

# The Golden Age of Technical Communication

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## Abstract

This article uses a historical perspective to describe the development of the profession of technical communication through three ages: Brass, Beige, and Glass. I compare this development to the growth of the academic discipline and both to the explosion of noninstitutional technical communication—the growing body of tactical technical communication that happens outside of organizations and institutions. This leads me to describe today as the Golden Age of technical communication. I conclude that we should broaden the scope of technical communication and spread it as a set of skills valuable for everyone to learn.

## Keywords

technical communication, profession, practice, curricula, history, employment, first-year composition, definition

Some time ago, I had a conversation that made me reconsider the state, substance, and history of technical communication. A technical publications manager for a large corporation mentioned that he did not care if he hired people with technical communication degrees; he just wanted people who could think, communicate, and solve problems. Someone listening asked if this made me nervous, as a professor in a program conferring technical communication degrees. I responded, “No—we have plenty of other work to do.”

My answer was impromptu, but I soon realized that this brief exchange had deep implications for technical communication, mostly because it reiterated a common (though not universal) underlying assumption that the purpose of a

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technical communication program is to prepare future technical communication professionals.

If we make that assumption, we may be on a difficult path—particularly insofar as the profession has experienced little employment growth in the past 17 years, while the discipline that trains students to become professionals has grown significantly. Meloncon (2009, 2012) and Meloncon and Henschel (2013) compare their analyses of 185 undergraduate programs to the similar study of Harner and Rich (2005), which counted only 80. That’s 231% growth in less than a decade.

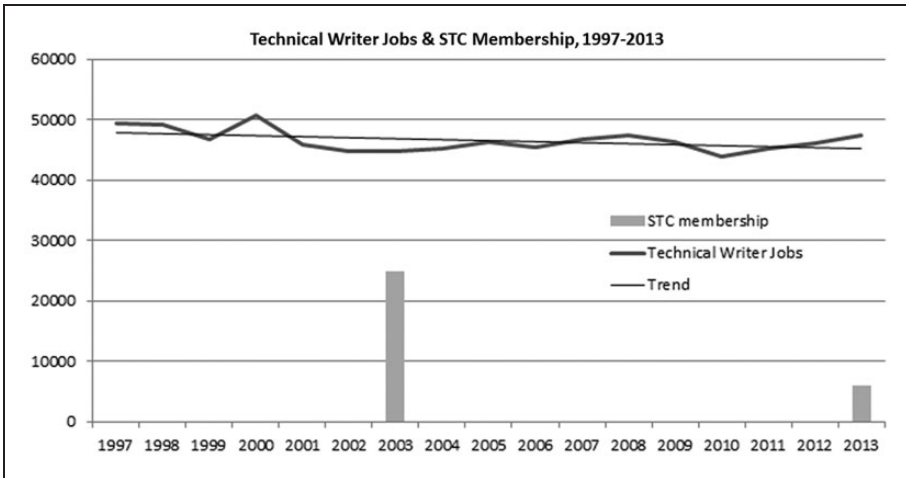
Is this growth wise? Are we academics behaving responsibly in undertaking this expansion, given the limited growth in the profession? Do we really have plenty of work to do?

I think the answer to these questions is “yes”—justified not by the demand for professional technical communicators but by the historic growth of the *performance*<sup>1</sup> of technical communication, by which I mean the vast, underrecognized landscape of technical communication as enacted by nearly everyone in the world who communicates about or through technology. Recognizing this broader scope justifies maintaining the current growth of academic programs and even expanding them—but in directions that do not necessarily lead to preparing more professional technical communicators for duty.

Ultimately, I argue that we should engage with this broad scope of technical communication by revising the focus of our academic programs to offer technical writing instruction more broadly as a set of skills everyone should learn—not just professional technical communicators, not just engineers and scientists, not just business-people or symbolic-analytic workers, but everyone. To this end, I conclude by suggesting that technical communication should get more involved in college writing generally, including first-year composition, writing in the disciplines (WID), and writing across the curriculum (WAC).

## Technical Communication: Discipline and Profession

If technical communication degree programs have grown 231% to meet a perceived demand for professional technical communicators, we may soon be disappointed. While the *discipline* of technical communication has experienced tremendous growth, the *profession* of technical communication looks less rosy. The most striking indicator is membership of the Society for Technical Communication (STC), the field’s premier professional association. In the early 2000s STC boasted a membership of over 25,000 (Carliner, 2003, p. 75; Giammona, 2004, p. 351). Today, its membership has fallen to about 6,000 (Figure 1; STC, 2013b). Of course, a professional organization might shrink without necessarily reflecting on the profession more broadly, but such a drastic and persistent drop in membership is a discouraging barometer of the profession’s health.



**Figure 1.** Technical writer jobs compared to membership in the Society for Technical Communication (STC), 1997–2013.

Sources: Bureau Of Labor Statistics, <http://www.bls.gov/oes/tables.htm>; Carliner, 2003.

U.S. employment figures for technical writers are a bit more encouraging. STC’s annual *Salary Database* report for 2012 to 2013 comments that in 2008, the Bureau of Labor Statistics (BLS) recorded 47,460 technical writing jobs (coded Standard Occupational Classification 27–3042, “Technical Writer”). By 2010, the number dropped to 43,990. It has risen again with the economic recovery to 47,300 in May 2013—nearly making up the recession losses (BLS, 2013; STC, 2013a, p. 3). Yet in the longer term, employment in the profession has trended slightly downward from 1997 to 2013.

Technical writing jobs have also shifted in setting. Industries that had employed large numbers of technical writers laid off many, while professional services firms added positions (STC, 2013a, p. 3). BLS projections of employment from 2012 to 2022 suggest that traditional areas of strength—aircraft, computer, and communication equipment manufacturing—will have fewer opportunities for technical writers (BLS, 2014a). The BLS projects that “Computer systems design and related services” will grow 34.7% and “Management, scientific, and technical consulting services” will rise 40.8%. In other words, in a familiar pattern predicted long ago by Robert Reich (1992; Johnson-Eilola, 1996, 2005), there are now fewer jobs in manufacturing and more in service industries. The market also includes fewer traditional corporate jobs and more contract or consulting jobs, which are relatively precarious.

Wages data are also discouraging. The STC report comments that “wages in the profession remained weak in 2012,” noting that annual salaries rose only 0.9%, below the average of 1.2% for all jobs, and that “only some technical

writers, primarily those at lower wage levels, were able to keep pace with inflation” (STC, 2013a, p. 5).

It’s not all bad news. The *Occupational Outlook Handbook* for 2014 predicts technical communication jobs will grow 15% from 2012 to 2022, well above the average rate of growth for all occupations at 11%—enough for 22,600 job openings (BLS, 2014b). However, the *Occupational Outlook Handbook* has in a number of earlier years predicted growth in jobs that did not occur. (Like most agencies and observers, the BLS has not been particularly good at anticipating recessions.)

I do not claim any special expertise in labor economics, so I could be overlooking many meliorating factors. We could blame the recent retraction of interest in professionalization entirely on the 2008 recession, as we did on earlier recessions (Giammona, 2004). But as jobs return to growth, we might expect STC membership to grow as well—and that has not happened. Or it could be simply that professionals have looked at the rising cost of STC membership and calculated that professionalization is not worth the expense. But it bodes ill for the profession, if professionals do not wish to invest in it. Or most obviously, perhaps we are simply not counting everyone. A profession with hazy boundaries inevitably produces fuzzy statistics.

Yet overall, it’s safe to say that profession of technical communication is just not as big as some thought it would or should be—certainly not enough to justify a 231% growth in academic programs, if those programs are intended to train professional technical communicators. It may be that the market will lay on 22,600 jobs in the next 10 years, as the BLS predicts—but even if all of those jobs went to graduates of the 185 technical communication programs counted by Meloncon and Henschel (2013), that accounts for jobs on average for only about 12 students for each program each year ( $22,600 \div 10 \text{ years} \div 185 \text{ programs} = 12.2$ ). That’s enough work to support the graduates of 185 undergraduate degree programs with stable enrollments of perhaps 30 students each, at most. More likely, the number will be something like half that, because many of those jobs will be taken by people with training in other fields. (The boundaries of professionalization in technical communication are permeable—one can still land a job as a tech writer with many kinds of training or with no training at all.)

Programs may be able to survive at that level of enrollments. But if we focus on training people for a relatively small, underappreciated profession, technical communication will likely remain a relatively small, underappreciated academic discipline. In the United States, about 46,000 people make their livings as technical writers; four thousand more are technical editors. Perhaps two or three thousand U.S. academics teach technical communication. Of those, an even smaller number—certainly under 1,000—actually do research on technical communication. A simple count finds that from 2004 to 2013, 609 individual people were published in three of the field’s biggest journals: the *Journal of*

*Technical Writing and Communication*, the *Journal of Business and Technical Communication*, and *Technical Communication* (the STC's academic journal). Counting book reviews, *Journal of Technical Writing and Communication* published 216 unique individuals; *Journal of Business and Technical Communication* published 200; *Technical Communication* published 302. Naturally, some authors published in more than one of the journals, so the number of unique authors is lower than the number of publications. So in round numbers, let's say 55,000 people in the United States are directly involved in organized, "professional" technical communication, either as practitioners or academics, acting on behalf of and employed by corporations, agencies, universities, and other organizations. Compare this to the size of the United States labor force (the sum of employed and unemployed adults): about 157 million (U.S. Department of Labor, 2015). That makes professional technical communicators about 0.035% of the total, many of whom must now use and communicate through complex technologies themselves, even in relatively menial positions.

## **Professionalizing Technical Communication Across the Ages**

At this point, this article could turn, as many have, to lamenting the lack of professional status, power, and legitimacy for technical communication, calling for greater professionalization as the solution to a variety of ills (see in particular Kynell-Hunt & Savage, 2003, 2004).

Yet most observers would likely agree that formal efforts toward professionalizing technical communication have had limited effects. For example, in 2010, the STC launched a certification program with great fanfare, but it has been put on hold, having awarded only 30 certificates as of spring 2014 (STC, 2014a). This limited participation may have arisen from implementation problems or from broader issues, but clearly, only a few professionals agreed to participate. It was a disappointing outcome after more than 30 years of discussion about certification (Turner & Rainey, 2004).<sup>2</sup> For all the effort we've expended, professionalization initiatives seem akin to convincing water to flow uphill.

I believe the reasons for this difficulty lie in the historical development of the profession itself and its relationship to technology. When we look at long-term trends, we have to conclude that technical communication may not soon return to the glory days of a 25,000-member STC. If that's the case, then we should not design our academic programs on the assumption that boom times lie ahead, rather than behind us.

To understand the profession's current situation, we need to take a long, historical view of its development. I see four trends in the historical development of the profession, the first three of which I call the *Brass Age*, the *Beige Age*, and the *Glass Age* of technical communication. These ages are less distinct historical

periods then they are cumulative, overlapping waves: They spawn a boom, then become incorporated into the next wave.<sup>3</sup>

### *The Brass Age: Technical Communication and War*

War has long been a primary generator for technical communication. As scholars from Robert Connors on have proclaimed, technical communication started *as a profession* by explaining weapons to American soldiers during the 1940s and 1950s—in World War II and its continuation in the Cold War, which saw huge investments in military technology and later, in space flight, essentially an extension of military technology (Connors, 1982; Kynell, 2000, p. 89; Savage, 2003, p. 137). This long-standing technological conflict and the money governments desperately threw at it led to many opportunities for civilian technical writers, who contributed not only directly to the documentation of military equipment and procedures but who also participated in the adaptation of military technology for civilian uses—most notably, the Internet.

In effect, World War II and the Cold War created a boom in the profession. I call this boom the *Brass Age* of technical communication because of the armaments (including brass shell casings) that funded the growth of technical communication and because of the sheer amounts of money involved (“brass” is British slang for money). Money in Brass Age technical communication was so plentiful that opportunities for fraud arose. It’s hard to imagine, but according to Malden Grange Bishop’s exposé of the technical writing industry, *Billions for Confusion* (1963), greedy and corrupt technical writers were even the subjects of an Federal Bureau of Investigation probe for providing technical manuals stuffed with duplicated content to fulfill a lucrative contract. If that’s not a marker of boom times, I cannot imagine what would be.

However, the defense technology boom has gone bust, even despite the United States’ renewed militarism post the fall of the Berlin Wall. After 9/11, in particular, the country launched a huge new cabinet agency, the Transportation Safety Agency, and embarked on two expensive wars, which built up the Pentagon budget to over \$700 billion in 2008 to 2010—not counting the price of the conduct of the wars (Plumer, 2013). Given the historical link between technical communication and war, one might think that this kind of public spending would extend the Brass Age for tech writers or at least offset job losses from the recession. But if BLS statistics are correct, this outlay of money did not lead to more jobs for technical writers; instead, their numbers actually dipped. The STC (2014c) Salary Database for 2013 to 2014 pointed out the continuation of this trend:

[S]tates that experienced some of the sharpest declines in technical writer employment were also among the states most dependent on federal government spending.... Of the ten states reporting the largest losses of technical writers,

eight were among the top 15 states in either civilian or defense spending. Three were among the top 15 in both categories. It is not surprising that the state of Washington, dependent on both defense and civilian aerospace manufacturing, reported the largest loss, cutting a quarter of all technical writers in the state. In addition, technical writer employment in Hawaii, where defense spending accounts for 13.5 percent of the state's entire gross state product (GSP), fell below publishable levels in 2013. The question remains as to whether the declines in technical writer employment in these states were temporary shocks caused by 2013's Congressional impasse or the results of more long-term, sustained industry declines. (STC, 2014c, p. 11)

This pattern suggests that while militarism will likely provide some opportunities for technical communicators for many years to come, the boom years of the Brass Age are over.

### *The Beige Age: Technical Communication and Computers*

An astute observer might ask why, in the almost exactly 12 years between the fall of the Berlin Wall in August 1989 and the tragedy of September 11, 2001, did employment not sag more than it did, with the drawdown of Cold War U.S. forces and military spending? Likely because by the end of the Cold War in 1989, we had embarked upon another huge round of public and private investment: the microcomputer revolution, including the growth of desktop publishing in the 1980s and the opening of the Internet from a military or academic project to a public utility in the 1990s. These developments increased opportunities for technical communicators to the extent that I call it the *Beige Age* of technical communication, in recollection of the color of the computers of the era. Technical communicators in this era made a good living as they sat before beige boxes and wrote thick manuals on how to operate beige boxes.

However, the Beige Age boom in professional technical communication also shows signs of flagging. Understanding why will require reconsidering some familiar conceptions. David Dobrin (1983) famously claimed that "technical writing is writing that accommodates technology to users." But it would be more accurate to say that *technical writing accommodates users to technology*. Technical documentation does not typically change the machine (whether hardware, software, or system); it changes user behavior to make interactions with the machine more successful in terms of the machine. The immediate goal of user documentation is to teach users how to make the machine work as its designers intended (not necessarily as the users' desire). If the machine itself is deficient, technical communication is powerless to fix it. For instance, if performing a particular operation requires pushing five buttons in a complex sequence, technical documentation can tell users which buttons to push in which order. But documentation cannot provide a sixth macro button that automatically



pushes the other five—that's typically the province of engineering. All technical communication can do is to patch over the rough spots of user-machine interaction by directing the user's fulfillment of the complex process; it typically can't make the process less complex. The closest we can get is to point out the problem to engineers, and in the meantime to turn *the user* into the macro button, through training and instructions that regularize and mechanize his or her actions. In this sense, technical documentation could be described as a user interface to the machine—or more accurately, a user interface to the user interface, telling users which buttons to push and when.

But what if the buttons themselves told users when to push them? If devices were better designed, if the primary user interface was more elegant, easier to use, and provided more affordances to the user's needs, situation, and even body, then documentation would be less necessary. That's exactly what we have seen in recent years, as design and usability have become watchwords in the computer industry (and any industry that uses computers). Although it might not always seem so, computers and other electronic devices *have* become easier to use. Most users old enough would readily agree that learning to use a smartphone is easier than learning DOS or Unix. Many interfaces now are simply better designed than they used to be; technologies are *already* better accommodated to users, without the intervention of technical documentation. Hardware and software designers have increasingly built information and guidance into the interface itself, making the thick manuals once written by professional technical writers a quaint anachronism. At best technical documentation is a stopgap, a cheap way to control user-machine interaction—cheaper, anyway, than redesigning the machine. But if the machine already explains itself, then documentation is simply redundant. Hammers never come with manuals.

Just as computers are better accommodated to users, users are better accommodated to computers. People using consumer and business electronic technologies have by now more or less learned the conventions interface designers have implemented as extensions of human activities and gestures. Apple and Microsoft successfully integrated the desktop metaphor into our consciousness in the 1980s, building on our familiarity with physical desktops and vertical file drawers (which were themselves technological innovations from the previous century). In the past five or six years, Apple, Microsoft, and Google have successfully extended natural human physical gestures—pointing, touching, caressing—to interact with information through smartphone and tablet interfaces, to the point that swiping a screen has become a wilful yet largely unconscious action, like pushing up your eyeglasses or walking across the room. Essentially, we have integrated ourselves into this technology and technology into ourselves; machines are prosthetic extensions of our bodies and self-conceptions, and we are prosthetic extensions of machines. It is scarcely controversial now to say that that we are all cyborgs, in the manner described most famously by Donna Haraway (1985) and more recently by Andy Clark (2004).



In terms of the technology we call technical communication, we are the prosthetic hands that enact the actions described in procedural texts, while those texts are our prosthetic brains, allowing us to shut down our own mentality and simply follow the steps that technical writers strive to lay out so clearly for us. (*Don't Make Me Think*, as Steve Krug (2005) so adroitly put it.) The same pattern continues when procedural information is embodied in the technological interface itself: “Eat Me,” said the cake to Alice—and she ate it.

### *The Glass Age: Technical Communication and the Network*

More profoundly, the computers that pervade our lives are less important today in themselves than the network to which these prosthetic appliances give us access. We might therefore call recent years the *Glass Age* of technical communication, both because of the fiberglass or fiberoptic network we rely upon to share technical information, and because of the resulting dependence upon the global database we view through the “window” screens of computers, tablets, smart phones, and even Google glass. The particular interface is simultaneously essential and insignificant. We recognize its presence only when we experience its loss, which we feel as mournfully as we might the loss of a limb, an eye, or one of our senses.

The essential concept of the Glass Age is the separation of form and content. This concept has significant implications for technical communication because of its assumption (indeed requirement) that disembodied content can be stored in a database, then readily and effectively ported through the network into a variety of embodiments (formats, media, and actual human bodies).

This concept clashes with a cherished older tradition in technical communication. As expressed by Elizabeth Overman Smith, the work of a professional technical communicator is “document design (defined in its broadest sense . . .),” in which “Technical writers are the subject matter experts on the integration of text and visuals and document production” (Overman Smith, 2003, p. 52). Overman Smith continues, “Technical communicators exert their power as professionals who understand rhetorics of technology and visuals and contribute to the construction of documents” (2003).

This vision of the profession is attractive, even noble. But the separation of form and content has unfortunately also separated many professional technical writers from this traditional role. They no longer design an integrated document in which they strategically apply visual and lexical rhetoric to solve human problems. Instead, the work of a professional technical writer has increasingly devolved into a more mundane task: Pounding out fragmented chunks of prose that will be assembled by a system designed by someone else. This movement toward separating content writing from strategic design makes technical writing of this type look less like a profession and more like a modular, relatively mechanical activity—just like any part of the machine.

Dave Clark (2007) commented on how challenging this movement must be for scholars such as Charles Kostelnick and Karen Schriver, who have argued (as have I) for an integrated approach to designing the whole document (Kimbal & Hawkins, 2008). Clark ultimately argues that we should not worry about the separation of form and content, because from classical rhetoric on we have always thought that what was said is different from how it was said. However, in employment terms, separating form and content encourages companies to separate document production between one smallish group of people paid well to think strategically about design, rhetoric, visualization, presentation, information architecture, technology, and usability, and another much larger, less-well-paid group of people who write fragmented paragraphs that they save to a database, never knowing exactly where or how they will be used.

Anticipating this scenario, Johndan Johnson-Eilola argued that technical writers must raise themselves to be recognized as “symbolic/analytic workers” (Johnson-Eilola, 1996, 2005). This argument implies that technical writers should take up more strategic roles such as experts in information architecture, user experience, and usability—joining the elevated small group of designers, rather than the larger group of content developers. Yet the shift to symbolic-analytic work creates a divide as much as an opportunity. The fact is that this pull-yourself-up-by-your-bootstraps solution involves some significant challenges. The very construct itself implies that some people can make this leap to a higher priesthood of practice, but others cannot; somebody has to remain below as part of the content machine, while symbolic analysts plan its work.

We see this dynamic in the growth of a variety of fields ostensibly related to technical communication, such as information design, user experience design, interaction design, interface design, and so on. The STC claims many such fields as “jobs within technical communication,” including information architects and usability and human factors professionals (STC, n.d.). However, people in these jobs may not see themselves as technical communicators. We don’t hear the Information Architecture Institute or the User Experience Professionals Association proclaiming their fealty to STC or even acknowledging a common heritage in technical communication. Arguably, the use of the term “design” in so many of these new fields marks their symbolic-analytic nature in *contrast* to technical communication; professionals in these fields, in other words, are justifying their market value by saying that they’re *not* merely technical writers. So these new fields—less hazy around the edges than technical communication, and offering better pay and greater symbolic-analytic status—seem to be developing largely independently of technical communication, however much it might wish to claim them.

Moreover, technical communication scholars have tended to take symbolic-analytic status as a relatively unquestioned good. Who would not want one’s students to leave college and find fulfilling, prestigious, flexible, and well-paid work? But Robert Reich’s (1992) conception of symbolic-analytic workers was a

description, not necessarily a positive goal. Since then, Reich (2015) has commented on the participation of symbolic-analytic work in deepening the cavernous divide between the haves and have-nots in the world. Essentially, by training students to become symbolic-analytic workers, we are training them to become part of an elite class that makes far more money than most of the world. A person making an average income as a technical communicator—a little over \$70,000 in 2013 (STC 2014c, p. 154)—is not just in the top 10%, or the top 1%, but in the top 0.2% of global income. Besides, arguably, technical communicators have always already been symbolic or analytic workers, compared for example to the commercial printers we put out of business by taking over document production through desktop publishing in the Beige Age, and later, through Internet publishing in the Glass Age.

### **The Democratization of Technical Communication**

Meanwhile, much of the rest of the world's population is actually engaging in the act of technical communication every day. They are just not necessarily getting paid for it. While the profession of technical communication might have shrunk somewhat, the performance of technical communication has exploded in ways that make professional restrictions (like certification) difficult if not impossible to implement. While commentators from Jay David Bolter (1991) on have praised the expanded possibilities for authorship on the Internet, they have largely failed to recognize that a significant proportion of the content people author on the Internet is technical communication. Many people have grown so adept at using technologies that they do not use or need corporate-designed technical documentation; instead, they make technical documentation themselves to share with other users.

Examples abound, but here's a personal one. I recently learned how to turn wooden bowls on a lathe. It's a surprisingly complex task, requiring intimate knowledge of wood, steel, abrasives, and the physics of rapidly spinning bodies. It involves risk assessment and communication, because one never knows when a 50 pound log spinning at 1,500 RPM might go flying over your shoulder (and in one case, through my garage door window). In years past, to learn how to do this activity I might have turned to more traditional sources of technical information—the lathe manual, books, a club, or formal training or apprenticeship. But my primary guide has been the myriad of instructional YouTube videos made by experienced woodworkers. These videos are not always polished, but they're often highly successful pieces of technical communication. In fact, some are gems (e.g., Fidgen, n.d.; Howarth, n.d.; Wandel, n.d.) They're also typically free or ad-supported, offered mostly out of pride of accomplishment and a willingness to share expertise.

Other examples are not difficult to find. One of the biggest expansions of technical communication performance is in the form of a new genre: online

product reviews—which are after all merely a new species of technical report (Mackiewicz, 2011; Pollach, 2006). Another example is the ubiquitous unboxing video, which shows potential buyers what’s inside the box of popular consumer devices, physically and metaphorically cutting through the glossy corporate packaging (Kelly, 2014). Or yet another: Typically the most common Do-It-Yourself video category on YouTube is how to apply makeup or do arts and crafts.

Like me, many users now turn to this kind of technical documentation instead of official documentation. The common first step we now take when we encounter a problem is not to open the manual, search the help file, visit the online help, or call the tech support line, but simply to type the problem into Google and see what pops up. Chances are somebody else in the world has experienced the same problem and found a solution they are happy to share. We look for help not to the corporations that designed the technology, but to other users of the technology.

What we are seeing is people helping each other navigate the complexities of the technology that surrounds and penetrates every aspect of our lives—so much so that in posthuman terms it becomes difficult to separate people from technology. And if people are inseparable from technology, then any communication about technology must be something we should recognize as technical communication. Thus product and process apply equally: Technical communication is both a thing that can be made and exchanged, and an activity that people the world over engage in every day.

## The Golden Age of Technical Communication

When we take this scope into account, we can see that the Brass, Beige, and Glass ages are not so much over, as they are eclipsed by the *Golden Age* of technical communication. At no time in human history have more people, or a greater proportion of living people, been involved in helping to accommodate each other to technology and to accommodate technology to their own ends. They instruct, they demonstrate, they hack, they modify, they tweak—they engage in brilliant and mundane acts of sabotage and *bricolage*—and almost compulsively, they share with the entire world how to do what they did.

In the 19th century, Matthew Arnold wrote, “The future of poetry is immense.” Today, communicating about and through technology has become such a central part of human life that we can confidently say, *the future of technical communication is immense*—as long as we recognize “technical communication” as a human activity practiced by many, many people every day. Not all human communication is technical communication—but technical communication is a large and growing part of human communication.

We are all technical communicators.

This expansion of user-developed content in the information ecology marks a new mode of technical communication, which I have elsewhere labeled *tactical technical communication* (Kimball, 2006). By tactical technical communication, I mean technical communication conducted for reasons other than traditional institutional or *strategic* motivations (Kimball, 2006). In doing so I build upon Michel de Certeau's distinction between strategies as the systems and activities set up by institutions and tactics as the actions of individuals that cut across the grain of institutional strategies (Certeau, 2011).

Other scholars have begun to explore this much broader view of technical communication, digging into how technical communication happens not only in institutions but also between and despite them. For example, Huiling Ding (2009) examined extrainstitutional rhetorics in alternative media surrounding the debate over the SARS virus. Sarah Hallenbeck (2012) researched women's technical writing about bicycling in the late 19th and early 20th centuries, when the safety bicycle was a new and controversial technology that dramatically increased women's independence and mobility. Derek Van Ittersum (2013) analyzed the technical communication in Do-It-Yourself and craft instructions. Jeff Rice (2009) theorized folkonomies of technical communication to argue that the "motorization of space" allows for flexible ways of defining mobile information and mobile work. Building on Herbert Moorhouse's (1991) work on the hot rod community, Glen Fuller (2013) explored enthusiasm and its role in spreading "know-how." Hannah Bellwoar (2012) researched how patients adapt, repurpose, and reproduce official health communication for their own purposes. Emil Towner (2013) examined the public apologies of those found guilty in the Rwandan genocide through a framework of technical communication that builds up from individuals rather than down from official organizations. And before any of us, Katherine Durack (1997) argued that concepts such as technical communication, technology, work, and workplace have been framed in gendered terms, largely excluding the contributions of women from accounts of traditional technical communication and excluding the household as a site in which technical communication occurs. The work already completed in this vein is impressive, but the possibilities are endless for using a technical communication framework to understand how people communicate about and through technology in every aspect of their lives—not just at work, but at home, at play, in their communities, and in their families.

In this way, the networks of the Glass Age have allowed users of technology to become the "user-producers" that Robert Johnson (1998) theorized—not only consuming strategic, institutional technical communication but also creating their own tactical technical communication. These user-producers often trust and value the work of other amateur technical communicators over the work produced by a professional tech writer hired by a corporation. Professional technical communicators are experts at representing the corporation's perspective on how a product *should* work. A fellow user is more free to tell other users

how a product *does* work. Moreover, a fellow user has fewer impediments to breaking the black box of a product. While a corporation typically resists modifications to its products, a user-producer is free to advise her colleagues how she disassembled, modded, jail-broke, adapted, rearranged, and in essence remade the product to her own ends. This kind of *bricolage* is central to the culture of sharing tactical technological action through tactical technical communication.<sup>4</sup>

## Markers of the Golden Age

The performance of tactical technical communication that characterizes the Golden Age differs from the strategic technical communication of organizations, corporations, and agencies in at least four essential ways.

### *Invisible or Visible*

Golden Age tactical technical communication is a voluntary contribution to public discourse. It typically puts itself out there and hopes to be heard—perhaps even to entertain, as well as instruct.

Strategic technical communication, however, is designed not to intrude; as Longo (2000) points out, it is essentially invisible. In fact, strategic technical communication is typically visible only in the context of failure. On a heroic level, we have well-known disasters such as the space shuttle Challenger. On a mundane level, we have the multitude of badly written manuals people inevitably bring up to us. Even under the best circumstances, strategic technical communication assumes that users will turn to it typically when they have already failed in some way—failed to make the machine operate as advertised, failed to find clues in the interface to lead them where they wish to go.

Before that failure, technical communication is simply invisible to users; strategic technical communication fades into the background for most people as part of the ephemera of their lives. Yet people are positively surrounded by technical documents. Every day, they encounter a myriad of pieces of technical information—directions, references, reports—in their work, homes, cars, airports, grocery stores, doctors' offices, polling booths, and so on. Yet they rarely recognize the impact of technical communication on their lives. To judge by the quizzical looks that technical communicators get when answering the question, "What do you do?" many people scarcely recognize technical communication at all.

Ironically, people often don't even recognize technical communication as *something they themselves do*. That makes sense if people see technical communication as strategic or corporate communication; even when they write a thoughtful product review full of technical specifications and procedural workarounds, they will likely not see it as technical communication, though it clearly is.

### *User Centered or User Created*

Both tactical and strategic technical communication can be user-centered, but in different senses of the term. Although the corporations have made great strides in user-centered design, they ultimately do so to sell products, to avoid liability, and to foster customer loyalty. Even when the corporation has benign motivations, the corporation is at the center, and the user is a subject to be guided into compliance with appropriate uses of the corporation's product.

Tactical technical communication, however, is more than user-centered—it's user-created. It is filtered through experience, not marketing strategies, committees, or even usability testing. It is not determined by paternalistic decisions about the user's safety or appropriate actions. It is a relatively direct expression of users speaking to other users, at once autobiographical and instructional. It's not only "here's what I did" but also "here's how to do what I did."

### *Anonymous or Authored*

Thus another main characteristic of tactical technical communication in the Golden Age is the claim, even the boast, of *authorship*. Strategic technical documentation traditionally hides who wrote it behind a veneer; the corporation *is* the effective embodiment of the author. Professional technical writers write anonymously for the organization, never revealing the actual person speaking. They even internalize this value, denying that they should claim authorship. This makes technical writers as invisible as good technical documentation. (This voluntary invisibility may be a central reason for the lack of power and legitimacy the profession perceives: Technical writers get no respect in part because they hide from it.)

Tactical technical communication, however, is often signed—and with pride. In many cases, pride in one's skills or accomplishments forms the primary motivation for sharing technical know-how online; it's pleasant to be recognized as an authority. This authority builds the ethos of the speaker as an expert user to whom other users should attend. Corporations recognize this authority by increasingly leveraging or coopting this expertise through online forums, where user-experts can share information with each other, rate the validity of the help they receive, and provide valuable metrics on the product and its use.

### *Controlled or Authentic*

Of course, the biggest complaint about user-produced tactical technical communication is low quality. Corporations can invest in developing carefully designed and tested documentation, controlling the quality of their output. Few individuals have those kind of resources. But for strategic quality, tactical technical communication can substitute a high level of authenticity.



Strategic communication, though highly controlled, lacks this authenticity. The common perception, often condoned by professional and academic technical communicators, is that technical communicators are experts in packaging other people's expertise. We even have a term for the people who know something about what we merely write about: subject-matter experts. As Longo (2000) argued, this is a precarious position for technical communicators.

Ironically, technical communication instructors are complicit in promoting the strategic, corporate operation of technical communication. We teach students that good technical communication is institutional; that it should not draw attention to itself or to its author—after all, it is not self-expression.

These strategic, Brass- Beige- and Glass-age values have carried us as far as they can. We should recognize that good technical communication in the Golden Age, rather than being invisible, user-centered, controlled, and anonymous, is often quite the opposite: visible, user-created, authentic, and personal.

## Rescoping Technical Communication

The Golden Age democratization of technical communication from a strategic to a tactical activity suggests that we may need to rethink its scope, and thus its definition.

Scholars have defined technical communication variously as a mode of interacting with technology (as mentioned previously, Dobrin, 1983); as a transmission, translation, or articulation between subject-matter experts and users (Slack, Miller, & Doak, 1993); as a management control mechanism (Longo, 2000); as an academic field (Johnson-Eilola & Selber, 2004); as a problem-solving activity (Johnson-Eilola & Selber, 2014); as professional practice (STC, 2014b), and so on. Each of these definitions is reasonably valid and worthy of consideration. However, most definitions explicitly or implicitly draw technical communication as a profession itself, as an academic field that trains professionals, or as an activity of professionals (typically engineers).

This scope leads us into unfortunate controversies that actually obscure the larger picture of technical communication. When we discuss the power and legitimacy of technical communication, we commonly divide it into two camps (as I did consciously at the beginning of this article): Discipline or Profession. Many have lamented the misunderstandings arising between these camps. For example, George F. Hayhoe's chapter in volume one of *Power and Legitimacy* catalogs differences between the academic and the professional viewpoints, asking "What is it that spawns such rivalry in our field?" and "What can we who work in the academy and in industry do to demilitarize the border and cooperate to our mutual benefit?" (Hayhoe, 2003, p. 102). I agree academic and industrial technical communicators should work to understand each other better.

However, this binary division of technical communication is an oversimplification—ironically, in two ways. First, it magnifies difference and obscures the many overlapping activities between academy and industry. Many professional technical writers are products of academic technical communication programs. While they may feel hostile or dismissive toward “ivory tower” academics, we in the discipline know they learned something in school. Besides, the “ivory tower” description is largely a myth, particularly in terms of the relationship of practice to theory. No academic would argue that students should leave a technical communication program without practical skills—quite the contrary, academics typically claim that both theory and practice are necessary, theory generalizing practice and practice grounding theory. Moreover, many academics in technical communication *are themselves* professional practitioners or have considerable past experience as professionals—and conversely, many practitioners have contributed to research and teaching. The pages of *Technical Communication*, the STC’s journal, are filled with work from practitioners, sometimes even on esoteric subjects (e.g., Dragga & Voss, 2001).

Second, this oversimplified binary obscures the much larger *performance* of technical communication, the many people doing technical communication every day, as I described earlier. Limiting *technical* communication to *workplace* communication gravely underestimates the scope and reach of technical communication in the world.

These considerations lead me to suggest that our definition of technical communication should broaden dramatically—to include workplace and professional communication, but also to include the vast, unrecognized bulk of technical communication performed every day. In this sense, we might say that technical communication is not just a profession, but *an activity that manages technological action through communication technologies, including writing itself, in a particular setting and for particular purposes*.

Some might think this definition too broad; one might justifiably ask, what isn’t technical communication? I intend that this definition should be as broad as possible, but it does not include everything. The operative limitations here are the overlapping and necessary phrases *manages technological action* and *through communication technologies*. While technical communication may use writing to record narratives, it does not tell narratives to entertain or to provide general edification, but to manage further technological actions. Thus a technical report would fit under this definition, but a short story would not—a short story might inspire action, but typically not manage it, while recording past actions in a report ideally shapes future actions. Conversely, while the affordances of a door knob might suggest the technological action of pulling or twisting it, few would argue that a doorknob is a communication technology.<sup>5</sup> The specificity of setting and purpose is also a key limitation. Thus a holy text would probably not be technical communication because it manages moral action generally, rather than technological action in specific situations. But an order of service or a

liturgical calendar might indeed be technical communication, because these documents manage resources, organize action, and direct procedures in a church and among the members of a congregation.

I anticipate that others will temper the expansiveness of this definition in useful ways as they fit it to their own local situations. But the discipline needs to express that expansive view especially now, when technical communication as an activity has so obviously outstripped the profession. Technical communication scholars are particularly well situated to value and understand this breadth in ways perhaps no other discipline can.

## Directions for the Discipline

Given this definition, in which technical communication is a broad human activity used to effect change in the world, perhaps academics should stop worrying so much about the profession of technical communication or its power and legitimacy, and come to a better sense of the scope and power of its *performance*. This realization also justifies the burgeoning growth of technical communication programs—the phenomenon with which I began this essay. Far from being irresponsible, the discipline has an imperative for growth—just not in the direction we have been growing.

Meloncon (2009, 2012) and Meloncon and Henschel (2013) chronicled not only significant growth in the number of academic programs in technical communication but also a common pattern of that growth. Technical communication programs tend to begin with a service course in technical writing offered to students from a variety of departments and disciplines across campus. From that basic course, programs add others, intended for students planning to enter the profession: technical editing or document design, web design, usability, proposal writing, report writing, instructional writing, and so on. Given an adequate stable of such professional courses, programs then go into degree-building: they offer a minor, then an emphasis upon an existing major, then an entire major. Once the major is well established, they propose a Master's degree, sometimes with the intermediary step of a graduate certificate. At this point, their aims shift from professionalizing technical communicators to reifying the discipline. They hire more people, and eventually they offer a PhD. Their doctoral students graduate and gain jobs at other schools, teaching the introductory service course—and then they repeat the same familiar pattern, building courses and programs in roughly the same manner and to the same ends. And so it goes.

If we see our primary function as training future professionals, then this pattern makes sense, especially in terms of the typical reward structure for academic growth, which validates increasing the number of majors. Careers are built on this pattern. But with the recognition of the broader performance of technical communication, our perspective and our practices must shift.

That shift will reveal a single course often overlooked at the beginning of this development: the basic technical communication service course. As a program grows, faculty delegate the teaching of the basic service course to graduate students or lecturers, unhealthily replaying the relationship in English departments between literature and freshman composition. The service course becomes something we think of as a support to the professional program, rather than as an end in itself. This attitude is unfortunate, because as I regularly remind our instructors, the basic technical writing course is frequently *the last writing course many students will ever take*. As such, it is a precious opportunity for the discipline to serve a larger and growing group of people: Those who will do technical communication as part of their lives, both at work and in other contexts.

Recognizing Golden Age dynamics, we should begin to reframe the basic service course and to build similar courses around it for a general audience. I have argued that technical communication is becoming a mode of human communication, rather than merely professional communication. If so, rather than thinking of the service course as a service only to certain other professions—engineering, business, health fields—we should begin considering it as a service to all students who, regardless of the profession, job, or calling they enter, are likely to be engaged in the central activities of technical communication: helping their coworkers, friends, and families to communicate about and through technology. They need the kind of writing instruction technical communication courses excel at providing.

In other words, we should begin directly teaching the world of people who are already doing technical communication how to do it better, without necessarily attempting to prepare them for our profession—or for any profession. We should begin to think of the technical writing service course as serving students in roles well beyond their professional identities. We should amplify our use of this course not only to teach traditional genres and conventions, but also to teach students how to interrogate technology, how to examine its complex role in human life, and how to use the technology we call writing to change the world. We should teach them to become better tactical technical communicators.

One promising way to do so is to expand something we already do well and make a bigger deal about it: Experiential learning, often framed as service learning. As many have argued (see among others Cleary & Flammia, 2012; Coppola, 1999; Henson & Sutliff, 1998; Huckin, 1997; McEachern, 2001; Matthews & Zimmerman, 1999; Scott, 2004), this pedagogical approach gives students the opportunity to interact directly with potential audiences, to learn genres in context, and to recognize the activity networks or writing ecologies (Spinuzzi, 2003) in which technical documents arise and act. Our discipline's preoccupation with the Profession has led at least to this benefit: That we tend to value teaching students how to use communication not just to express themselves, but to change the world in practical, highly transactional ways.

But I would like to see us expand the sites at which experiential and service learning can take place. We often imagine that this kind of pedagogy requires a formal organizational setting: We engage our students to work for or with a particular company or agency or nonprofit. That work is terrific, but it shouldn't keep us from encouraging our students to address problems not necessarily bounded by one or even any organization. For example, as a good number of us do already, we can as readily teach students how to write proposals by having them seek out problems in their own communities and propose solutions to them, as we can by teaching students how to work on a formal grant proposal for a nonprofit agency.<sup>6</sup> These sites can be global as well as local: Some of the instructors I know have experimented successfully with Internet services like Pinterest and Instructables, teaching students how to share their expertise with people all over the world.<sup>7</sup>

In short, we should raise the service course beyond its traditional focus on the conventions of workplace writing. Many of us already teach this course in interesting ways. But too often, the curricula of introductory courses fail to give students the opportunity to explore how they can use technical communication to make a real impact. We should also lobby our universities and other programs to encourage them to include technical communication courses in their curricula so we can broaden access to instruction in this field. And we must make good arguments for reward structures that validate this kind of growth—not simply as “service” work, but as an essential ingredient in the intellectual growth of students.

Of course, we needn't *call* such courses technical communication courses. Any number of names would do, depending on the local setting: “Applied Communication,” “Solving Problems through Communication,” “Communication, Technology, and Society,” “Making Change Happen with Communication,” “Power Communication,” “Communicating for Action,” “Communication Engineering,” and so on. In fact, some other name would be preferable, as it would short-circuit assumptions that technical communication is corporate, banal, and derivative.

If technical communication academics do not refocus our energies to value outreach opportunities such as the service course more highly, we will face some limitations. But there's a bigger audience who needs our help.

## **A Slightly Radical Suggestion**

These observations lead me to suggest that technical communication should play a greater role in college writing instruction more broadly, whether in traditional first-year composition or as Russell (2007) has argued, in WAC or WID. I am by no means the first to make similar suggestions—that probably was W. Earl Britton (1974), who argued that technical writing should simply replace freshman writing. I am not going quite so far, but I do think that we should

participate more fully in teaching the general student population technical communication skills.

My suggestion is slightly *radical* because FYC and even WAC/WID have largely been in the bailiwick of compositionists. But perhaps we could collaborate to add more practical and instrumental writing—in short, tactical technical communication—to general writing instruction. After all, as Britton pointed out, “essays are rarely encountered after college” (1974, p. 127); I would extend that claim to say that few students will write many traditional essays after FYC, even in their subsequent college courses. Almost all of our students, however, will have many occasions in school and in life to report information, to tell somebody how to do something, to make a recommendation, or to propose something—traditionally the stuff of technical communication. We should teach all students how to do this kind of writing: The kind of writing that changes things.

However, this suggestion is only *slightly* radical, as many compositionists are already tending this direction. Compositionists are rethinking general college writing instruction, for example by having students write “multimodal” compositions (see among many others Anderson et al., 2006; Dalton, 2012; Edwards-Groves, 2011; Jewitt, 2005; Selfe, 2007). This change reflects a growing awareness of the importance of technology in human communication. Multimodality, however, does not always emphasize instrumentality; many multimodal compositions are simply expressive writing in multiple media. We owe all students an opportunity to learn how to communicate in a technological world—not just by writing a multimodal essay instead of a lexical essay, but by learning to use technologies of communication to bring about practical change. Technical communication is ideally situated to help do just that.

Also, compositionists increasingly realize just how rhetorically FYC has been taught. FYC still too often asks students to analyze texts for no specific purpose, to express opinions to nobody in particular, or to write an argument with no vital exigency to call it forth. This criticism is not mine: Scholars from Petraglia (1995) to Wardle (2009) and beyond have made this point repeatedly. Wardle decries the use of “mutt genres” in FYC—genres that exist largely within the course itself, such as personal narratives, profiles, arguments, interviews, reflections, and rhetorical analyses (Wardle, 2009, pp. 773–774). These mutt genres are in effect just many species of one genre, the essay, and FYC instructors can therefore apply the same traditional markers of “good (essay) writing” to all of them equally: a strong thesis sentence; a clear beginning, middle, and end; well-structured paragraphs with topic sentences, and so forth. The trouble is that the essay is only one genre, and in global terms a relatively esoteric one. In the meanwhile, students could be learning to communicate in many other more common and useful genres, such as we teach in technical communication.

Wardle (2009) concludes that it’s simply impossible to teach general (essay) writing skills outside of specific disciplinary contexts, and that FYC is poorly



suiting to provide those contexts. Thus the skills we teach in FYC do not transfer to later writing situations in college classes. But perhaps the *transfer* problem in FYC is at least in part a *genre* problem. If we taught genres that students might actually use in some way after FYC, we might see more skills transfer to other contexts—particularly if we teach genres not as formulas, but as situated, flexible, socially constructed mechanisms for rhetorical action (among others see Artemeva, 2008; Brasseur, 2003; Luzon, 2005; Miller, 1984; Spinuzzi, 2003). For example, Kain and Wardle (2005) describe actually teaching students about genre theory, rather than just how to fulfill generic conventions as formulas. Because technical communication instructors are not tied so strongly to one genre, we are quite good at teaching students how to communicate effectively using the conventions of diverse contexts, as well as how to find out what those conventions are when presented with a new context. Technical communication academics should share this expertise more broadly—not just in the technical communication classroom, but in FYC, WAC, and WID.

Why not just replace FYC with tech writing, as Britton (1974) suggested? Doing so might be a good option for some situations. But the spectrum of possibilities is broad. The most conservative approach would be to leave the courses in their current configuration and simply change their focus slightly—tech comm toward a broader scope and FYC toward more specific applications. A more aggressive configuration might be to use FYC to focus on Writing-about-Writing (focusing specifically on genre), then use technical communication as a service learning advanced writing course. A further step might be a fully tracked curriculum, with students from a particular disciplinary framework such as the sciences, social sciences, or humanities taking three progressive classes together in a cohort, with a series of service learning projects of increasing complexity. Another position along this spectrum would simply replace the second semester of FYC with a tactical tech writing course. What's most important is that students receive further opportunities to receive guidance as they learn to use communication to change the world.

Whatever the configuration, we should be reluctant to reduce the number of writing courses students would take. Writing isn't something you can ever learn completely. Taking a writing course is less like an inoculation ("take 6 hours of freshman composition and you'll be cured of illiteracy") and more like a piano lesson ("keep practicing and you'll gradually get better at it; stop practicing and you'll get worse"). Students need as many opportunities as possible to practice making a real impact through authentic communication.

We should also take care not to reinforce the labor practices that have dogged freshman composition programs. If tactical technical communication (by whatever name we call it) extends across all walks of life, then instruction in it should be deeply embedded in disciplines and professions across campus. This framework would be a useful way to move WID beyond "writing to learn" and fully into "learning to write." We will need to provide scaffolding for colleagues in



other fields to give students opportunities to learn and use the communication conventions of those fields to bring about real change. Rarely do other fields give students enough deliberate training in things like how to design a research poster, how to write a lab report, or how to write a research grant proposal. Technical communication specialists should collaborate with and advise their colleagues across campus in the best methods for incorporating a broad-spectrum technical communication.

Finally, it would be glib of me to suggest that these changes would come about without some inevitable frictions, both from inside technical communication programs and from outside. We will tread on some toes. Before taking a step, then, technical communication programs must make concerted efforts to build relationships and collaborations not only with first-year writing but also with other communication programs on campus—the various places where large universities park communication scholars: a college of mass communications; departments in agricultural communication, advertising, and speech; programs in legal writing, engineering communication, environmental writing, and so forth. Administrators also must be sold on such an idea, although ironically they may be the easiest to convince; they're used to looking at big pictures. And finally, we will need to leverage any evidence that justifies increasing communication instruction across campus and in many disciplines; for example, we should regularly point to the ABET accreditation standards for engineers, which feature communication skills prominently. But the end result would be worth it, as we engage in the central work of teaching students to change the world through communication.

## **Conclusion**

In the meantime, technical communication programs should also continue to train technical communication professionals—while giving that effort its proper place in our priorities. The profession is still viable as a career path for many students. The world will always need communication professionals; right now the United States seems to need about 47,000 of them. The 22,600 technical writers the BLS claims will be necessary by 2022 is significant, and we can feel comfortable about our students' prospects for getting a good proportion of those jobs. I confidently advise my own students that technical communication is a terrific profession to join, with good opportunities for smart, well-trained people.

In addition, despite the major shifts described in this article that undercut the demand for professional technical communicators, technical communication skills are highly prized in nearly every organization, agency, and corporation, and are useful in many jobs and walks of life. Those skills include the ability to analyze rhetorical situations, to learn and apply generic conventions intelligently in context, to use technologies to speak effectively to diverse audiences, and to solve human problems through better communication.

In sharing these skills widely, we have plenty of work to do, indeed.

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## Notes

1. By using *performance*, I recall and extend Sullivan's (1990, p. 382) use of *practice* to include in technical communication discourse beyond traditional corporate documents. *Practice*, however, is often applied to professionals or "practitioners." *Performance* avoids that ambiguity.
2. The STC is taking another run at this problem as I write; I hope and expect that the next certification effort will improve upon its predecessor.
3. I foreground here procedural documentation, recognizing that instructions are only one thing we do. However, instructions form the core of the profession's historical, functional, and social identity. When we tell people that we are technical writers, they typically assume we write instructions—and to a great extent, they're not wrong.
4. I do not intend to delineate strategic and tactical positions naively as bad corporations and good, rebellious users. Every individual can inhabit strategic and tactical positions simultaneously, depending on the context. A janitor at a corporation may be the chair of the Board of Elders at church. A successful business owner might simultaneously be an initiate in a women's social organization. Even the President of the United States is a public servant. Moreover, tactical technical communication can be as ethically suspect as strategic technical communication; right now, someone is likely out there engaging in *bricolage* to write a terrorist manual.
5. The extremities of this framework might lead us into some wild places, because humans are inventive in what they can use as media or as inscriptions. An unremarked bear in the wild would not be technical communication; neither would a bear in a simple cage. But a polar bear in a zoo might be, if it's inscribed (branded, tagged, labeled) and intended to explain a system of geography (the Canadian tundra) or taxonomy (family *Ursinae*, species *Maritimus*) in order to direct action on that knowledge in some practical way ("Next time I'm in Canada, I'd better watch out for polar bears!" or "These polar bears are endangered; we should do something to protect them!"). In this case, the bear is no longer a bear, but a moving bear-shaped inscription on a particular communication medium (the zoo) that is replete with other inscriptions: signs, labels, the organization of the zoo itself by ecological habitat (the veldt, the tropics, the arctic) or biological taxonomy (the monkey house, the aviary, the hippo pool). These points are made more fully than I can here by David Levy (2001) and are informed by Bruno Latour's book, *Pandora's Hope* (1999). I do not suggest that we teach students bear-writing, but there will likely be a budding zoologist or two in our classes who would benefit from thinking about some aspects of their work as communication that manages action.

6. See in particular the special issue on civic engagement. *Technical Communication Quarterly*, 2004, 13(3).
7. Credit goes here to current and former Texas Tech Tim Elliott, Angela Schaffer, and Amelia Chesley.

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