

Beyond Imagination The Internet and Global Digital Literacy

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IBEGIN WITH FOUR NEWS STORIES THAT APPEARED IN NEWSPAPERS IN THE United Kingdom and Ireland during late March and early April 1996. The first story from the *Irish Times* describes a class in an isolated rural school in County Donegal that in the words of the article has “caught Internet fever” (“Drawn into the Net”). Even though the school has no computers, a first and second grade teacher, Michael McMullin, came up with the idea of teaching a unit on weather by connecting children on different continents using his home computer. McMullin identified partner schools in Alaska and Tasmania where elementary teachers had children collect weather data, and their observations were exchanged daily. Soon the children began to ask other questions. The children in Alaska wanted to know whether the water swirls down the toilet in the same direction all over the world. By comparing observations with children in Tasmania and Ireland, the children in Alaska discovered that water swirls in different directions in the Northern and Southern hemispheres. It was not long before the children began writing about other subjects, including their favorite television shows. The story ends with the teacher commenting that the project has been a good start, but the situation is far from ideal because the children are not getting hands-on experience and the school lacks funds for purchasing equipment.

The second story from *Computer Weekly* runs with the headline, “UK: A Battle for Young Hearts and Minds.” It describes a large-scale give-away package to British schools from Microsoft that includes software and Internet access. Mark East, a manager for Microsoft, is quoted as saying: “Microsoft does not see education as a revenue stream. We want to give children access to our products as early as possible.” Until recently schools in Britain have been dominated by Acorn and Apple platforms, but the Microsoft offer is likely to direct future purchases to Intel-based computers. The article summarizes Microsoft’s goals with an adaptation of the Jesuit maxim, “Give me a child of seven and I will give you a Microsoft user for life.”

The third story from the *Evening Standard* concerns a television ad campaign for British Telecom office products that include Internet connections

and videoconferencing (Bradshaw). The campaign runs with the slogan "Work smarter, not just harder." One of the ads depicts a bumbling male manager attempting to persuade a female secretary to stay late and type letters for a mass mailing. His inducement is an offer of cups of tea. She gently explains to him that they have a database program that can produce the letters with a simple command, and thus the commercial ends with smiles all around.

The fourth story from *The Scotsman* with the headline, "Fears of Financial Jobs Axe" begins: "Job losses in the financial services sector will rise sharply in the next three months, according to the latest survey of the sector by the Confederation of British Industry" (Stokes). It goes on to mention that huge job cuts have been announced by companies such as Barclays Bank. The results of the survey anticipate even larger cuts during the second quarter of 1996. The associate director of economic analysis for the Confederation of British Industry, Sudhir Junankar, is quoted as saying: "Firms seem determined to ease the pressure on profit margins in the current highly competitive market, and are planning to cut their costs by cutting employment and investing more heavily in information technology."

At this point you likely are thinking you have heard all these stories before set in different locations among the advanced nations of Europe, North America, and the Pacific Rim. Hundreds of articles have appeared recently about children around the world who are now connecting with other children on the Internet. Many of these articles are framed with sweeping pronouncements claiming that the Internet has become the best opportunity for improving education since the printing press (Ellsworth xxii) or even in the history of the world (Dyrli and Kinnaman 79). In spite of the hyperbole, these claims do have some justification, at least within the span of our lifetimes. According to the National Center for Education Statistics, the percentage of public schools in the United States with Internet access rose from 37% in fall 1994 to 78% in fall 1997. Schools with five or more instructional rooms increased from 25% in 1996 to 43% in 1997. And while poor and rural schools lag behind in these categories, they too have made substantial gains in connectivity. Furthermore, a little noticed provision of the Telecommunications Act of 1996 requires telephone companies to pay for wiring all schools and libraries in the United States to the Internet. By spring 1998, the Federal Communications Commission had collected \$625 million to hook up American schools and libraries with the eventual price tag expected to run much higher (Tumulty and Dickerson). If phone companies are allowed to raise rates to fund this initiative (which may be a big "if" when consumers see higher phone bills), the promise of President Clinton's Technology Literacy Challenge to connect all U.S. public schools and every instructional room (classrooms, computer labs, libraries, and media centers) to the Internet seems not only possible but inevitable.

The curiosity of the first and second graders in Michael McMullin's classroom in County Donegal suggest the potential for students creating local content and communicating worldwide. Furthermore, children connected to the

Internet can use library resources on a scale that is almost beyond comprehension. Massive data bases like Lexis/Nexis offer access to thousands of periodicals, and the search tools for using these data bases are becoming increasingly easier to use. In President Clinton's words, "This phenomenon has absolutely staggering possibilities to democratize, to empower people all over the world. It could make it possible for every child with access to a computer to stretch a hand across a keyboard, to reach every book every written, every painting ever painted, every symphony ever composed." It raises the question: How does education change for a child who begins school with the potential to communicate with millions of other children and adults, to publish globally, and to explore the largest library ever assembled?

Sometimes hidden in these stories and statistics about the incredible potential of the Internet are hard facts that classroom teachers know all too well. Even though the student-to-computer ratio in American schools has risen to about 9-to-1, over half of those machines are so obsolete that they cannot be connected to the Internet. Cheap Internet access does little to help classrooms still equipped with XTs, Apple IIs, and Commodore 64s. Nearly everywhere else the situation is worse. Even in Germany, one of the most technologically advanced nations in the world, the Research and Technology Minister, Juergen Ruettggers, bemoaned the fact that of the 43,000 German schools, only 500 were connected to the Internet in 1996 and only two percent of students had access to a computer in school (Boston). The ending of the County Donegal story that the school lacks funds for purchasing equipment is unfortunately the often repeated downside of children's enthusiasm for the Internet.

In rich and poor nations alike, educators are looking to the private sector to provide information networks and computers for schools. Microsoft, which now controls over eighty percent of software business worldwide, is pouring tens of millions of dollars into education. The motives of Microsoft are perhaps most clear in China, a nation that sanctions software piracy on a massive scale. Pirated copies of the latest Chinese version of Windows are sold for about five dollars before they are even announced. Nevertheless, Microsoft is spending two million dollars a year to train Chinese technicians and programmers and giving away millions more to government ministries and universities. The great irony of the massive piracy of Microsoft is that it makes Microsoft the standard with a huge base of installed customers. Microsoft figures that it will make the money back in the long run with sales of upgrades, applications, and service contracts (Engardio 1996).

The second question I want to pose is raised by the Microsoft example and its adapted slogan: "Give me a child of seven and I will give you a Microsoft user for life." Technology has brought corporate involvement in education to an extent never before seen. At a time when the level of public expenditure on education in many nations continues to decline, schools have little choice but to accept corporate support for expensive technology. Microsoft might well be commended for its largess, but the dependence on corporations to provide

technology for schools is a large step toward the privatization of education. Thus my second question is: how will education be affected by the increasing presence of large corporations in making decisions about how children and adults will learn?

Finally, I want to examine the question implicit in the third and fourth news articles—the story about the ad campaign promoting the coming of digital technologies and one about corporate downsizing. Let's begin with the brutally obvious. The manager and secretary story does not have a happy ending. They are fodder for the next volley of layoffs. "Working smarter" really means cutting salaries and increasing profits. The technologically savvy secretary might be able to retrain herself, but the manager is a hopeless case. Any bean counter would identify him as a prime candidate for redundancy. The manager will be lucky to have a job drawing pints in a pub a few months from now. The question these stories present is: what sort of future will children enter in the aftermath of the massive redistribution of wealth and disruption of patterns of employment that have occurred during the last two decades?

Clearly these questions are of a scope much greater than I can address in this chapter, but I will argue that we as teachers must address them if we are to have any influence over how technology will reshape education. Times of major transition offer many possibilities as well as pitfalls, and those who can assess the terrain will be in the best positions to make convincing arguments about what roads to take. I begin with the unprecedented opportunities for education made possible by the Internet and for the moment put aside the limitations of access to equipment and willingness of teachers to enter new environments. To date there have been four primary educational functions of the Internet: communicating one-to-one, communicating in groups, publishing globally, and finding information globally.

Person-to-person communication is the most common use of computer networks big and small. The example of County Donegal is quite typical use where children exchange local information. Children learn a great deal about other countries and other cultures by communicating directly. One teacher in the United States observed: "You can't imagine how powerful it is for my kids to learn that their Malaysian counterparts speak three language, are members of a religion they never heard of, and live in a community with six racial groups" (Dyrli and Kinnaman 79). Even more dramatic instances of one-to-one communication have occurred following natural disasters like the 1995 earthquake in Kobe, Japan, where the Internet stayed up when other lines of communications went down and the first reports came from eyewitnesses. Other major world events (e.g., the Gulf War and the fall of the Berlin Wall) have also produced vivid accounts by those on the scene.

In addition to their peers, students can communicate with members of government, professionals in various fields, and online mentors. On my campus, staff members at the Undergraduate Writing Center have been working online with students in Roma, Texas. Roma is a town with a population of about

8,500 located in the Rio Grande Valley in one of the poorest areas of the country. As part of an outreach project to introduce high school students to the expectations of college-level work, students in Roma work with consultants in the writing center who provide the students with regular online commentary on their drafts. The computers were donated to the school as part of a technology transfer program, and they are connected on a statewide network. The Roma students are enthusiastic about their online instruction and find it one of the most successful aspects of the outreach program.

The easiest and most popular way to get students started communicating online is to have them join a discussion group. Thousands of these groups exist on the Internet and on all major commercial online services. Many are specifically for children, and several others are addressed to educational and curricular issues. Besides facilitating ongoing conversations that new voices can join, network discussion groups also give many possibilities for one-to-one communication. Because individual addresses of those who post messages to discussion groups are included in the message, these individuals can be contacted one-to-one. To give one example of how students can benefit from contacting individuals, a writing instructor at Texas had his students write to individuals posting in a discussion group concerning South Africa at the time of the elections that brought Nelson Mandela to power. They were able to ask questions and obtain first-hand reports from people in South Africa.

With the development of the World Wide Web, students can now publish their work online and make it potentially available to millions of people worldwide. A typical example is Smoky Hill High in metropolitan Denver, where students have placed a virtual school on the Web. Visitors can click on click on pictures of teachers, read the parent newsletter and student newspaper, find email addresses and browse student projects. The students have also created a virtual mall where online shoppers can buy products from the student store (Bingham). There's no doubt that these and other students across the nation have put an enormous amount of effort into creating Web pages. As teachers who encourage students to publish work in print formats have found, publication itself is a strong motivating factor. Friends and parents now regularly read the work of students at all levels of education. Many of these student Websites are quite innovative in combining graphics, text, and even audio and video, taking full advantage of the multimedia capabilities of the Web.

Finally and perhaps most important, the World Wide Web already contains vast information resources. The printing press led to the widespread distribution of information, and the Web is extending that democratization, allowing anyone with an account on a Web server to become a publisher. Companies, government agencies, non-profit organizations, and individuals have been quick to publish on websites. Large libraries like those at the University of Texas have effectively put the entire reference room online along with hundreds of periodicals with full-text articles. Much information produced by the U.S. Government is available through FedWorld, extensive scientific information is

on the Fisher Scientific Internet Catalog, and economic data is available on EDGAR. Conventional print publishers have also joined the rush to the Web.

Quite extraordinary kinds of learning facilitated by the Internet are happening now and no doubt will become more common in the near future. But we should remember that similar pronouncements were issued by advocates of cable television in the late 1960s and early 1970s. They envisioned two-way interactive systems that would facilitate political participation, improve education, and overcome social isolation. Seldom-viewed community-access channels are a legacy of this optimism. But as we all know the major result of cable television has been much more of the same. The Internet provides resources and opportunities for communication of a far greater magnitude than the most ambitious scheme for cable television, and therein lies the rub. Finding information on the World Wide Web has been compared to drinking from a fire hose. The quantity is overwhelming, even to experienced researchers. Finding information the World Wide Web is not magic. For those new to the Web, it is like a vast library with the card catalog scattered on the floor. You can spend hours wandering serendipitously on the Web just as you can spend hours browsing in a large library. But when you want to make a sustained inquiry, you need assistance. Libraries have very well developed tools to guide researchers. There are also powerful tools for searching the Internet, and if you want a specific piece of information such as a telephone number, a stock quote, or a train schedule, you can pull it up very fast.

But if you're looking for information that isn't so specific, such as the causes of the Cold War or the questions I began with, you will not find existing search tools nearly so helpful. Even if you can narrow down the search, you still will pull up much that isn't useful. One of the biggest problems with the Internet from a teacher's perspective is that it's not just the amount of information that is daunting to students; it's also the extreme variety. Pornography has been represented as the great danger to children who use the Internet, but a far greater danger is the amount of misinformation on the Internet. Misinformation even confounds the most literate users. Highly educated people swear to the validity of Internet-circulated urban folklore like the story of the scuba diver who was scooped out of the ocean in the water bucket of a fire-fighting helicopter and then dropped alive onto a forest fire in California.

Misinformation, of course, is a problem with print literacy also. The elaborate classification schemes of libraries, however, give many clues about the origins and reliability of information. Academic periodicals are often shelved in locations apart from popular periodicals, but such differences on the Internet are often hidden. Many discussion groups and websites purport to offer factual, neutral information but in fact contain highly biased and false information. There are Web pages that deny the Holocaust with seemingly credible references and statistics. Images likewise can be deceiving because they can be easily altered. In the past teachers have managed the information students receive by limiting the number and variety of sources. Of course, they can still

impose such limitations, but at some point students need to learn how to access the vast information on the Internet and how to assess its value. Usually access is described in terms of equipment and technical skills, but information literacy will require a great deal more on the part of teachers and students. The Internet is sometimes described as a tangled information jungle, but perhaps a better metaphor is a metropolis of tribes, each with a different view of reality. Perhaps the hardest task of all is leading students to understand why the different tribes interpret reality differently.

At this point I would like to return to the issues of access I raised with my second and third questions. For those who foresee the coming of a techno-utopia via the Internet, access is simply a matter of bandwidth. Expand the bandwidth by going from wires to wireless and all can communicate to their hearts' content. This vision continues a deeply embedded libertarian ideology that dates to the origins of the Internet as a Cold War project designed to maintain communications in the aftermath of a nuclear war. The ingenious solution was to flatten the lines of communication so that every node was an independent sender or receiver and messages could take any route to their destination. All that was necessary to hook up a computer to the system was a small robust set of protocols. This ease of access was celebrated in slogans like "Information wants to be free."

In fact, this vision of the Internet depended on a government-supplied communications backbone funded first by the United States Department of Defense and later by the National Science Foundation. The end of this libertarian vision of the Internet came on April 30, 1995, when the National Science Foundation unplugged its backbone and the Internet became privatized. In February 1996, the signing into law of the Telecommunications Reform Act set off a frenzy of mergers and partnerships among corporations involved in computing, communications, publishing, and entertainment—mergers that perhaps are only the beginnings of consolidation of power as the giants buy up the technology to control how we work, how we get information, how we shop, how we relax, and how we communicate with other people. The supporters of the Telecommunications Act of 1996 claimed deregulated airwaves would bring increased competition and lower prices, but to date, just the opposite has happened. The big players recognized that the biggest profits would come from the biggest market shares, and they have consolidated by merging rather than engaging in a competitive free-for-all. Prices for customers often have gone up. In November 1996 AT&T raised long-distance rates 6% for its 80 million residential customers, and some of the Baby Bells including PacTel and Bell South increased prices for high-speed ISDN Internet access.

The corporate giants are also influencing ambitious plans for higher education. Large companies such as Federal Express, Motorola, IBM, and Xerox have extensive online education programs, and state governors are looking to corporate education for models of alternatives to traditional higher education. The leaders in this movement have been Mike Leavitt, Governor of Utah, and

Roy Romer, former Governor of Colorado, who have been the chief proponents of Western Governors University, that takes its name from the Denver-based Western Governors Association. Sixteen of the eighteen states in the Western Governors Association, along with Indiana, have signed on. South Dakota and California are not part of the consortium, but Pete Wilson, when he was governor, announced a similar plan for California.

Western Governors University is designed to be a virtual university without a traditional campus. Students will in enroll in courses and receive instruction online. The governors endorsed the following criteria for Western Governors University. It is to be:

- market driven, focusing on the needs of employers rather than a faculty-defined curriculum;
- degree granting, going into direct competition with community colleges, 4-year colleges and universities;
- competency-based, grounding certification on the demonstration of employer-defined competencies rather than credit hours;
- non-teaching, thus not providing direct instruction;
- cost effective, meaning that without campuses to build and maintain and large faculties to pay, it is far cheaper than traditional education;
- regional, allowing students to enroll in online courses offered at colleges and universities in any of the other states or courses offered by businesses; and
- quickly initiated, with the first associate degrees awarded in 1998.

Western Governors University is designed from an employers' perspective. Degrees from WGU are certifications of particular skills, thus in theory guaranteeing the employer that a trained worker is being hired. Companies that have contributed to WGU and sit on its Advisory Board include 3Com Corporation, AT&T, Educational Management Group (a unit of Simon and Schuster), IBM, International Thomson Publishing, MCI, and Sun Microsystems Inc. (Fahys).

One of the goals is to expand access to postsecondary education for citizens of Western states. There's no question that extensive content can be delivered by digital technologies and that it is absolutely essential for professionals in fields such as medicine, pharmacy, and engineering to have access to continuing education. But the motives of the Western governors are not solely based on expanding access. They are worried about how they will meet increasing demand for higher education when the "baby-boom echo" generation expands the traditional college age group by fifteen percent by 2008 and more adults are returning to college. This boom has been called "Tidal Wave 2," with most of the impact coming in the Western states which will see a 60% growth by 2008, in contrast to 10% in the Midwest, 21% in the Northeast, and 22% in the South (Honan).

In the late 1960s and early 1970s, in response to the surge of baby boomers, California built 42 new community colleges, 4 state colleges, and three new UC

campuses. Want to bet that it will happen again? Spending on education in the Western states and especially Washington, Oregon, California, Idaho, and Nevada, is limited by voter-led tax initiatives, and elementary and secondary education is first in line for what money is available for education. In Oregon the spending on higher education has been cut by almost half in actual dollars since 1990.

The primary motive driving Western Governors University is providing higher education on the cheap. The logic is economy of scale. What can be taught to 10 can be taught to 100. What can be taught to 100 can be taught to 1,000. What can be taught to 1,000 can be taught to an infinite number.

With budgets already strained, governors and legislators are looking for cheap solutions. Online courses offered from virtual universities that do not require new buildings or faculty are going to be very popular with state legislators who want to slash faculty payrolls and abolish tenure. But if the primary motive driving distance learning is to cut costs, distance learning will be inferior learning. We've seen ambitious schemes for distance education based on economy of scale before, and they've produced a list of disappointments. You may remember Sunrise Semester, Continental Classroom, and University of Mid-America.

Not every administrator is enthusiastic about eliminating the faculty's role in teaching and defining the curriculum. Kenneth Ashworth, former Commissioner of the Texas Higher Education Board, says that Western Governors University "has enormous possibilities of harming higher education as we know it, particularly if it is largely controlled and organized to meet the demands of employers." His voice, however, is not the one of the majority.

The most immediate question for us as college teachers and administrators is how do we respond. Denial is not an option.

First, we have to keep the focus on learning and not on technology, and to do that we have to ask: What do we want students to learn? I believe we have good answers to this question. We want students to recognize and value the breadth of information available and to evaluate, analyze, and synthesize that information. We want students to construct new meaning and knowledge with technology. We want students to be able to communicate in a variety of media for different audiences and purposes. And we want students to become responsible citizens and community members. We want them to understand the ethical, cultural, environmental and societal implications of technology and telecommunications, and develop a sense of stewardship and responsibility regarding the use of technology.

The next question is how to create the best possible environment for learning, and to answer that question, we need to query our assumptions about how people learn best. I believe that most learning is not "self-taught," most learning is not a solitary experience, and that people learn best learning with other people. From research I have read, from my experience administering a large computer-based writing program, and from ten years of teaching in networked

classrooms, I offer you the following characteristics for the best possible learning environment with technology:

First, students trained in collaborative learning have higher achievement and self esteem. Even though the value of collaborative learning has been well established, many faculty still remain resistant to collaborative learning.

Second, introducing technology has made learning more student-centered, encouraged collaboration, and increased student-teacher interaction. Students who would probably not make a special trip to an instructor's office hour for a simple question will pose that question in an email message. Students likewise can work collaboratively without having to meet always face-to-face.

Third, students who use telecommunications across different geographic locations are more motivated and learn more. For one example, Wallace Fowler, professor of aerospace engineering at Texas, administers a project that joins students from historically African-American and predominantly Mexican-American colleges with students at Texas in designing actual spacecraft. He said when the project started, he feared the educational differences would be too extreme for successful collaboration, but by the end of the first year, the performance levels across institutions were comparable.

Fourth, exemplary computer-using teachers typically enjoy smaller classes and more technical support than other teachers. At Texas we have never pretended that our computer-assisted courses are cheaper than traditional courses. Instead, we have argued that our computer-assisted courses offer students opportunities that are not available traditional courses.

Fifth, teachers are more effective with training and support for integrating technology into the curriculum. While this statement seems beyond the obvious, of all the professionals who use technology, teachers are probably the most poorly supported. Training reduces anxiety and increases understanding in how to use technology.

Sixth, major change does not come overnight. I would like to end by briefly talking about my own experience. I began using mainframe computers for statistical and linguistic analyses in the mid-1970s and for word processing by the end of the 1970s. When microcomputers came on the scene in the 1980s, I like most writing teachers advocated their use because they facilitated revision. In spring 1988 I began teaching in classrooms where computers were connected in local networks. I and others have written about how these local networks led to significant changes in patterns of classroom interaction, but most of the work of students in these classes remained discussing topics which I had selected and producing essays in multiple drafts with peer reviews. If I had to plot my trajectory as a college writing teacher from my first course as a graduate assistant in 1970, I would note incremental change up to spring 1996 when I began teaching a lower-division elective course designed to give students opportunities to publish on the Internet. I had just finished teaching a practicum for new graduate student instructors, and I found myself in desperate need of a similar course. Even though I adapted most of my materials from

other instructors who had taught the course before, I still spent a great deal of time preparing for the course.

Part of my difficulty was caused by shifting from essays to multimedia websites as the students' main products. I dug out books on graphic design that I had used as an undergraduate studying architecture. I went to Web publishing classes offered by my university and did independent tutorials in Photoshop. But that was only the beginning. I had to find teaching materials and figure out how to sequence activities. The biggest problem I had, however, was adjusting to a very different classroom space. We had a sense of community and we worked together well, but at the same time everything that we did involved interacting with the big world. We had throughout the semester virtual visitors from around the world who would comment on what we were doing and occasionally engage us in discussion. What I was teaching was not preparatory to interacting with the world. We were doing it from the get go.

I'm struck by the mismatch between my experience teaching with technology and visions of future of education set out in the public media and by government officials. I find the following statement nothing short of astounding:

Academic technophobes, of course, insist that nothing will ever replace the good teacher. But even the best teacher cannot match the flexibility, the richness of resources and the ease in mastering a body of knowledge made possible by top-quality instructional software, especially for a generation often more at home on the Internet than with a textbook. (Elfin)

This quotation appeared in the lead article for *U.S. News & World Report's* annual "Best Colleges" issue, one of the most widely read statements on higher education. I do not discount the facts that there are many academic technophobes and that many students have learned a great deal on their own by using technology. But I do not see top-quality software providing the answers for the questions I have raised nor do I see top-quality software preparing students to take active roles in public life.

Indeed, I see teachers needed more than ever before because the demands of digital literacy are greater cognitively and socially than those of print literacy. Because we have a great deal of convincing to do, I believe that teachers have to enter policy debates, even when they are not invited. We have to convince those in corporations and government and the public at large that teachers should still be allowed to determine the curriculum and be granted leadership roles in educational policy. So the downside is that we're going to have to learn a lot more and do a lot more and speak out a lot more, and we're probably not going to be directly rewarded for doing it. But if we're under-appreciated, under-loved, and underpaid, at least we're not irrelevant. And that's our big advantage in the long run.