This article discusses the future of reading and writing. It includes a brief history of reading and writing, shows the reader how digital text has quietly evolved and threatens to take over traditional notions of what it means to be literate, and suggests that speech will emerge as a dominant way of communicating. The three ideas developed here are: (a) Pens, pencils and paper will soon be artifacts of the past; (b) Electronic reading and writing will be pervasive, collaborative, and social events; and (c) Speech will replace most writing.

Amazon's Kindle is a handheld wireless reading device with a six inch screen that looks like a book and has sparked a firestorm of interest in readers and investors (Gunnison, 2008; Klein, 2008; Levy, 2007). It is a bone-white 5 in. x 8 in. plastic device that costs $359. and can access over 185,000 books, magazines, newspapers and blogs. In 2008, Amazon announced the Kindle2 which can store 1,500 books. In 2009, the KindleDX was introduced (Wildstrom, 2009). It holds 3,500 books, supports PDF files, newspapers and textbooks. The unveiling of these e-readers and others, kindled my imagination, causing me to think about the changes reading and writing have undergone historically. *(Author’s Note: Since this article went to press, Amazon unveiled the Kindle3 which costs $139., comes with Wi-Fi, can access 630,000 books, and underscores the rapidly changing nature of technology and literacy (http://nyti.ms/cB2t2D ).*

*kindle*- to excite; stir up or get going; animate; rouse; inflame

1 www.dictionary.com
Recently, while thinking about the impact of technology on writing, I stopped short of predicting the future of literacy (Bromley, 2006, 2008). I wrote about how technology is changing our ways of writing and communicating as we combine paper and pencil with technology. I wrote about how electronic journals were augmenting paper journals and texts. I wrote about how technology affects written conventions. But, I did not explore the future of reading. This article goes beyond that earlier work to offer three ideas to kindle your interest and explore some of the challenges related to the future of reading and writing.

**Pens, Pencils, and Paper Will Soon Be Artifacts of the Past**

Reading and writing have undergone an evolution over a long period of time. A snapshot of several critical events in this history begins 50,000 to 100,000 years ago when our early ancestors created drawings on cave walls. Much later the Sumerians invented cuneiform which was the first written language inscribed on clay tablets. Then the Egyptians created hieroglyphics, a picture alphabet they wrote on papyrus. The Greeks and Romans later inscribed their alphabets on scrolls and wax tablets. The Chinese used carved blocks of wood for printing on paper in 200 BC. In 1000 AD, the Chinese invented movable clay type and later the Koreans invented movable metal type. Then, Gutenberg’s mechanical press led to steam-powered presses in Europe, with monotype and linotype presses coming later. Quill pens, pencils, ink pens, ball point pens, and felt tip markers were developed, and later typewriters and computer keyboards. In the 1980s, laser printers and personal computers supported desktop publishing. Today, reading and writing are digital events that occur worldwide. They include word processing, email, blogging, twittering, and text messaging on the Internet, cell phones, smartphones, and PDA’s (Leu, Kinzer, Coiro, & Cammack, 2004; Malloy & Gambrell, 2007). So, the absence of pens, pencils, and paper in the future should not be surprising when we look back on the history of reading and writing. This abbreviated history illustrates the evolution of reading and writing. The vocabulary associated with literacy reflects these changes as well, e.g., *pen, pencil, journal, typewriter, cursive and manuscript, book, magazine, etc.* word processor, MSWord, IM, PDA, Blackberry, email, web, keyboarding, cursor, blog, weblog, podcast, blogosphere, hypertext, e-book, e-zine, cyberspace, twitter. Clearly, reading and writing are evolving much like photography has in evolving from Brownie box cameras, single-lens reflex cameras, and Polaroid cameras, to video cameras and digital cameras.
Whether we like it or not, reading digital text has invaded our world and has found a solid place in our future. According to a Pew Internet and American Life survey (2008), 73% of adults use the Internet as compared to about 20% in 1996, and that number is growing (http://www.pewinternet.org/trends/Internet_Adoption_4.26.06.pdf). So, picture a world without pens, pencils, and paper, where we download not only Sudoku, crossword puzzles, and recipes, but also magazines, newspapers, books and other printed materials using the keypad of a Kindle, cell phone, iPhone, or PDA. For example, publishers of the Christian Science Monitor and US News and World Report made a decision based at least partly on economics and announced recently that they will go entirely online. This shift to electronic print will occur more often with the advent of “super broadband” (Lasica, 2005) that will be 100 times faster than today’s internet services.

Today, computer programs are replacing people in the newsroom. At Thompson Financial, a US news service, computers automatically generate news stories, e.g., reporting that a company did better or worse than expected (Van Duyn, 2006). How long does it take to generate these stories? After a company makes results public, it takes .03 of a second for the story to be generated. Reuters also does this and Bloomberg is not far behind. So, picture a world where pens, pencils, and paper are collector’s items, and where every K-16 student will have a laptop or wireless device for reading and writing. We no longer live with generation X... this generation is generation text, and who knows about generation next?

Electronic Reading and Writing Will be Pervasive, Collaborative, Social Events

Many of us already read electronic maps on navigation systems in our cars and golf carts. In some churches, people read the words to hymns from a screen, not a hymnbook. We read and write electronically to shop, order food and prescriptions, and pay bills on the Internet. So, picture a world where our offices and homes are paper-free and we spend more time in social cyber-networking environments like blogs, Craigslist, Angie’s List, FaceBook, or Youtube. In fact, President Obama regularly uses his Blackberry and gives a weekly video message on Youtube, a change from previous presidents who gave weekly radio addresses. In the future, we may read all our magazines, journal articles, and books online, and send and receive all our correspondence electronically. The postal service will no longer deliver advertisements and junk mail, it will come electronically to our spam mailboxes. A solitary trip to the library to leaf through a paper copy of a magazine or journal will not happen. The opportunity will be lost to discover ideas and information
serendipitously as we browse a paper text. We will be *mouse-potatoes*, as well as the *couch-potatoes* some of us are now.

Picture a world where the community of readers and writers expands dramatically. With a mouse click we will be able to reply online to authors. For example, a colleague told me recently that she has received more responses to an article she published in an online journal than to any other article she had published previously in a paper journal. Feedback from an expanded audience offers tremendous possibilities for dialogue, collaboration, and the generation of new knowledge. But the ability to quickly connect with each other will have other outcomes. For example, we may experience mental stress and sensory overload as we are bombarded by more electronic input. Or, this sensory overload may cause us to deliberately ignore possibilities as we read more narrowly so as not to be overwhelmed by the possibilities of online print.

Picture a world where we read mostly e-books. Today, along with the Kindle, Project Gutenberg and World e-Book Library are making hundreds of thousands of scanned books available on the Internet. Google has already scanned seven million books and plans to make millions more available to Web users (Trachtenberg & Vascellaro, 2008) and other internet providers are digitizing more library books. Google’s agreement with publishers will establish a registry that enables publishers and authors to receive payment when their titles are used online.

Web sites like Amazon and Scribd (short for *scribbled*) market e-books by posting free previews and excerpts. Scribd permits anyone to upload versions of books, research reports, and other printed material and share them across the web (Ante, 2009). Simon & Schuster and other publishers offer thousands of e-books for sale on Scribd. This kind of alliance demonstrates the direction traditional book publishers are taking as they step into the digital age.

What about the book as an interactive and collaborative site? Young (2006) says scholars are “beginning to question whether the printed book is the best format for advancing scholarship and communicating big ideas” (p. A 21). He believes books should be dynamic sites for conversation. He describes an example of open review on the Internet by those who read a professor’s scholarly book. Both colleagues of the professor and those who did not know his field provided feedback. One person gave valuable ideas for revising. Another reader who was unfamiliar with the field said, “This doesn’t have substance. Take some time off; teach a little” (p. A21). Receiving similar kinds of helpful and less helpful feedback on a book in draft form may be in the near future for authors.
Other examples of this new process, called open-source development, point to the future of writing. Open-source material is content that users can use, change, improve, and redistribute on the Internet. First, *Wikipedia*, the online public encyclopedia available in several languages that anyone can contribute to, caused us to rethink authorship, collaboration, text format, and access. In fact, today K-12 teachers and university professors alike set up wiki sites to encourage students to collaborate in the creation of information. Second, the journal *Nature* began making submitted articles available immediately for electronic review by anyone (Young, 2006). The standard review process is used, but authors also receive online comments from the public. This digital response process makes reading and writing a social process. Third, Rice University recently began the first all-digital university press as a model for other universities faced with increased costs of scholarly publishing. The Rice press includes multi-media features and online discussions of its e-books (Young, 2006). Fourth, President Obama, called “the first major politician who really ‘gets the Internet’” (Lyons & Stone, 2008, p. 40), plans to create “a user-friendly portal where people can look up and comment on legislation before he signs it” (p. 41).

In this new world, public collaborations in cyber-space will affect all kinds of reading and writing. Quart (2008) and Wittenberg (2006) believe the publishing world is at a crossroads. Because users are learning to communicate in sophisticated, interactive, collaborative, and often free online environments, “traditional forms of publishing are at risk of becoming irrelevant if they do not evolve” (Wittenberg, 2006, p. B20). It seems that libraries, books, magazines, newspapers, and even television must be prepared to undergo drastic makeovers. And, indeed many of them have by changing the type and style of information and access they provide. Many libraries now provide *Information Commons* where patrons use computers to search library holdings and the Internet. Magazines, newspapers, and television have changed the style and type of writing they feature by adding blogs and interactive sites to engage users. People have created their own blogs in which they do not follow anything traditional, but create their own venues and genres.

What will happen to all the written text we have produced and will produce? The electronic information we create is fragile. It exists as “magnetic pulses or microscopic pits on a disk” (Carlson, 2004, p. A27). Documents saved in the 1980s on a floppy disk may be unreadable now, but Emily Dickinson’s poetry locked away in a box for decades can be found, read, and reproduced. New technology will require new ways of preservation. Future historians will need to know how to use software programs and machines that no longer exist, or all that information
archived there will be lost. Thus, the Library of Congress' $100 million dollar digital-archiving program is critical to future readers and writers (Carlson, 2004).

Speech Will Replace Most Writing

In his essay “The Future of Writing,” Sperber (2002) says, “the revolution in information and communication technology may soon turn writing into a relic of the past” (p. 2). He predicts that with the speech-to-print capability of computers, speech may well displace the activity of writing. He says, “Once it will be possible to by-pass writing, many people may come to realize what a source of discomfort it always was to them” (p. 20). Using speech recognition software to convert talk to electronic print will be much quicker than handwriting or keyboarding because we speak more quickly than we write. This software will free us from the physical tension of writing and it will be freeing once we are over the awkwardness of speaking into a machine. However, reading computer encoded, digital print and hypertext will still be necessary, and we will need to be competent, creative, as well as cyber-savvy users.

We may all soon use speech-to-text conversion programs with our laptops, iPhones, cell phones, PDA’s, and other newly invented writing devices. The evolution of speech-recognition software like Dragon Naturally Speaking 9.0 will make talk our new form of electronic writing. This software program is “three times faster than typing and 99 times more accurate” (www.nuance.com). In the future, we can be sure there will be even more programs of this type with even better improvements in the future.

Imagine a world where writing no longer involves our fingers touching a keyboard. Picture a world where our voices activate and produce digital print. Speech-to-text software will reproduce unwanted oral output like “um,” “ah,” and “like, you know” and we will need to edit these utterances out of our writing. Picture a world where students use speech-to-print programs to take high stakes tests electronically. The need for thinking skills will outweigh the need for skills in handwriting or keyboarding. However, thinking while using speech-to-text writing will be difficult and we will need to understand this new process and be able to teach it well.

Speech can speed up the entire writing process. Thirty years ago I wrote my first article for a professional journal using a pencil and yellow legal pad. I revised it many times, drawing arrows, inserting new text, cutting, and pasting segments into the manuscript. I retyped it many times on my typewriter as well. After this long process, it took eight months to learn that the piece was accepted with revisions, two months to complete the revisions, and ten more months before it was finally in print.
The entire process might have been much faster if the reviewers and I had used speech recognition software. At any rate, using my word processor today is quicker and easier than the pencil and yellow pad, and submitting my manuscript online is accepted practice today. The contrast between writing 30 years ago and today is sobering, and the possibilities new technology holds for the future are amazing.

**Challenges to Consider**

The shift away from traditional forms of literacy to digital reading and writing offers many challenges. I acknowledge many possible challenges but discuss only three of them here due to space limitations. They are (a) the chaotic nature of digital literacy, (b) the potential for increased plagiarism, and (c) the changing nature of the English language as we know it and teaching in general.

Carr (2008) observes that “the Net is becoming a universal medium, the conduit for most of the information that flows through my eyes and ears and into my mind” and the Net is “chipping away at my capacity for concentration and contemplation” (p. 57). In some regards, electronic reading and writing has become more chaotic than traditional literacy. As we read an article on a newspaper's site, a flashed box or bell announces the arrival of a new email message that diverts our focus. Television programs add “crawlers” (that move along the bottom of the screen), magazines and newspapers contain shortened articles and capsule summaries, info-snippets, and pop-up ads. These changes from the traditional static print of our past will challenge us and our students to continue to reprogram our receptive powers and thinking.

However, many struggling readers and writers at all levels, from K-16, may be more capable at multi-plexing than we are (their teachers) as they make sense of a barrage of incoming digital data. Young people who have grown up in the digital age may be comfortable with what makes many of us uncomfortable (those of us who have just recently entered the digital world). Indeed, I squirm a bit when I observe the apparent ease with which a student concurrently manipulates multiple digital activities successfully (browsing websites, viewing pop-up ads, listening to downloaded music, reading and answering emails, and using instant messaging).

The ease of digital access may also enable stealing. Think about a world where intentional or unintentional plagiarism is rampant. This world may be fast approaching. Some experts believe that computers and technology have not only caused more writing, but have caused more bad writing (Grow, 1999; Leibowitz, 1999). Consider the plagiarism unearthed by a graduate student in mechanical engineering who
discovered 39 plagiarized theses with material copied from textbooks, other theses, journal articles, and the Internet (Wasley, 2006). Sometimes the copied material was as much as 14 identical pages, including flow charts, data tables, and narrative (with typos and misspellings, as well). The university removed the 39 theses from the library and the degrees confirmed are in question.

We will need to teach reading and writing differently in the future. Sonn (2006) says, “people have spontaneously and accidentally created what amounts to a new printed medium” (p. 343). This medium has no real usage rules, and as we create “great megabyte mountains of information” there is a collapse occurring in grammar and language (p. 343). Changes in what we know as Standard English practice are occurring today and will continue to occur in the future. Thus, many teachers who find IM (instant messaging- a shortened version of standard spelling) in student writing, have a difficult time persuading students that IM is not acceptable in class assignments. Some examples of IM used in text messaging and emails are “ttyl” (talk to you later), “lol” (laughing out loud), and “brb” (be right back). This e-shorthand enables quicker communication and has established a new form of English. Perhaps future students will need to know both the traditional English spelling and grammar and IM as well.

Implications for Instruction

Acceptance of the growing place of digital literacy in society today leads to the following question: What do we do now to accommodate struggling learners and those who have grown up in a digital age who often use technology more adeptly than the tools of traditional literacy? There are several ways to begin to face this reality.

It will be of paramount importance to teach critical visual literacy to all students including those who struggle with learning. Monaghan (2006) observes that “students must be able to interpret not just words, but still and moving images, understanding how they are constructed, how they create meaning and how they can deceive” (p. A33). The Internet offers a greater variety and vastness of information in print, pictures, sound, animation, and it is available more quickly than with hard copy. While the images and sounds of hypertext are sometimes easier and more interesting to read, they also require special skills (Leu et al., 2004; Malloy & Gambrell, 2007). Those special skills include accessing, selecting, reading and evaluating the pictures, sounds, print, sources and format of electronic documents.

K-16 teachers will need to encourage and recognize digital creations as valid demonstrations of literacy. Today, many researchers, teachers
and students routinely create multimedia projects with hypertext. In the future, developmental literacy courses like “Writing with Video” may routinely take the place of “Freshman Composition 101.” These courses are offered now at a few institutions like the University of California (Monaghan, 2006). Teaching multimedia literacy will undoubtedly need to be a routine part of the general education requirement in all schools, colleges, and universities in the future. And, because university level education reaches only about 20% of the population, learning to evaluate and create Internet information with hypertext will be extremely important for those who do not finish high school or attend college or university.

We will need to be intentional in our teaching of K-16 students about what constitutes plagiarism. The “cut and paste” option of word processors makes the possibility of plagiarism from the Internet more of a probability than it has been in the past. One way to offset this after defining, discussing and showing students examples of plagiarized work, is to demonstrate the function of Web sites like Turnitin (www.turnitin.com) that identify plagiarized work. A teacher might send students to the Website Essayrater (http://www.essayrater.com/) which is a writing support tool that proofreads texts and protects against plagiarism. It also checks for spelling, grammar and poor word choice thus helping students improve their style as well. Additionally, teachers can have students upload their finished papers to Turnitin to learn first-hand about the originality of their own writing.

It is important that we are sensitive to the kinds of reading and writing students use in their out-of-school worlds. Williams (2008) believes that we understand those experiences better when we listen to students. She asserts that understanding students’ use of electronic reading and writing and the collaboration and knowledge sharing they do outside school can better help teachers connect the in-school literacies students need to learn with the out-of-school literacies in which they engage. Thus, we can listen to students and/or ask for their responses in written surveys about their beliefs and practices related to their out-of-school reading and writing practices.

Teachers then can make assignments that blend students’ in-school-literacies with their out-of-school literacies. One way to integrate students’ multiple literacies is to require both paper and electronic references and citations in their work. Another way is to assign a paper on a given topic and have half the class write it using some IM and half the class write the paper in traditional English. Then students can swap papers and translate English into IM and vice versa. Or, students could write two versions of a paper, both credit-bearing, one version including IM
and one written in standard English. Teaching this way validates these multi-literacies and provides an opportunity to help students know in which instances IM and Standard English are used appropriately.

K-16 teachers will need to provide access to and use of new technology across the curriculum. Marchant (2007) says that giving high school and postsecondary students a wider range of online experiences in their class work in all subject areas will provide both teachers and students better preparation for the digital future. So, having students evaluate websites for validity and readability related to a topic they are studying in science, social studies, math or English is one way to incorporate Web-based learning. Accepting a PowerPoint presentation in place of a research paper or report is another way to involve students in using the new technologies in various curricular areas.

Postsecondary education is in transition and quickly facing an upheaval in the way learning is provided. Indeed, online courses and degrees offered by a variety of institutions are proliferating rapidly at all levels (associate, bachelor, masters, and doctoral). Teachers who value face-to-face classes and coursework might consider the advantages of creating hybrid courses that include both face-to-face meetings and electronic classes. Indeed, blended courses can provide students with opportunities to become socially adept and technologically proficient at the same time, thus dispelling the criticism that on-line programs and degrees create technology skills but not interpersonal skills.

**Final Thoughts**

Certainly, I have ignored topics, missed issues, and omitted expert opinion. However, I hope I have kindled your imagination to think about the notion that we are fast approaching huge changes in reading and writing. We are looking at the replacement of “lost media” (e.g., magazines and newspapers) with “found media” (e.g., blogs and the Web) (Quart, 2008). Of course, to say these things unequivocally is to forget some past predictions. What happened when we thought the U.S. would “go metric”? What happened to the Initial Teaching Alphabet (ITA) that promised to solve children’s reading problems? Why isn’t the Edsel “the car of the future” as it was first described?

Picture a world where reading and writing do not remain static. As reading and writing have evolved throughout history, they will continue their transformation into new entities that are beyond our wildest imagining. Surely, objects like pens, pencils, and paper soon will disappear. Surely, more reading and writing will be electronic, collaborative, and social. Surely, writing will occur more often through speech. Surely, reading and writing will present us with new challenges as we
learn it and teach it. And surely we need to listen to students and use their feedback as we provide quality and rigor in the digital learning experiences we create.

References


Karen Bromley is a SUNY Distinguished Teaching Professor in the School of Education at Binghamton University where she teaches courses in the master’s and doctoral programs. Her research interests are vocabulary development, literacy instruction and assessment, and writing. Her most recent books are *Writing for Educators: Personal Essays and Practical Advice, Stretching Students’ Vocabulary and 50 Graphic Organizers for Reading, Writing and More.*