



Why technology matters to writing: A cyberwriter's tale

Jim Porter

Michigan State University, East Lansing, MI 48824, USA

Abstract

Technology does indeed matter to writing—and in significant ways. But *how* it matters can vary, depending on the particular technology, the habits and attitudes of the individual writer, and the context of learning and use. Here I employ a personal narrative (“a cyberwriter’s tale”) to track my development as a writer over time—from handwriting to typewriting to cyberwriting—and to show how each new writing technology influenced my practices and products. I argue finally for a cyborgian, posthumanist view of writing technologies. Such a view does not isolate the technological tool as an abstracted machine apart from human use, but insists on defining technology *as use*—as the human and machine working in concert (joined at the interface) and writing in a particular social, political, and rhetorical context. © 2003 Elsevier Inc. All rights reserved.

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The past is not dead. In fact, it’s not even past. (William Faulkner)

Dad, what’s a typewriter? (Thomas Porter)

We are all. . . cyborgs. (Donna Haraway)

1. Introduction

This will be an odd essay (odyssey?) addressing an egocentric question: How have writing technologies changed my writing process, my conception of writing, and my understanding of rhetoric over time—first in my development as a writer, then as a teacher of writing, and eventually as a member of the field of computers and writing (albeit as a quirky, off-center, not particularly cutting-edge member of that field)? I start with a personal reflection roughly covering the years 1960 to about 1995 (the emergence of the Web) and focusing on how

Email address: porterj8@msu.edu (J. Porter).

technology has aided, abetted, obstructed, and/or changed my writing processes and habits, starting with pencil-based handwriting and moving to the internetted computer. This article is sort of a “pencils-to-pixels” tale of the late 20th century—in reference to Dennis Baron’s (1999) essay by that title.¹ However, I plan to disagree with Dennis.

But no tale is merely personal, especially not if an academic is telling it. Yes, I confess, there is an argument involved: Technology matters to writing. Hardly an insight for readers of *Computers and Composition*. You *know* technology matters; the entire field of computers and writing is based on that belief. But still, there might be some doubters out there—our compatriots in other fields perhaps, or administrators, or folks who just don’t get it. Perhaps the 20th anniversary of *Computers and Composition* is a good time to restate the case. Let’s try it one more time:² *Why and how* does technology matter to writing?

2. The discipline of handwriting

I don’t remember very much about my early experiences with crayons, drawing on the walls, having my hand slapped, that sort of thing; no deep Freudian recall, I’m afraid. I will say, though, that I was taught handwriting by Ursuline nuns (Catholic), who insisted on careful attention to penmanship. The quality of handwriting mattered. In the first grade (1960), we practiced and practiced and practiced drawing our letters to get the angles and the sizes and the positioning and the quality of the ovals and loops exactly right. First printing and then later, in second grade, cursive. We did a lot of writing—not to express ideas but to form beautiful letters. Later we advanced to correctly spelled words and then finally to legible prose. Good penmanship was a sign of virtue, character, discipline, and proper training; it distinguished us (Catholics) from them (Protestants). Sloppy penmanship revealed an undisciplined education.

In the primary grades we used pencils—big blue Eberhard Faber pencils without erasers. We were, in fact, forbidden to have erasers. Why no erasers? Because the teachers wanted to see our errors. They didn’t want to encourage hiding our flaws. After all, you can’t hide your sins from God. (Long discourse possible here about relationship of handwriting to Catholic theology, sin, and formation of conscience—deleted in the interest of space and relevance.) The goal was to write properly the first time. Any fool (or sinner) can make a mistake and then fix it.

A big moment came in fourth grade when we were old enough to use pens. Not ball-point pens, but Sheaffer cartridge pens with little plastic cartridges full of liquid ink (see Figure 1). Yes, this was a messy proposition, but not as bad as you might think. Of course the pens would leak, and I would spoil probably three shirts a year. But it was strictly verboten to ink anybody deliberately; such an act carried harsh penalties. Some boys drank the ink out of the cartridges—some as an act of resistance, others to disgust or impress girls, others (the strange ones) because they liked the taste. There was no such thing as correction fluid. You thought before you wrote so that you could write correctly the first time. Crossing out was not allowed. Definitely a product-oriented writing pedagogy.

You might be shaking your head woefully at my retrograde upbringing, at the mistakes of my prehistoric writing teachers, who had no idea that their writing pedagogy was damaging to young minds and to writing development. Yes, this training led us “to fixate on appearance



Fig. 1. The Sheaffer cartridge-ink pen (1960s) (see <<http://www.jackbergsales.com/writing/sheaffercartridge.htm>>).

rather than content” (Kalmbach, 1997, p. 102). But these early writing teachers taught me that good penmanship (that is, readability) mattered. Even more important, they taught me implicitly, through the hours and hours of disciplined handwriting practice, that there was an ethical component to delivery—that is, in terms of the credibility and character of the writer (or rather, *handwriter*. Handwriting *was* writing in these early years).

3. The speed and journalistic ethos of typewriting

Despite this early handwriting training, I learned to be a writer in typewriter culture. I abandoned longhand writing, without the least regret or romantic longing for the pencil or the feel of ink on my fingers (or the stain of ink on my shirt). Now my hand aches and my handwriting wavers whenever I try to write anything longer than a grocery list or a phone message.

When I was 13, my mom signed me up for a summer typing class at Shaw High School (our local public high school in East Cleveland, Ohio). She thought it would be a useful skill, plus she didn’t want me loafing around the house all summer. Thanks to this class, I learned to type at maybe 12 words per minute. Not so great. But that one class gave me a tremendous boost the following year, when I took the required freshman typing class at St. Ignatius High School. You’ve got to understand, it’s pretty amazing that a Jesuit, all-male, college-prep high school with high academic pretensions would, in 1968, require all the boys to take a typing class (which at that extraordinarily sexist time was regarded as a secretarial skill for non-college-bound girls). This was amazingly or accidentally farsighted of the Jesuits (but knowing them, I’d guess it was intentional). I came out of that class typing 70+ words per minute—and the keyboarding speed and the proofreading lessons learned in typing class helped me immensely. These skills made written production *fast* and relatively easy, made my documents look good, and sharpened my editorial eye.³ Those QWERTY keyboard strokes I learned as a young teenager are now almost totally unconscious for me, etched into my fingers, which, like a guitar player’s fingers, are trained to move unconsciously to certain fret positions.⁴

I took up writing as a serious practice in the age of the typewriter, a technology that had a profound effect on my composing process in the late 1960s and into the 1970s, particularly during graduate school (for me, 1975–1979). I learned to write—I mean *really* write as an act of creative force and expression—in high school, not in English classes but as a writer for the high school newspaper. I started out as a lowly feature writer (trained by junior and senior editors), then advanced to feature editor, and then finally served as editor-in-chief my senior year. We wrote like real journalists: typing and retyping stories, clacking away on the typewriter, pencil behind ear, drinking coffee and smoking. I learned how to write a lead, how to interview, how to develop an interesting or thought-provoking story line. I learned some rudimentary principles of page layout and something about publishing practices. I learned that features needed to have a point, that writing could make people laugh, get them excited, or make them mad. I also learned that editorials could upset school authorities, which I discovered was not only easy to do, but worthwhile and often fun. I learned that writing can have a political and social effect (not a lesson we learned in English classes).⁵ I learned that writing could piss people off, especially in the Vietnam era and in the era of countercultural protest against authority. I learned about the potential power of publishing—and about the importance of editorial control of the means of publication.

At some point in graduate school, I moved from a manual typewriter to an electric typewriter, a rebuilt IBM Selectric⁶ (see Figure 2). At this stage I was not composing initial drafts at the keyboard. Rather, I imitated my dad's writing practices: My dad, a lawyer, used legal pads to handwrite his briefs. (He would then give the handwritten pages to his secretary to type.) I used legal pads to write and rewrite my drafts. Once I got the story drafted to a certain stage of minimal completion and coherence, I would type it myself—and then do stylistic editing and proofreading on the typewriter. I might retype a story or paper three to six times before regarding it as finished. In other words, I used longhand for drafting, and used the typewriter as a tool for revision and editing. Typing and retyping the same lines over and over forced me to examine, reread, contemplate, and refine my style. That process of retyping—a stage that word-processing software has eliminated—helped me as a writer.



Fig. 2. The IBM Selectric (late 1970s) (see <<http://www.idsa.org/whatis/100yr/selectric.htm>>).

In 1978–1979, while doing my doctoral work at the University of Detroit, I consciously made the decision to eliminate longhand drafting and to begin composing at the typewriter keyboard. My uncle, Thomas Porter (a professor and academic administrator), composed at the keyboard and encouraged me to give it a try. I made this shift first by practicing with personal correspondence. I sent a lot of letters to family members back then (parents, aunts, uncles, grandparents, brothers), and I started composing those letters at the keyboard. In 1979, I wrote my PhD comprehensive exams on the typewriter, the first time I had ever composed formal academic writing from scratch at the keyboard. (In retrospect, a daring occasion to experiment with my writing process. What *was* I thinking?) This was a significant breakthrough in my writing process, effectively eliminating longhand writing.⁷ It was the end of legal pads for me.

4. The efficiency of word processing

In 1981, I became an assistant professor of English at Indiana University-Purdue University at Fort Wayne, where I was one of a team of four faculty teaching technical writing as well as first-year composition. At the time, I was rewriting what would turn out to be the last (thank God!) version of my dissertation. One of my technical writing colleagues, Steve Hollander, had a Radio Shack TRS-80 computer, which he used as university editor to update the academic catalog. He let me use his computer in the evenings and on weekends to run the final versions of my dissertation—and helped me learn the coding conventions for word processing. (In this application, formatting options had to be coded much like HTML.) Using computer-based word processing saved me hours and hours of time.

In 1984, I bought my first computer—a Tandy Radio Shack TRS-80 Model 4P, running on the TRS-DOS operating system with 64 K RAM (see Figure 3). It used 5-1/4 inch floppy



Fig. 3. The TRS-80 Model 4P (1984) (see <<http://www.trailingedge.com/~dlw/comp/texttemp.html?tandymod4p>>).

disks (the original floppies). I spent \$1,784 for the Model 4P and \$800 for a high-end (at the time) letter-quality printer—an expenditure, in total, that was approximately 15% of my yearly academic base salary. (For comparative purposes, this would be like an assistant professor today who makes \$45,000 per year spending \$6,750 out of pocket for technology.⁸) This was in the days when universities did not routinely provide faculty with computers. To enter the world of “high-end” writing technology at this point required serious (if not foolhardy) commitment of financial resources, as well as considerable time and effort learning to use the technology.

Computer-based word processing changed my writing habits and processes in small ways (for example, it streamlined my writing process by eliminating retyping), but I didn’t view the change as significant or revolutionary. I was still producing print products. I was still working within print and typewriter culture, with a print-based, manuscript view of rhetoric. I was still writing in an isolated mode (alone at the keyboard). The TRS-80 had no networking capability. It functioned as a high-end typewriter—albeit with memory. It was the machine I used to write and revise my first articles in the field and my first book (from about 1984 to 1988).

5. The visual breakthrough of desktop publishing

In 1988, I joined the Rhetoric/Composition program at Purdue University—and that decision had a profound effect on my understanding of writing technologies. Fall 1988 was my introduction to the field of computers and writing. I had two new colleagues at Purdue—Patricia Sullivan and Gail Hawisher (my officemate for one, all-too-brief year)—who helped me see computer-based writing from a pedagogical frame. In Fall 1988 I also taught my first writing course in a computer classroom: ENG 515 Writing for Specialty Publications, a senior-level publishing course for professional writing majors. This course was my introduction both to the Macintosh computer and to teaching computer-based writing. The course was taught in a Macintosh lab in the basement of the math building at Purdue. The machines were Macintosh SEs (see Figure 4) with 1MB of RAM and a 9-inch built-in monochrome monitor. My introduction to Macs was a pentecostal moment. No joke, my transition from the clunky command-line



Fig. 4. The Macintosh SE (1988) (see <http://www.everymac.com/systems/apple/mac_classic/stats/mac_se.html>).

interface of the Model 4P to the graphic user interface (GUI) of the Mac was a breakthrough moment (see Hawisher et al., 1996, pp. 74–76).

ENG 515 was essentially a desktop publishing course. Teaching that course pushed me to consider visual design, page layout, and graphics as integral to rhetoric and writing. (Of course the Mac platform and its graphic user interface promoted that perspective.) I was helped a great deal in my thinking by Pat Sullivan. We worked together on our courses and on curriculum design, using and talking about design books such as Robin Williams' *The Mac Is Not a Typewriter*, Roger Parker's (1990) *Looking Good in Print* (1990) and *The Makeover Book* (1989), Alex Brown's (1989) *In Print*, and James Hartley's (1987) *Designing Instructional Text*. Pat and I taught ourselves, and collaboratively published on, professional writing, usability, computer-aided publishing, and the rhetoric of visual design—in conjunction with teaching desktop publishing courses and learning how to teach writing in computer-based environments.⁹ We worked to develop a rhetorical approach to page design and to computer-based publishing (see Kalmbach, 1997; Porter, 1994).

This particular entry point into teaching with computers makes me different from most members of the computers and writing community, who started their computer-mediated teaching practice in first-year composition. (Actually, I never taught first-year writing in the 11 years I was at Purdue, and I did not teach first-year writing in a computer classroom until Fall 2001.) Because I was teaching professional writing majors, my focus was always more on publishing practices (vs. composing), on document design, and on technical and business writing in the workplace, with students who had already selected professional writing as their major. This experience partly explains why I've always been out of step with most, but not all, of the computers and writing community. While I was working in visual design and desktop publishing, the field was chiefly focused on word processing and synchronous discourse.¹⁰

From 1988 to 1990, I gradually shifted over to the Mac platform and used my TRS-80 less and less. During that time, I did not own a Mac, so I worked in the math building public lab. I would work in the evenings and on weekends. Working there would be faculty members and graduate teaching assistants (TAs) who taught the courses in that lab, as well as the undergraduates taking them. I particularly remember prepping my ENG 515 class for the first time in the summer of 1988 in the math building lab. Pat Sullivan was working there, as well as grad TAs like Nancy Allen, Jennie Dautermann, and Bob Johnson, and our undergraduate professional writing majors. None of us owned Macs at the time. As we worked side-by-side in the lab, we exchanged information, talked about teaching and about writing projects, and taught ourselves to use Adobe Pagemaker and the advanced functions of Microsoft Word. It was an extraordinarily rich learning environment.

One of the features of this story is certainly the importance of social networks and personal help, as well as the value of having access to public labs. Whenever I pushed to another level of technology use, somebody was there to help give me a boost to that next level or that next set of skills. I have been lucky to have good colleagues, friends, and family, who encouraged me to use new technologies and helped me negotiate new terrain. Once I had the boost to a new level or new set of skills, I could expand my skills and learn on my own. But that initial personal help and/or motivation made the difference. Sometimes this was one-on-one help, but often the help occurred in a *community of practice*, a group of people who were learning and theorizing and teaching each other about new writing technologies—like in the

lab at Purdue during 1988–1989. Much of this learning took place in unplanned and ad hoc ways, in the academic cracks. I learned technical writing and editing that way, working with Steve Hollander and Rick Ramsey at Indiana University–Purdue University Fort Wayne. I learned desktop publishing working with Pat Sullivan, and then later with Jan Tovey and Greg Wickliff. Tharon Howard pushed us to learn and use email and Usenet groups in our classes—and, just as importantly, theorized their rhetorical importance as pedagogical, social, and collaborative tools (see Howard, 1992, 1997). In 1994, Johndan Johnson-Eilola arrived at Purdue and helped us with web-based publishing. These experiences at Purdue taught me about writing as *collaboration*, as well as about writing as *design*.

In 1990, I bought my first Macintosh—a Macintosh IIsi—which improved my personal work productivity but which also kept me working at home and reduced my connection to the face-to-face community of practice. One by one, faculty and then eventually graduate students purchased computers and gradually dropped out of the learning community that had been established after hours in the public lab. However, a new kind of connection was established. Now our computers were hooked up to modems (external ones) and we were logging on to the Purdue network, learning to use email and email discussion groups as a means to collaborate. A new kind of learning community—a virtual one—began to emerge.

6. The network revolution: Online publishing with the graphical interface

So far this story shows how writing technologies influenced my writing practices. But so far this history is still about the production of print. Yes, in 1989–1990 I was using the computer—and that use of the computer pushed me into electronic publishing. But I was still using the stand-alone computer and operating mostly within the realm of print: using word-processing applications to produce scholarly manuscripts and using page layout applications (like PAGEMAKER, or for that matter the table functions within WORD) to produce graphically interesting print flyers, brochures, and articles. The real rhetorical revolution started with networking, when those of us at Purdue began using email in a social and collaborative way—and then, later in the 1990s, when we began to do web-based publishing.

In 1989–1990, I was working in a bifurcated collaborative environment: With high-end desktop publishing, those of us at Purdue were experimenting with page design, layout, and typography, teaching ourselves about information design (see Hartley, 1987) and producing beautiful print products. As we started using email regularly (in 1989), we retreated to the opposite end of the graphical spectrum: using plain ASCII text in Unix-based Berkeley mail (a clunky command-line mail interface).¹¹ Students in my classes were, at first, highly resistant to email conferencing. They didn't share my excitement about the new rhetorical dynamic because they found the command-line interface and non-intuitive keystroke commands to be difficult, unusable, even silly compared to the graphic elegance of the Macintosh interface.

Very quickly, email interfaces evolved. We moved from Berkeley mail to ELM and then to PINE (both of which used the EMACS text editor).¹² Those programs still used ASCII plain text, but they offered menu-driven interfaces that displayed options—a huge improvement over the early Berkeley mail interface. (Looking back on this now, PINE and EMACS seem ridiculously clunky, but graphical email was not yet on the scene.) We joined email discussion groups and

experimented with asynchronous conferencing in our classes. Some of us preferred discussion lists; others experimented with Usenet. Tharon Howard created and managed the PURTOPOI Listserv (for rhetoric discussions), and most of us participated in the MBU list (Megabyte University, which began in 1989) for folks in computers and writing. The local, face-to-face learning community expanded not only to become a virtual community, but also to include participants from all over the United States.

Technology change happened very fast in the early 1990s, and I can't quite precisely remember the dates or the precise order of events. EUDORA appeared on the scene, perhaps as the first graphical interface for email. Some folks moved to that, with a number of us sticking to PINE. I attended my first Computers & Writing Conference in 1992 (Indianapolis). MOOs made their appearance, and then Gopher arrived (the Internet-based precursor to the World Wide Web). Developed at the University of Minnesota, Gopher was a hierarchical, menu-driven interface for accessing hypertextual databases. Gopher didn't last long, because the World Wide Web appeared—all of a sudden, it seemed—in 1994. At first we accessed the Web with the NCSA MOSAIC web browser (the prototype for Netscape NAVIGATOR and, later, COMMUNICATOR). Developed at the University of Illinois, MOSAIC was the first real GUI web browser (see [Hawisher et al., 1996](#)). One minute we were slogging along with the command-line interface and counter-intuitive keystrokes of Unix-based Berkeley mail—and the next minute, we were surfing the Web with Netscape NAVIGATOR (a spinoff of MOSAIC, developed by a student who'd worked on MOSAIC at the University of Illinois) and using MOOs in our writing courses. This was an amazingly fast transition—and it's mostly a blur in my memory. It was an exciting time, with almost every new semester bringing a new technology. No wonder I can't remember.

With the emergence of the World Wide Web around 1994 and with the development of graphical email programs (like Qualcomm EUDORA, Netscape MAIL, and Microsoft OUTLOOK EXPRESS), an important merger began to take place: The Internet-based tools we'd been using for email and conferencing merged with the graphical interface and with the publishing capabilities of our desktop computers. The Internet became graphical, in other words. Desktop publishing became electronic publishing, and Internet publishing broke through the ASCII barrier. Now, finally, our graphically interesting pages could be published and widely distributed on the Web.

This was a revolutionary moment, first, in terms of graphic design and publishing—which [Pat Sullivan \(1991\)](#) saw as itself a significant stage in publishing history—and, secondly, because of Internet-based delivery (at first via one-to-one email, discussion list communities, Usenet groups, synchronous chat, and MOOs—and then later the Web). There was tremendous intellectual energy directed toward understanding the relationship of writing, rhetoric, and technology. These technological advances happened, for those of us at Purdue, within an active community of learning and teaching. We reflected on the rhetoric of design, the rhetoric of delivery, the interactive dynamic of electronic conferencing, and the ethical issues arising for teachers and writers in these new writing spaces (see [Porter, 1998](#)).

Still in a blur, I had to learn even more new technology: this time web authoring. I started out coding with HTML; then advanced to BBEDIT (still code, but with some shortcuts); and then finally moved into graphical web authoring when those tools became available. I tried out several different applications, finally settling on Macromedia DREAMWEAVER (which I still use). Somewhere along the line I picked up Adobe PHOTOSHOP. My experience with web-authoring tools resembled my earlier experience with email: starting out with a very basic

ASCII type of tool, and then moving quickly through several different applications, up to a fully functional graphic tool. Staying current at this time meant struggling to learn different tools, some of which were hard to learn—and which then rewarded our struggle by becoming immediately obsolete. (Gopher was pre-eminent for perhaps 6 months?) As Johndan reminded us, we were working at the bleeding edge of technology.

7. So what? How technology matters

I am going to leave my writing technology story back at the birth of the Web in the mid-1990s and return to the question underlying it: How much do these computer-based writing technologies *really* matter in terms of their effects on writing? Is the computer changing writing in truly substantive, even revolutionary ways? Or is it simply one more writing tool, like the pencil, that aids the writing process but doesn't revolutionize it? The field of computers and writing is built on the former assumption: that teaching writing with computers matters in significant ways to the act of composing; that computers are not merely instrumental tools of writing, but rather influence the nature of composing and our rhetorical understanding of the composing situation.

My personal history using writing tools supports this view and challenges Dennis Baron's (1999) position in "From Pencils to Pixels". In his essay, Baron tracked the history of writing technology from the development of the pencil (in the mid-nineteenth century) to the present use of the computer as a writing tool. His point was implicit and his argument ironic, but Baron's argument was a fairly serious critique of the field's most fundamental premise: As Baron saw it, the computer is just another in a long line of writing technologies—from the pencil to the typewriter to the computer. These tools foster incremental change that aids our writing process—but writing, language, and communication remain pretty much the same as before. Why should we get excited about the computer as revolutionary literacy technology? We didn't get excited about the pencil. We didn't start a field called "pencils and writing."

My story about writing technologies tells me that, yes, the pencil matters—but not in the instrumental and ironic way that Baron talked about. The pencil matters not because of the composition of the lead or the quality of the graphite, but because of the lack of eraser and the training that accompanied the use of that eraserless pencil. It is not the pencil per se that is important, but rather the pencil in its social and ideological context. In my story, it's the pedagogical context that matters: the training, discipline, and practice that accompanied my use of the pencil, along with the ideology (theology, really) that framed that use and provided its *raison d'être*.

Baron misidentified the revolution, and so he could easily dismiss the revolution. He identified the computer as the supposed instrument of revolution—and then justifiably proclaimed that there's nothing to get excited about. (When Baron referred to the computer, he referred mainly to computer-based word-processing. And in that respect, I agree with him: Word-processing applications are not a breakthrough, not a huge advance over the typewriter.) He asked wryly: We didn't get excited about the technology of the pencil, why all the fuss about the computer? The answer is simple: Because the computer per se is not the revolutionary technology. Rather the revolution is the networked computer and the social/rhetorical contexts

it creates and the way its use impacts publishing practices. All *that* is revolutionary. The impact on social networks and publishing practices represents a significant change, of a magnitude that the pencil and typewriter (essentially print-based tools) don't achieve.

The first problem that we need to address is technological instrumentalism, a binary view that separates technology from humans, that sees them as separate entities. (The phrase “guns don't kill, people do” is a good example of technological instrumentalism; see Porter, 1998, pp. 66–68.) Pictures I have provided in this article actually reinforce instrumentalism by showing writing machines standing alone. Those abstracted machines stand in contrast to my story about them. The pictures don't show the particular ways that I learned or used each machine. They don't show the kinds of products I produced, or their effects. They don't show the learning, training, discipline, and practice that always guides use. They don't show the political, social, or rhetorical contexts of use. They don't show the learning communities that influence the nature of use, the way the particular tool is learned, deployed, and changed. In other words, the pictures misrepresent the machines as disembodied tools, instead of what they really were—extensions of my identity, practice, and training as a writer. Those machines shaped me. In turn, those machines became an extension of me. Now, as I sit here writing this paragraph on my QWERTY keyboard, watching the characters inserting themselves in the article—while at the same time checking my email and reading articles off the Web—my machine and I have become partners in composing, the machine (this time a PowerBook G4) allowing a wide range of options, only some of which I understand and use. This machine combines a number of old technologies with some new capabilities. The typewriter is still there in the computer, as is the pencil, the paper, the old desktop publishing tools, and other previous writing technologies. The computer is an accumulative writing tool—and learning to use the tool was for me, as for any writer, a richly varied and accumulative experience.

As an isolated object, technology is of little interest. Rather, the real story is the use of the tool in its particular social, pedagogical, and rhetorical context. The revolution lies in several complex factors. First, of course, are the tools themselves: the computer tied to the Internet, along with increased speed and memory capabilities (that support the distribution of richer products), along with the cut-copy-paste functions. But tools got to be tools because somebody had a use for them. (The hammer does nothing by itself.) Look at the social network and the rhetorical dynamic that have developed alongside of and in concert with the tools. Who's using the tools, and why and when? Look at the users of the Internet, the hackers and computer scientists and geeky entrepreneurs and, yes, even the writing teachers who pushed the tools in ways that they were not originally intended (and so contributed to their design). These people turned a Department of Defense technology into a means of creating user communities that would end up challenging government authority—and so encouraged the development of yet other new tools, a process that has led us where we are today. Understand technology not as a static set of devices, but as a system unfolding over time, including human and non-human agents in a developmental dance. The revolution lies in *use*, which guides technological innovation. (This is Bruno Latour's 1996 argument, or one of them, in *Aramis*.¹³)

The second problematic view that could lead one to underestimate the importance of technology to writing is formalism. If you hold a formalist/textual view of writing, then, understandably, technology is not likely to matter much to writing. From a formalist/textual perspective, writing refers to the words (the prose) in sentences and paragraphs. The formalist perspective

emphasizes style, syntax, coherence, and organization—meaning at the level of the sentence and the paragraph. And you can produce the same sentence whether you’re using a pencil, a typewriter, or a computer hooked to the Internet.

However, if you take a scenic/contextual view of writing, then technology matters a great deal. From the scenic perspective, writing is not only the words on the page, but it also concerns mechanisms for production (for example, the writing process, understood cognitively, socially, and technologically); mechanisms for distribution or delivery (for example, media); invention, exploration, research, methodology, and inquiry procedures; and questions of audience, persuasiveness, and impact. From the scenic/contextual perspective, writing technologies play a huge role—especially in terms of production (process) and distribution (delivery).¹⁴ If you see writing as an action (directed at some audience for some purpose in some social context), then you are more likely to see computer-based Internet writing as having a dramatic, even revolutionary impact on writing.

Technologies of writing matter a great deal, but how they matter depends both on your view of technology and on your philosophy of writing, language, and rhetoric. Yes, technology matters to writing, but only if you have a critical view of technology (one that defines technology in terms of human–computer interaction) and a contextualist view of writing (a scenic view

Table 1
Impact of new writing technologies

Time period	General type of writing technology	Significant effect on writing product, process, delivery, or social interaction
Early 1980s	Computer-based word processing	Process: Improves speed and efficiency of print production
Late 1980s, early 1990s	Desktop publishing	Product: Expands visual/graphic repertoire available for print production (for example, page layout, typography options)
	Early Internet: Email, synchronous conferencing (chat)	Delivery: Improves speed of delivery and potential range of distribution Social interaction: A new type of rhetorical dynamic emerges with synchronous and asynchronous communication (that is, birth of “virtual communities” and synchronous chat)
Mid-1990s	Later Internet: Web-based delivery of writing (graphical email, web authoring)	Product: Earlier technologies merge to enable delivery of graphically advanced documents via the Web Social interaction: The Web captures public attention and imagination, not to mention business use, to a degree that previous technological developments did not
Late 1990s, early 2000s	Multimedia writing	Product: Expands repertoire of production tools to include audio, video, and enhanced graphical capabilities Delivery: Increased speed of delivery (for even large files) through bandwidth expansion

that focuses on production and effects of writing in its political, social, and rhetorical context). And how technology matters can vary from tool to tool, and according to particular uses. As Table 1 suggests (and as my story illustrates), different tools can have different kinds of effects, depending on the context of use. Some uses influence design of the written product, other uses affect the composing process, still other uses impact delivery and rhetorical dynamic. For 20 years, articles in *Computers and Composition* have been exploring these effects, with an appreciation for the rich variations and complexities of use for writers.

8. A new field for cyborgs/cyberwriters

The humanist approach to technology is a binary approach: “the human” and “the machine” are separate entities; this approach, of course, generally favors and celebrates the human over the machine, but also supports various attitudes toward technology. Sometimes humanism is utopian in regard to technology: Machines can help us be better as humans—for example, the view that hypertext represents a textual advance over the linearity of the print book (Bolter, 1991) or that the virtual community is a new kind of public space that will revive democracy (Rheingold, 1993; cyberlibertarians in general). More often humanism takes a dystopian view of technology, or what Andrew Feenberg (1991) called the *substantive* view: Machines threaten our freedom and identity (Roszak, 1986) or damage our writing process (Heim, 1987). This dystopian view has perhaps its earliest expression in *Phaedrus*, in which Plato (as translated by Walter Hamilton in 1973) expressed the fear that the technology of writing would harm human memory. Sometimes humanism takes a neutral and dismissive view: The machine is merely a tool for writing, nothing more. The true art of writing exists apart from the machine; the machine can help or hinder the art, but is not essential to the art (Baron, 1999).

The humanist approach can be distinguished from what is emerging, according to Katherine Hayles (1999), as the posthumanist approach to technology. This approach theoretically begins with Donna Haraway’s (1991) notion of the cyborg: a hybrid metaphor that challenges the human–machine distinction and questions conventional body boundaries and notions of the writer as purely human. A posthumanist approach explores cyborgian hybridity, the connectedness between human–machine. Such an approach begins by recognizing that “there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals” (Hayles, 1999, p. 3). In effect, “we are all . . . cyborgs” (Haraway, 1991, p. 150).

Of course the merger of the human body and the machine is not new. What causes humanists grim anxiety is the degree to which machines are assisting mental processes. Robots are being developed that can simulate human intelligence. Humans are using assistive devices (for example, computer chips) to aid their mental processes (see Menzel & D’Aluisio, 2000). In 1998, Kevin Warwick, a cybernetics researcher at the University of Reading, had a silicon chip implanted in his arm (Warwick, 2000). This chip monitored his actions and performed some simple tasks (for example, opening the door to his lab when he approached); Warwick plans an expansion of this technology to allow communication between his nervous system and his computer.

The posthumanist view is also, of course, a feminist view. It is not coincidental that all the theorists I cite in support of this view—Haraway, Hayles, Sullivan—are women. This view is feminist in three important respects: (a) It acknowledges the presence and significance of the body. The body matters, the material matters. Physicality (for example, of the body) is not secondary to form, or mind, or language (the privileged masculinist focuses of Western thought)—it is, rather, fundamental; (b) it does not bifurcate individuals from machines, or individuals from each other. Rather it looks at interrelationships—in a sense, at the interfaces of human experience (humans and machines, humans with each other); (c) this approach, at least in its postmodern and queer versions, acknowledges fluidity and hybridity. It acknowledges, explores, and celebrates variations of form and the complexity and fluidity of identity.

This posthumanist, cyborgian approach provides a theoretical frame supportive of the field of computers and writing—and it is a frame I believe we need in order to explain and explore coming technological advances. The humanists (whose perspective the field often sentimentally embraces) are fighting a losing battle, a rearguard action doomed to fail precisely because it refuses to take technology seriously in an era when technology is becoming increasingly important to all human activity, but especially to writing and communication. (That critique doesn't bother humanists terribly much. Often they take special pride in being technologically passé; they can still write books wryly critical of technology.) In its preference for abstraction, for interpretation, and for philosophical critique, the humanist approach fails to answer the fundamentally important strategic question of *how*: How will we use technology? How will we design technology? How will we engage technology? In its focus on whether technology is good or bad, useful or not, humanizing or not, humanists answer the wrong questions.

The posthumanist approach promises to change the question: It can lead us in the direction of *how*. (Of course even posthumanist theorists, like Hayles and Haraway, often fall victim to the Male Theory Game and turn away from *how*.) The posthumanist framework is an engaged metaphor that asks about human use, and that intervenes in technology design, that asks how we can shape technologies to improve human life. However, the theoretical framework needs the pragmatism of a field like computers and writing, whose members typically focus on questions of production, design, and use. The members of the field are engaged in the practice of teaching, in the act of developing a strategic and productive art of *how*.

We need to develop a rhetorical theory for this moment in technology—a theory that understands where and how the revolution is happening, that moves beyond the misdirected focus on instrumental tools (the computer, functions, applications). We need a theory that isn't tied formalistically to genre considerations (whether the genre is email, hypertext, or the new media). We need a theory that focuses on writing as not simply the activity of an individual writing or the isolated writing classroom (where the field of computers and writing has been strong, but also limited), but that looks closely at the socialized writing dynamic and the conglomerate rhetorical dynamic of readers, writers, and users and their impact on society. The revolution, if there is one, is the social one of interconnectivity. The writer and the machine have become one—the cyberwriter—but we haven't yet engaged the full implications of that metaphor. We still have a lot of work to do.

The field of computers and writing needs a name change. The term “computer” is now inadequate and is holding us back. The term does not capture the full range of technologies, nor the complexity and variations of use that we now deal with as writing teachers. Similarly,

calling our field “composition” ties us to a limited (albeit important) sphere of activity that doesn’t correspond to what members of the field actually study and do. Are we only about computers in the first-year writing classroom? The computer is the machine we use, but our critical focus through the years has never been just the machine. It has always been some kind of writing application (for example, word-processing, electronic publishing, email, the Web), or the dynamic interactions of cyberspace (for example, studies of synchronous discourse), or how computer technology changes the classroom dynamic. This work has moved well beyond the composition classroom to think about writing technologies across the academic curriculum, in the workplace, in society at large. In a way, calling our field by the machine, instead of the particular use, leads us down the trail to technological instrumentalism. More so than other fields, computers and writing has resisted that fallacy. We have been attentive to questions of human use, interaction, the composing process of the cyberwriter, etc.—but our name needs to reflect that range of inquiry. What should the new name be? That’s a tough question to answer. “Rhetoric and Technology” is broad, but doesn’t capture the concentrated focus on written production, particularly with emerging technologies, that has always been a strength of the field. “Rhetoric and CyberWriting”? How about “Rhetoric, Technology, and CyberWriting”?

9. Finally

A few years ago my son Thomas, at the time age 5, asked me in a tone of bemused curiosity, “Dad, what’s a typewriter?” (At 5, I’m pretty sure he was asking a genuine question. At 11, his current age, I’d more likely suspect it of being an ironic dig at my age or text-based view of technology.) I guess that’s when it really hit me: The typewriter age was over, gone and invisible to younger generations—even though we all still sit at that QWERTY keyboard.

My son’s question reminds me that my attitudes and views of composing on the computer still carry attitudes and practices formed in typewriter/print culture—and that later generations, including my son’s, view the computer in a totally different frame. The challenge for my son will be moving from a multimedia video game culture to seeing the computer as a tool for textual production. As an 11-year-old he is very much into video games (for example, *Tomb Raider*, *The Sims*) and Internet-based virtual reality (for example, Neopets in the world of *Neopia*¹⁵). He is impatient with the textual mono-media of email—though perhaps that is because he needs to improve his keyboarding skills. His generation is already changing our conception of writing: We are already in the age of new media, where visual and video forms of expression supersede alphabetic text.

The next generation’s story about the computer as a writing tool—and, increasingly, a writing *environment*—will be a different story from mine. But it will resemble mine in one important respect: The technological past matters. It shapes the writer and writes the body in significant ways—etching itself on the writer’s consciousness and body, influencing how the writer learns to compose and how the writer communicates in a social milieu. Our ideologies about writing, about composing, about rhetorical situation are formed in these various technological pasts, etched by various technologies. One thing I’ve always admired about the field of computers and writing is that we understand the significance of this.

Notes

1. For other personal narratives about the use of the computer as a writing tool, see Corbett (1990) and Hawisher, LeBlanc, Moran, and Selfe (1996).
2. With respectful acknowledgment to numerous blues artists, including Luther “Guitar Junior” Johnson and the Magic Rockers whose song “Can’t Get Along With You” contains this phrase as a lyric (off the “I Want to Groove With You” CD, Bullseye Blues/Rounder Records, 1990). “Let’s try it one more time./If it don’t work out,/Won’t be no fault of mine.”
3. When I graduated from college, my typing skills were good enough to land me a job as department secretary in the Department of Radiologic Physics in the Medical School at Case Western Reserve University—a kind of science editing position as well as a secretarial position.
4. As a former (alas) guitar player, I understand the similarities between typing and guitar playing. Both activities require agile and strong fingering. In guitar playing, the left hand (of the right-handed guitar player) has to move unconsciously to certain chord positions on the guitar neck; all four fingers have to move simultaneously, and quickly and with sufficient strength, to cover the chord. I have a hitch in the little finger of my left hand, a hitch created by muscle development playing the guitar (that is, the need to cover a guitar string quickly, with enough force to play the note cleanly). In a very literal sense, technology (whether of the guitar or the keyboard) *does* write the body. Especially if you drink the ink.
5. How did English classes contribute to my writing development? As an English major in college and in graduate school, I wrote *a lot* of papers. Most of these papers were in the genre of literary analysis. Frequently my English instructors gave me stylistic feedback. They taught me how to marshal evidence in support of a thesis—an important skill in argumentation. Mostly they commented on the quality and depth of the literary analysis. I don’t remember ever hearing a single English professor comment on the writing process or on writing technology. Even though the feedback was mostly product-oriented, the frequent practice in writing and the occasional editorial feedback did help. In my time, English was the only department that paid any attention to writing.
6. We don’t hear much about rebuilt computers. Electric typewriters were less noisy and somewhat easier to use than manual typewriters because you didn’t have to punch the keys so hard.
7. A word about hands and muscle memory: My right hand was first disciplined for handwriting. But starting in seventh grade my hands began to realign themselves for the QWERTY keyboard. And now, more than 30 years later, whatever handwriting muscle memory I once had is now mostly gone. Would the nuns be disappointed? Well, maybe—but then handwriting was never just about handwriting. It was more about accuracy, precision, discipline, and correctness. It was about the importance of making the writing look good. In other words, it was more about delivery—that neglected canon of rhetoric—than about composition.
8. I made almost this same level of investment again in 1990, when I purchased a Macintosh IIsi. Including the monitor, the Macintosh IIsi cost \$3,865. I purchased the 5/80 package,

which meant 5 MB RAM and an 80 MB hard drive (running at 20 Mgz). To do reasonably high-end desktop publishing, I also purchased an Apple Personal LaserWriter NT for \$2,111. (The LaserWriter printer was as much a breakthrough as the Mac interface—see Kalmbach, 1997, pp. 77–80.) In 1990, this \$5,976 technology investment constituted 14% of my annual academic base salary. I don't want to suggest I was the only person investing in this level of technology. By no means. Pat Sullivan purchased a comparable system at the same time, and the Purdue doctoral students were probably spending an even larger percentage of their TA stipends for computers. My point is that maintaining technology currency in the field of computers and writing meant—and, for most, probably still means—committing a large chunk of personal resources.

9. At this time, Pat and I began a long and fruitful collaboration on issues related to computers and writing in the workplace, and on usability, visual design, and research methodology. This work did not fit comfortably with most computers and writing research, nor did it fit comfortably with professional/technical writing (because that field was not yet taking computers or writing technologies very seriously—ironically); see Porter and Sullivan, 1994; Porter and Sullivan, 1996; Sullivan and Porter, 1990; Sullivan and Porter, 1993a, 1993b; Sullivan and Porter, 1997.
10. From its conception until about 1988–1989, *Computers and Composition* mainly focused on word-processing applications (see, for example, Hawisher's 1988 article, "Research Update: Writing and Word Processing," which reviewed 16 studies examining the effect of word-processing technology on writers' practices.) However, by the 1990s the journal was focusing on a wide range of emerging writing technologies, including synchronous chat tools, email, and hypertext.
11. To get a sense of how Unix-based Berkeley mail worked and how we had to learn it in the early 1990s, see <<http://www-acs.ucsd.edu/mail/berkeleymail.html#label5>>.
12. For information about the PINE email application, see <<http://www.washington.edu/pine/>>. For information about ELM (Electronic Mail for UNIX), see <<http://www.instinct.org/elm/>>. To get a sense of working with ELM in the mid-1990s, see Dave Taylor's ELM documentation, still available on the web in its original ASCII format at <<http://www.instinct.org/elm/doc/Ref.txt>>. For information about the EMACS text editor, see <<http://www.gnu.org/software/emacs/emacs.html>>.
13. This view endorses the contextual–critical position articulated in various ways by theorists including Sullivan (1991), Feenberg (1991), Latour (1996), Robert Johnson (1998), and by numerous others, including most members of the field of computers and writing. Generally, this view sees technology as including human use—that is, as a social realm involving writers, readers, genres, writing practices and habits, and distribution mechanisms, all of which operate dynamically. See Latour's *Aramis* for an extended case study of how this human–machine dynamic operates. See Feenberg's discussion of the "critical" approach to technology.
14. In "Taking Control of the Page," Sullivan (1991) articulated this kind of critical perspective in her discussion of the effects of electronic publishing on the writer's composing process. Her view is critical/contextual in the Ongian sense: "Technology constantly remakes the way in which we communicate and even think" (p. 45). The computer does indeed have a dramatic effect on the composing process—and Sullivan argued

that this effect is true for electronic desktop publishing technology, which dramatically changes the role of the writer by granting additional control over “the processes of text publication” (p. 48). Sullivan even took the field of computers and writing to task for its instrumentalist tendencies: “By focusing on the ‘toolness’ of writing with computers, discussions of computers and composition have promoted an image of the computer as a ‘helpmate’ or ‘assistant’ to writers and teachers rather than as an agent of change” (Sullivan, p. 45).

15. See <<http://www.neopets.com>>.

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Jim Porter is director of Rhetoric & Writing at Michigan State University. Since coming to MSU in 2001, he has helped to develop three new writing degree programs: a BA in Professional Writing, an MA in Digital Rhetoric & Professional Writing, and a PhD in Rhetoric & Writing. Currently he is writing a book on writing for digital audiences. Porter serves as an editorial board member for *Computers and Composition*, and has co-authored *Opening Spaces: Writing Technologies and Critical Research Practices* (1997) with Patricia Sullivan as part of the New Directions in Computers and Composition Studies book series. Porter’s *Rhetorical Ethics and Internetworked Writing* (1998) is also part of the New Directions series. *Rhetorical Ethics* won the 1998 *Computers and Composition* Distinguished Book Award. Porter can be reached at <porterj8@msu.edu>.

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