both cases, the course name was the same: Publications Management. As you might expect, each set of responses to the assignment taught both me and the students a slightly different lesson. For that reason, in the next section, after describing the assignments themselves, I'll explore possible implications gleaned from each collection of responses. The implications I drew from these student reflections provided the impetus for immediate classroom innovations and were valuable as I planned future courses and programmatic proposals for modifying the undergraduate and graduate programs in which I work.

The process I used in both classes (graduate and undergraduate) was similar:

1. I assigned the autobiographical activities described later.
2. I combined their reflections into a class booklet (hardcopy and .pdf versions) to be used as a text in the class.
3. I asked students, after reading the class booklet, to speculate on the range of learning styles, attitudes, technological skills, and experiences (LATEs) they saw in the combined document. (I also participated in this process.)
4. I worked with them to determine how these LATEs should influence the technology modules (instructional documentation) they would be producing for the class.

For the purposes of this chapter, I'll touch briefly on step 4 but focus primarily on the value of step 3. I, of course, learned at least as much as the students from their responses to this assignment. Students were informed that the autobiographies were also part of a classroom research project that would be used to help reconfigure this and other TC courses and used to make recommendations that I hoped would influence technical and professional, undergraduate and graduate communication programs in the future. The technology autobiographies, then, had two primary purposes:

1. To help the students learn more about an audience that they would be addressing in future assignments
2. To help me better understand students and their relationship to technology and course content

In both classes students were asked to respond to the following question sets in informal, autobiography assignments.

Questions Leading to the Undergraduates' Technology Autobiographies

1. Write and/or draw an autobiography in which you recall your earliest experiences with technological devices or artifacts. What were they? What do you remember about using them?
2. What were the popular gadgets in your house while growing up?
3. Who[m] do you identify as being most technologically "literate" in your life?
4. What's on your desk at home?
5. What technological devices are you carrying now?
6. What's on your technological "wish list"?
7. How do you expect to deal with new technologies in the future?

8. What sort of documentation works best for you?
(Artistic representations [are welcome] and need to be accompanied by a written statement explaining the work.)

Notice that the eighth question—"What sort of documentation works best for you?"—was not directed so much at the technological portion of this assignment as it was at the content of the course. The upcoming assignment would ask students to design, test, and produce a technology documentation for the people using a local computer lab. You will see that I expanded this section in the next iteration of the autobiography assignment (for the graduate class). I included an entirely new focus for student reflection: the publishing autobiography. I quickly realized that it would be useful to know more about students' past experiences not only with technology but with the course content as well. In both cases, I hoped to find ways of involving students more intimately in the design of assignments and products that come out of the class. A version of the assignment as I explained it to students follows:

Technology and Publishing Autobiographies

These two pieces of writing are meant to be fun and interesting to your classmates and myself. We need to know a bit about you. I would like you to write a personal technological autobiography (TA) and a publishing autobiography (PA). We'll start this assignment in class and then, after you complete your autobiograph[ies], distribute them electronically (in .pdf format) as a booklet. The class will have the weekend to read them. It's a lot of reading but by the second class, we will all know something about each other and our collective technology and publishing experiences. These TAPAs will NOT be graded other than to note that you handed them in. . . . To complete the assignment, respond to the following prompts:

Technology Autobiography (TA):

Write and/or draw an autobiography in which you recall your earliest experiences with technological devices or artifacts. What were they?

- What do you remember about using them?
- What were the popular gadgets in your house while growing up?
- Whom do you identify as being most technologically "literate" in your life?
- What's on your technological "wish list"?
- How do you expect to learn and keep up with new technologies in the future?
- What technological workshops are you willing to develop for me and your classmates?

- What technologies do you need to learn in the near future?
- (Artistic representations of your relationship to technology are very welcome and usually very interesting. I would appreciate a short written statement explaining the work.)

Publishing Autobiography (PA):

- What experiences in your past have gotten you excited about publishing?
- What informal or formal (work-related) publishing experiences have you had?
- What specific publishing expertise do you bring to the class: organizational, audience analysis, technological, experience with types of publications, . . . ?
- What sort of publishing NOW interests you? In other words, imagine yourself working for a company, organization, or start-up that you really believe in: describe what kind of work they would do and what sorts of publishing they would engage in.

Write both the TA and PA with your classmates' interests in mind. What examples would be most interesting to them? How much time do they have to read about your experiences? What do they need to know about you and your abilities?

Why start with this information?

Almost every professional/technical communicator I talk to about her/his job mentions the need to know more, more, and still more about the audience being addressed when creating a publication. In other words, knowing your audience very intimately is more important to a successful publication than almost anything else. Your first individual project will be to construct a technology module for users of your home computer lab. And if my experience holds true, even those of you who have worked in this lab know very little about the literacy skills and learning habits of those around you.

IMPLICATIONS FROM AUTOBIOGRAPHY ASSIGNMENTS IN UPPER-DIVISION AND GRADUATE TC COURSES

The Technological Ambivalence in an Undergraduate TC Course

In both classes, I was introducing students to the publishing industry and, in that process, relied on real client projects. Because of the need

to use imaging and publishing software and hardware in both classes, it seemed important to identify what students already knew and what they could add to the class (because many students came in, as was the case in Dale Sullivan's class, with skills more advanced than the teacher's). I also wanted to better understand what attitudes and learning styles they had adopted in the past. The technology autobiography assignment for the undergraduate class was one way of collecting this type of information and incorporating it into the planning of subsequent courses and sessions within this particular course.

Learning About Each Other: An Aside

Because of a subsequent assignment, it was important that these students learn a great deal about each other, and the autobiography booklet provided that opportunity. The assignment asked them to develop "technology modules" (instructional documentation) that would be useful to students working in the drop-in lab that they frequented. The students in the class would be, as a result, both the creators of helpful technology modules and representative users of those same modules. Not surprisingly, these informal autobiographies were remarkably useful in our audience analyses ("really get to know your audience") for this assignment. After receiving their short autobiographies, I constructed a single document that contained the entire class set (thirty pages long). That booklet became a reading assignment out of which the students were asked to develop a user profile for their technology modules. The technology autobiographical document gave us the exigence for discussing the nuances of audience needs, expectations, and learning styles at a level well beyond the generalities I often received in students' previous audience analyses.

But the autobiography assignment gave me and the students information about the technological literacy makeup of the class that seemed just as or more valuable at pedagogical and curricular levels.

Perhaps because these students were young, burgeoning professionals and just beginning to realize the full extent of what communication technologies would mean to them in the future, this set of autobiographies, as a whole, illustrated the ambivalence that students have for their technology-rich futures. In a future publication, Karla Kitalong, Michael Moore, and I discuss this ambivalence in more detail (forthcoming). Here, I'll summarize some observations that seem to have implications

for TC classes and programs in the midst of pedagogical and programmatic change.

A Diversity of Experience

One observation common to all the sets of technology autobiographies that I have reviewed over the past two years (our research team and others have been asked to apply this type of assignment to a number of technology-rich English-studies classes) is that students bring a wide range of technological experiences to bear in the TC classroom. This might be best illustrated by a student's description of what I call generational compression of technological experience:

> My little brother, who is four years younger than I am, just graduated from high school with more knowledge of computers and technology than I will ever learn. He just built himself a computer from scratch and is currently attending [XXX] State to study computer networks and systems. My sister, on the other hand, is only two years older than I am. She spent 4 years in college without ever having to turn a computer on. (Paula, pseudonym)

Students realize that there are radical differences in experience levels. Those variations in experience, however, don't necessarily reduce the opportunities for hard-working, self-motivated students, as the next quote indicates:

> [A] calculator was my only real link to technology [in high school] until I managed to actually touch computers again in college. I was overwhelmed when I got here. I had no clue what computers could do. At the time I was an electrical engineering major. Now, I'm a computer science major [and one of the most technologically adept students in the class]. (Otto)

But for the average student entering our technology-rich programs, we can't assume that they will all simply "catch up" magically. They worry about, and we should worry about, how our classes might better facilitate the catch-up process, and, at the same time, we should continue to challenge those students who come in with Paula's brother's level of experience.

A Backgound of Gaming

A second component to the technological ambivalence in these undergraduates' TAs is a growing experience with gaming systems. In all sets of technology autobiographies, educational and purely entertainment-level

gaming has a strong representation. To a follow-up question to students who claimed a strong gaming background came these responses. "Believe it or not, games can make children less frightened of technology. I thought of computers as a toy for years before it actually became a tool." (Johnson, email correspondence, Sept. 22, 1999) Not only did they suggest that gaming reduces computer anxiety, they hinted that specific learning strategies were encouraged by games. The following is an extended quote from a young woman's reflections on gaming:

> What gaming taught me is that there are always little tricks to doing things. For example, when i played supermario bros. i learned how to "warp" to different worlds and that meant that i could skip 4 levels of playing without losing points. So i would always try to do new things regardless if there was a hint that i could do it or not. . . . The hidden shortcuts really got to be fascinating. . . . But what is also key is that i learned a lot of tricks from my friends. . . . So that is getting a reward [from others'] experience with the game. (Glenda, pseudonym, email correspondence, Sept. 22, 1999)

These two short comments suggest that students with gaming experiences might be more willing to approach new technologies fearlessly, try techniques regardless of whether those techniques seem possible or not, and seek out shortcuts and tricks on their own and with friends. The questions that come to mind first include the following: How can students, who are designing instructional modules, or how can we, who are devising technology-rich classroom activities, take advantage of this playful, exploratory attitude? Will someone with this type of background approach technology instructions or our classroom activities in interesting and unique ways? As this type of gaming experience becomes more common than exceptional (nine of nineteen students in 1999 claimed to have had substantial gaming experiences), how will our approach to online and print-based learning systems and documentation change? How should our approaches to teaching change? What will this mean for technical and professional communication departments at a programmatic level? The ambivalence here resides mostly in my concerns, not students'.

Learning Styles Differ Radically

The technology autobiography assignment asks explicitly about how students learn or plan to learn new technologies; this led to the third component: students' technological ambivalence, which came out of the undergraduates' reflections and which has to do with radically differing

learning strategies. Though a certain percentage of students have a tinker's mind-set—one that encourages them to understand the underlying workings of the technologies they use—most admit to short-term, just-in-time learning patterns that allow them "to stay current with those things that pertain to my field or are positioned in it" (Randall).

Students will apparently come to us, not surprisingly, with a number of learning strategies, some of which won't be a comfortable fit for many of technical and professional communication teachers: students will be crisis learners; fearful, reluctant learners; stealth learners willing to make the trade-off between their depth of understanding and the practical art of getting the job done. They are also aware of the trade-offs they may have to make if they are going to commit to learning new technologies thoroughly.

> I have a hard time throwing off other, maybe older, values for the sake of my computer literacy. I recognize that it takes a tremendous time commitment to stay fluent. I don't know what other part of my life I want to give up so that I can learn yet another piece of software. I will probably manage the learning of future skills by crisis, doing only what I have to do to remain literate enough. (Diana, pseudonym)

These comments only hint at the ambivalence students sometimes express about their future with constantly changing computing technologies. They sometimes speak about enslavement, painful values, reluctant learning, impersonal lifestyles, and rude online behavior. All are words and phrases that make it clear why students might approach our use of communication technologies with some reluctance. Our job, as a result, would seem to go well beyond the introduction to new—sometimes useful, sometimes painful—bleeding-edge technologies. Technical and professional communication instructors may well need to begin asking themselves what strategies they themselves adopt to stay reasonably and appropriately current. More difficult might be to imagine innovative approaches that make those strategies an explicit part of our instruction.

To summarize, this one set of technology autobiographies led me to reimagine several components of TC courses and programs. The first is to question how we accommodate the wide (some would say "ever widening," C. Selfe, 1999) technological experiences that students bring into our classes. The second is to imagine how the substantial online

experiences with gaming systems will change the way students work and learn in our classes. The third is to build a robust set of strategies for adopting new technological systems into our curriculum and for adapting to them. These concerns are not necessarily going to emerge in all technical and professional communication courses. The autobiographies do, however, give me data and an agenda to take back to our curricular committee, which is endlessly reconfiguring and reconstructing the requirements and courses in our program. I assume that other programs, having collected their data, might well come up with unique (innovative) concerns that they might address in their curriculum as well.

One of the most interesting aspects of collecting these autobiographies over time and courses, however, is that patterns begin to appear. As I read through the technology and publishing autobiographies (TAPAs) from a graduate professional communication course, not only were patterns evident, but potential pedagogical solutions also seemed to present themselves in the anecdotes and descriptions students provided.

LEARNING FROM THE TECHNOLOGY AND PUBLISHING AUTOBIOGRAPHIES (TAPAS) FROM A GRADUATE PROFESSIONAL COMMUNICATION COURSE: REASSESSING THE COURSE ITSELF

Content Feedback: Another Aside

You might have noticed that the second autobiography assignment added questions aimed at better understanding not only the technological literacy of the class but also the content experiences of students (in this case, publishing autobiographies that detailed their experiences with print publications). In future classes, I plan to use the content questions to help organize that portion of the class as well. Students' varied publishing experiences in this set of autobiographies have convinced me, for instance, of the value of several strategies:

1. I might ask students to recruit expert consultants to visit the class physically or virtually during the term.
2. Productive interviews with working professionals (again either face-to-face or virtually) will enrich the class and subsequent classes.
3. It should be possible to develop sustained relationships with some of these professionals to set up lively online discussions that provide professional relevance and contact with industry professionals even in the remote north woods of Michigan Technological University.

But the more generalizable and important innovations for technical and professional communication programs would seem to be located in the technology autobiographies of these students.

Adopting and Adapting to New Technologies

Although there is always a great deal to glean from the technological experiences that students describe in their autobiographies, each set seems to provide some insight into particular or related portions of the courses I teach. The informal TAs assigned to this graduate publication course in the fall of 2000 made it clear that students from both courses were quite concerned about one issue in particular: the need to develop strategies for adopting and adapting to new technological systems.

> I read these journals and magazines advertising new software and technologies and wonder how on earth I am supposed to stay competitive in the job market when I haven't learned the old stuff before they introduce the new. (Brown)

Ms. Merrill says,

> I did eventually get my hands on a word processor, which was replaced by an actual computer when I was starting college.
>
> What do I remember about using them? Fear. Trepidation. I remember being more than a little daunted by those computerized thingys with all their buttons and options and programs. This reluctance did not last long, however. Without ever really consulting the instruction manuals except in extreme desperation, I figured out how to work them through guess-work and trial-and-error.

Statements of anxiety seem common to many students coming to technology late in their academic careers. The lucky ones are thrown into an institutional setting where they are required to learn new systems quickly to survive. Usually, they have no structured way to develop any systematic method of learning new technologies and so are thrown back on survival strategies: just-in-time learning, trial-and-error efforts, guesswork learning patterns. These are the lucky ones. Unlucky students may not even have these opportunities. Students' anxiety was compelling possibly because theirs reflected mine so accurately. They made me wonder whether together we couldn't devise some alternative models that would better serve their technological literacy needs. As I read their stories, I began to imagine some possibilities.

Resources and Procedures for Staying Abreast

> I try to stay educated about technological trends, though. I peruse magazines, engage in conversations about what's "out there", and play enough video games to understand the implications of new technology to the entertainment industry. To this day, I still relate my experiences of technology through my obsession with entertainment, because I have learned the most about technology through this medium, and I honestly think entertainment drives technology more than any other single factor. (Bonhan)

Obviously, Bonhan hasn't been exposed to high-end military applications or he might change his mind slightly. But his claim about gaming might also be closer to the truth than I might think. His comment suggests to me that we might incorporate explorations like the ones he mentioned during class by asking students to find reliable sources for technological news relevant to the class and share summaries of their visits (to Web sites), articles, posts, and so forth with the class. If one of Bonhan's techniques is to "play enough video games to understand the implications of new technology," then we might ask him and other gaming aficionados to bring the implications they draw from that experience to class. If TC instructors make this type of activity an explicit part of our exploration, we might all be able to imagine how the gaming industry can provide some positive, productive protocols to technical communication professionals interested in instructional systems and online interaction.

Setting Up Collective Learning Experiences

One approach to reducing anxieties and providing students with strategies for learning new technologies is to set up appropriate technological learning experiences within our classes. The sixth question for the masters-level class was supposed to help me set up this type of learning experience. (What technological workshops are you willing to develop for me and your classmates?) Surprisingly, even those experienced with some technologies often responded this way: "At this time, I don't feel that I have enough expertise to lead a technical workshop" (Julie).

Students are justifiably concerned about teaching their peers. If public speaking is one of the most anxiety-producing events in a person's life, consider how nerve-wracking public teaching must be! Students often don't believe that they are *the* most technologically savvy person in the class and so feel incapable of leading a technology session. I haven't

given up on this approach, however. Instead, it has become my job to convince them of the *kind* of workshop they can develop and lead, not *whether* they can lead one. To pave the way, I might

1. provide them with a model interactive learning situation appropriate for the class,
2. survey them and identify the expertise in the class around which they can form teams,
3. help them construct interactive learning modules that will help bring the entire class (including the teacher!) up to some baseline understanding of a particular software, hardware, or netware environment; we could then . . .
4. implement those learning activities systematically during the course.

Not only will we all learn a great deal about relevant technologies, but these activities are also full of opportunities for typical technical communication compositions (textual, visual, aural, animated, and so forth), oral presentations, interactive instructional presentations, and the development of online help systems and Web-based constructions.

Technological Mentoring Programs

> The second event that changed the way I look at technology occurred when I became friends with the guy I am now dating. He was raised in a technologically advanced environment, so computers are quite the norm for him. (Loftin)

Though we are unlikely to intentionally set up close personal relationships between students, there is every reason to believe that it might be productive to add a mentoring experience to capstone classes for graduating seniors. A technological mentoring assignment may provide a way to harness the expertise of seniors and pass it along, at some level, to our younger students. On the other hand, if the technological compression described earlier holds true, these graduating seniors might also find themselves learning a great deal about new technologies from the younger students. And they will certainly learn a bit about relating to younger colleagues, a skill of some significance in the workplace.

For years, I've encouraged teachers in professional development workshops to recruit their best, most enthusiastic former students as technical resource collaborators. These students can help implement a version of the technological mentoring program within a single class. Though it takes some preplanning and organizational finesse, it is possible

to recruit former students to work with your current class as volunteers or for small stipends or for independent study credit. I've seen even the most technologically savvy teachers use mentoring programs within their classes successfully.

Stand-Beside Consultants

An idea closely related to the technological mentor is the stand-beside consultant. When asked what software or hardware they might explore with the class, surprisingly, most students expressed unease at the prospect of leading a technology demonstration for their peers. But they were quite willing to offer help to novices as they worked. Programmatically, we might want to consider in-class or out-of-class activities that pair those new to specific systems or software with experienced students as they work on class projects. Using these students as "stand-beside" consultants will give consultants valuable teaching experience that they will no doubt need in the workplace. Both novice and consulting participants can be asked to produce reflective writing that details the kind of collaboration and consulting that worked well. Collected, these reflections could be combined into a "text" to be read and discussed by the whole class.

This begs the question, however, of how to push the more experienced students in the class. Perhaps we should be making time in the course for technologically advanced students to push their skills along by collaborating with out-of-class consultants if the teacher can't provide the expertise. We might contact former students, local professionals, or students from other majors as we attempt to recruit these consultants. Part of the assignment for advanced students could be to create a learning experience for the rest of the class that will introduce us all to the new systems they will be learning.

CONCLUDING STATEMENTS

The Method

A great deal of the "method" involved in applying participatory design processes to our classes and programs has yet to be developed. I look forward to dialogues with other TC professionals as we try to imagine how learner-centered design might best be applied to the technology-rich instructional environments.

The Work Load

Resource assignments, collective learning experiences, mentoring, and stand-beside consultant programs are all the more work for the teacher or more planning for the program director. As such they have to be weighed against the already substantial responsibilities of teachers, administrators, and students. As this volume makes abundantly clear, all innovative pedagogies seem to carry the same onus: they are typically more work than the status quo. But if we have to make choices about how we manage our courses and curricula, technology autobiographies at least give us vivid and contextualized "data" to use as we challenge our traditional pedagogical practices in a changing technological landscape.

The Context

As I mentioned early, the speculation about how we might draw on the observations from technology autobiographies to redesign classes and curricula is still quite preliminary and must be placed in unique programmatic contexts. What seems appropriate in a TC program at a technological university located in a rural, isolated region of the north woods (Michigan Technological University) and what seems essential to students living near the research triangle of North Carolina (Clemson University) are quite different. I look forward, however, to exploring the patterns of common student experiences with colleagues from around the country (and worldwide) as a prelude to innovating and making relevant technical communication programs of the twenty-first century.