

The New Millennium:
Transformation of Learning and Scholarship in a New Era

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Without a doubt, the advances in the capacity and reach of information technologies are so sweeping that we can properly say we have entered a new communications age – an age where institutional and personal communications, and perhaps even learning itself is being transformed in fundamental ways. It is the age of the New Millennium Learner, where technologies not only enable but perhaps even require new teaching and learning styles. It is an age of ubiquitous access, where the simultaneous engagement of multiple channels of communication, and multitasking to keep up with it all, are par for the course.

The various research projects in which we have been engaged point to a range of opportunities, problems, dilemmas and unresolved issues associated with this new world. This paper attempts to touch on a few of these.

While the evidence of the actual *value* in educational settings of the deep penetration of new technologies is meager at best and damning at worst,¹ many of us are drawn into participating in what are essentially promotional activities as if their value were a settled issue. Progress is assumed to be demonstrated in access *itself*, as if our mere capacity to deploy the technologies were the only evidence required to demonstrate that we are better off than we used to be.

It is fair to say that through the University of Washington I have contributed to a range of projects, the main purpose of which has been to bring technology to people who would otherwise lack access, on the assumption that enhanced access is beneficial and warranted.



Toward Ubiquitous Computing: Estonia's "@" signs signal the widespread availability and *expectation* of Internet access.

¹ See Todd Oppenheimer, [The Flickering Mind: Saving Education from the False Promise of Technology](#) Random House, 2003; Neil Postman, [Amusing Ourselves to Death: Public Discourse in the Age of Show Business](#) Penguin, 1985.

So, for example, I agreed several years ago to head a task force to advise decision makers about how best to provide “leading edge” computer technology to the Seattle Public Schools. It seemed to our task force that the sensible first step was to review the available evidence on the value and appropriate use of technology in K-12 education. The literature and practice reports, even from the computer industry itself², turned out to be inconclusive enough for us to propose that decision makers at least reflect for awhile on whether this (enormous) expenditure was the wisest use of available public funds. But even our attempt to provide a balanced perspective rather than a blanket endorsement of technology was greeted with skepticism, including questioning our motives for considering “denying inner-city students the technology that is routinely available in private schools.”³ The decision was made to invest heavily in technological solutions to the learning crisis in the Seattle Public Schools, recommending powerful (and expensive) computers be adopted for classroom use. Years later the Seattle schools are still floundering, uncertain about how to improve.

Interestingly, among the private schools whose technology was coveted by the public schools was “Lakeside” – where Bill Gates, co-founder and chairman of Microsoft, attended high school. When I visited the Lakeside campus, I saw that they were actually using *older* computers, very successfully, because their strategy included full-time support staff whose job was to enable *substantive* rather than *cosmetic* inclusion of technologies in classrooms. The Seattle Public Schools included no similar staff in their plans.

A project we studied on telecommuting in the Puget Sound region of Washington State (where Seattle is located) was initially funded to detail the circumstances under which working from home could be most effective. This telecommuting effort was being promoted by the Washington State Department of Transportation to encourage people to work at home in order to mitigate the massive traffic jams in our area. Our research, however, also described fundamental institutional problems which the proposed technological solutions did not address, and some of these findings are directly appropriate to the evolving lifestyle, and potential workstyle, of New Millennium Learners.⁴ Our research staff included survey researchers and students from the school of business, but also ethnographers and anthropologists so we could interview and spend time not only with telecommuters (all of whom spent some days at home and some at work) but also with their non-telecommuting colleagues and supervisors in order to understand the range of impacts of telecommuting. To our surprise, we found that the most productive work days for *both* telecommuters *and* non-telecommuters were telecommuting days. Why? Because those were days when meetings were minimized since a quorum could not be assembled in the office. What telecommuters most valued on their telecommuting days was the opportunity for time to get their work done, unimpeded by the interruptions that were commonplace in the traditional work setting. What non-telecommuting colleagues valued was the decrease in office time devoted to useless meetings. To the chagrin of the telecommunications industry, our telecommuters often barely contacted the office on their telecommuting days. The value they found was in the efficiency of work time *away* from the office, not in the opportunity to keep in touch even when

² See for example the various reports from Apple Computer’s Advanced Technology Group on the thoughtful, well-funded and carefully researched *Vivarium Program* implemented in the Los Angeles Public Schools from 1985 through 1992.

³ The deep influences of new communications technologies in schools, for good and for ill, are well illustrated in a video prepared by Bill Gates for a keynote talk at Lakeside School some years ago. If we have time, I would like to show it for discussion at the Florence event on March 5-6, 2007.

⁴ See, for example, Francesc Pedró, *The New Millennium Learners: Challenging our Views on ICTA and Learning*, May, 2006.

they were away.⁵ Thus, while the perspective of many of the initial participants in this work was that ready (even ubiquitous) access to technology was what telecommuting required, the participants themselves often found that productive thinking benefited from less technology, less access, and fewer interruptions.

These were mostly seasoned adult workers, and one interpretation of these findings is that this is a generational issue, with today's younger adults not only more comfortable with, but also more productive with multitasking – with what one might call *interruptive* technologies. But another possibility is that even for these younger people the problems persist, less noticed, and even less attended to.

In another paper, we have attempted to delve into the range of impacts of the widespread use of information technologies of progress in various settings, including education.⁶ But my most extensive relevant work over the past few years has been with the Bill & Melinda Gates Foundation as the foundation placed computers⁷ in thousands of public libraries in the United States and Canada (with a bias toward libraries in the poorest communities), and later with the foundation's Global Library Initiative, which is providing access and supporting the use of technology by "underserved" people in many countries, including Chile, Mexico, Bangladesh, Colombia, South Africa, and China among others.

We can say without question the availability of technology brings important opportunities to people to whom these opportunities would otherwise be out of reach. The poorer and more isolated the locale, the more likely these technologies are to have substantial, typically positive impacts on the libraries and their communities.⁸

In the public libraries in the United States, the introduction of technology through this initiative has been successful largely because of the planning that went into the effort before implementation, including a range of activities encompassing training, carefully crafted publications, "bullet-proof" computers which could withstand years of use by novices – and a willingness regularly to revisit the foundation's contribution to project design and implementation in response to what was learned through systematic feedback from staff and users.⁹

⁵ Cy Ulberg, Andrew Gordon, David Spain, Elizabeth Fortenbery, Bethany Whitaker, and Steven Fireman, *Evaluation of the Puget Sound Telecommuting Demonstration: Survey Results and Qualitative Research*. Washington State Energy Office, Olympia, Washington, August, 1993.

⁶ Andrew Gordon and Tom Martin, *Information Technology and Progress: An Unresolved Paradox*. In C.L. Anderson and J. Looney (eds), *Making Progress: Essays in Progress and Public Policy*. Lexington Books, Lanham, MD, 2002.

⁷ We actually referred to the installation of computer *packages*, consisting of hardware, software, installation training by Gates staff who visited each library no matter how isolated, carefully crafted training materials, years of free phone assistance, etc. We concluded that elements of this package other than the computer itself were critical to the programs' success. See A. Gordon, M. Gordon and E. Moore, E. *New Computers Bring New Patrons*. *Library Journal*, February, 2001.

⁸ Importantly, this is because the package referred to above incorporated careful attention to design, so that even in places where patrons were novices, where librarians were themselves untutored in technology use, and where technical help was miles away, the computers were designed to work effectively for years. See Gordon, A. and Gordon, M. *Sustainability and Community Technology*. In *Proceedings 2005, Community Informatics Research Network* (CIRN), Monash, Italy, 2005

⁹ See A. Gordon, M. Gordon, E. Moore and L. Heuertz, *The Gates Legacy*. *Library Journal*, March, 2003



Projects are underway to introduce technology for learning in thousands of settings, including these in South Africa and Colombia

It was evident that effective impact of these projects on *learning* in those settings, and on ties between libraries and schools, required strategic, hands-on efforts by staff and leaders who understood the circumstances and perspectives of their user communities sufficiently to fine-tune their work to the particulars of the settings.

In the international implementations we have been studying more recently, we again have found major transformations in the settings where these advanced information technologies are implemented – for good or ill. But successful implementation in ways that have positive impacts on the learning experiences of the intended users once again benefits especially from careful attention to the *details* of the settings where the technologies are introduced, and from a regularly evolving strategy for technology use which acknowledges the needs and realities of the people for whom the technology is intended.



Boats in rural Bangladesh equipped with solar panels bring books, technology and learning enrichment to “floating libraries” in communities without schools and electricity

One of the benefits of the widespread nature of technology deployments such as those by the Gates Foundation projects is that they provide opportunities for researchers if the opportunities are recognized and seized. The success of the foundation's efforts has been in no small part due to their willingness to engage in research that demonstrates both their successes and failures, coupled with a willingness to modify their strategies accordingly. Similarly, the most successful local implementations we have found were those where people were attentive to local context, and modified their approaches as appropriate.

It is not curmudgeonly to consider the various deployments of technology in schools and in society more generally as a series of experiments and replications from which, with carefully considered design and implementation criteria, much can be learned as hypotheses are generated and winnowed, leading to better future deployments, always with more to learn. For example, the experience in the Seattle Public Schools and their private counterparts described above suggests the hypothesis that it is not the nature of the technology *per se*, but rather the attention given to effective integration with learning goals that impacts the acceptability of the technology to students and teachers, and the likelihood of sustained learning.

While it is impossible fully to perceive and to anticipate the implications for learning of the ever-increasing use of information technologies, it is also unwise not to seize opportunities for more effective research when they present themselves. The societal transformations we are experiencing are too fundamental to be denied. And the opportunities to design analyzable studies where appropriate, and to exploit "natural experiments" when available, are too important to be ignored.