

Putting our minds together

# The Digital Network Infrastructure and Metropolitan Chicago

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## Technology and Schools

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Whether or not it draws on new scientific research, technology is a branch of moral philosophy, not of science.  
--Paul Goodman, *New Reformation*

Americans have long entertained a romance with the power of our tools to change the world. We believe that our technology serves two central moral functions, giving us the power to right the wrongs we face, and showing us how we can frame our experience to see the world differently. Recent developments in telecommunication technologies have not dampened this fervor. Our beliefs about the power of education to improve our lives have historically been nearly as strong as our beliefs about technological development. Indeed, Americans, as much as any other people, think that education is the central means to self-improvement.

But what happens when our schools do not live up to our expectations? Our sense of the failure of schools is apparent when we speak of systems that have "broken down," of schools that have lost contact with their communities, and of our apparent inability to train workers for an ever more challenging occupational future. Consequently, we bring the healing power of technology to bear as the panacea of an ailing education system. But this call asks too much of our tools. Technological innovation can never be the savior of education. However, such innovation can, if used well within the constraints and practices of existing school structures, offer the possibility for us to examine the real consequences for innovative technologies on school practices.

There are many researchers who dedicate their work to

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## The Authors

## References

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understanding how these and similar issues play out. One such effort is the Center for Learning Technologies in Urban Schools (CLeTUS) which studies and proposes solutions to the problems posed by the adopting advanced technologies of teaching and learning in urban schools. CLeTUS represents a consortium of research institutions (Northwestern University and University of Michigan) and urban public school districts (Chicago and Detroit Public Schools), designed to explore the challenges urban schools face in exploiting computing and telecommunications technology. Both Detroit and Chicago are exemplars of the promises and the pitfalls of urban education. Our ambitious expectations for education lead us to believe that the key challenge for all schools is to offer children an education that will enrich and prepare them for productive, competitive and democratically involved lives for the next century. This is especially challenging for urban schools, such as Chicago and Detroit, because of the inequity that arises from the often pervasive social context of poverty and urban decay (Kozol, 1991; Lewis & Nakagawa, 1995). The impact of inequity is seen in neighborhoods that surround schools (Lynn & McGeary, 1990), in the schools (Knapp, 1995) and on the children themselves (Strickland & Ascher, 1992).

CLeTUS examines the paradox of technological innovation in urban schools. In the foreground are demands that urban schools take advantage of innovations that use new technologies and new organizational structures to establish new practices. In education, as in other walks of life, those with the capacity to understand and handle innovation are in the best position to see and take advantage of the emergent possibilities of new technologies. Urban schools, often with limited resources and crying needs to provide fundamental social services for their students, can have a more difficult time taking advantage of such large-scale technological innovations. On the other hand, because the backdrop of poverty and inequity faced by many urban schools make reform imperative, they can also can make participants more willing to engage in reform. This willingness to change can put urban schools in an ideal position to take advantage of the promise of innovative telecommunications technology.

We argue that we must address two key issue for urban schools to benefit from recent technological innovations: *access* and *curriculum*. Access is the problem of how to help urban schools acquire and incorporate recent advances in telecommunications technologies into their environments.

Without secure, consistent and pervasive access for urban schools and families in urban communities, the information technology revolution will reinforce, rather than reinvent, the distinction between the haves and the have-nots. But access alone is not enough. What are the uses to be made of the new technologies? By themselves, tools may suggest possibilities, but will not genuinely engender change. Unless we develop ways to integrate new technologies into the daily practices of teaching and learning, the catalytic powers of the innovation will remain untapped. Thus the second issue we address here is an expanded sense of curriculum, that is, the articulation of what can be done better with telecommunication technologies, together with an account of the how to enhance the conditions for possibilities of such changes.

### **Access**

Disparities in access to innovative telecommunication technologies, based on economic and social contexts, threaten to close the door to disadvantaged students on future information-based employment opportunities. The possible closing of this door will have serious consequences for the future of labor in the Chicago area. William Julius Wilson argues that employment is the single most significant cause for the maintenance of a permanent underclass in urban America. (Wilson, 1996) While access to telecommunication technologies offers no resolution to the complex issue of urban employment by itself, access to these technologies in schools may provide a path for urban students to enter an information-based labor market.

Access to innovative telecommunications technologies may open other doors as well. On an individual student level, difficulties with organizing excursions, gang-related territorial issues, and lack of financial means can serve to limit the world that urban students experience. The World Wide Web, the Internet, and e-mail can open up these cloistered worlds, allowing students and teachers to expand their own horizons. The vision of a school without walls can be realized virtually as students interact with peers across the world. The *Access By Design* program, a joint research effort between Northwestern and the Center for Children and Technology, considers how urban students both use and envision the use of computer software tools through extracurricular programs. Once given access to telecommunications tools, students can realize the

opportunities for communication inherent in the design as well as reach beyond the designer's intentions, inventing new uses to fit the needs of urban students.

On a school level, changes in educational practice usually happen when people realize a change is needed, and when realistic options are available for people to consider. Access to new ideas is a necessary prerequisite to reform. Unfortunately, many schools are structured such that it is difficult for new ideas to take root. As Karl Weick notes, there is often a very loose coupling between the rules and regulations of a school and the school's instructional policies. (Weick, 1976) Consequently, reform ideas can reform school policies, altering many aspects of the school environment while leaving instructional strategies intact. Instructional practices are best altered by the interactions that teachers have with other like-minded colleagues; reform policies are most effective when the loosely-coupled nature of policy and practice in schools is recognized and accommodated. (Sergiovanni, 1993) Telecommunications technology can support this view of how instructional practices change by offering schools the chance to widen their reach, allowing teachers and administrators an opportunity to break out of the "my classroom is my kingdom" view and communicate with like-minded colleagues down the hall and across the country. Within the school community, programs such as Homework Hotline help teachers and parents stay in touch about classroom expectations; while intraschool e-mail systems allow teachers and administrators to discuss student and curriculum related issues despite the constraints of the school day schedule. (Halverson, 1997) Listservs and programs such as *Tapped In* (<http://moo.tappedin.sri.com:8000/>) help teachers identify colleagues with common interests, facilitating the exchange of curricular and teaching ideas.

## Curriculum

Access alone is not enough. Too often school technology plans focus on getting the right equipment, and not on figuring out how they will use it. Consequently, schools acquire first-rate equipment only to run second-rate software, languishing as stand-alone curricula, unintegrated into the daily practices of teachers and students. CLeTUS considers how the development of programs that allow schools to use their technology, and the investigation of how technological innovations can be integrated into the school

program, as the twin tasks of curriculum design. As such, curriculum design is the interface of educational research and practice. There have been no shortage of innovative curricula developed to take advantage of telecommunications technologies. These technologies are being applied to teaching and learning contexts in ways that are producing, at an accelerated rate, new curricular applications that support open-ended inquiry (Linn, Songer & Eylon, 1996) or environments that allow learners to learn-by doing in rich, simulated worlds (Schank, Fano, Bell & Jona, 1994) But the development of innovative curricula is not sufficient to change instructional practice. In fact, schools have proven remarkably resistant to large-scale instructional reform. (Cohen, 1992; Cuban, 1990) In many schools, the stability of instructional practice safeguards some regularity in a profession plagued with shifting goals and outcomes for learning, political pressures to reform, and community expectations to "do it they way it was when I was in school." (Cohen 1995) Consequently, the instructional innovations that stick are those that can be adapted to the iceberg of current instructional practice — new icebergs need not apply.

What will become of these curricula in urban schools? Will they lead to genuine change that shifts instructional practice toward embracing new technologies? Or will they falter as the successors of filmstrips and video-disk players? Designing curricular solutions that incorporate technological innovations is a key task for the CLeTUS research. To better understand the ways in which curricula are implemented in schools, CLeTUS considers how learning technologies themselves offer opportunities for teachers, students and administrators alike to learn from the technologies. We hold that successful curricula respect current educational practices and provide opportunities for teachers to supplement, instead of supplant, their current instructional practices. We have focused our efforts in several key areas including: 1) using technology to expand the communities of educational practice through efforts such as the *CoVis Geosciences Web Server* (<http://www.covis.nwu.edu/geosciences.html>) which uses Web technology to provide a community hub that unites hundred of teachers and researchers from across the country; 2) developing innovative uses for technology to do things that teachers and students cannot currently do, such as the *World Watcher* global data visualization tool ([www.covis.nwu.edu/ww.html](http://www.covis.nwu.edu/ww.html)) which allows students and teachers alike to manipulate vast climactic and demographic datasets through a sophisticated visualization tool; and 3)

developing tools such as the *Living Curriculum* project which document how good teachers use innovative curricula and technologies in their classrooms. This research promises to have a significant effect on understanding how urban schools can best integrate innovative technologies into their school programs.

## Conclusion

The essence of technology is by no means anything technological.  
--Martin Heidegger, *The Question Concerning Technology*

The traditional task of education remains the same, despite the communication and information possibilities provided by telecommunication technologies. Information is not knowledge, and communication is not learning — they become so only when fitted into meaningful frameworks of interpretation and understanding, situated within the context of prior experience. It is, and has been, the task of schooling to help students develop and refine meaningful contexts to transform information into knowledge. In the process of education, technologies are tools: means, not ends. As such, our tools serve the ends we create, and their value is determined by how close they help us to achieving our goals.

Yet, more sophisticated tools, such as telecommunication technologies, lead us beyond means to suggest ends that emerge from our use. For example, since students are often more adept at surfing and hacking than their teachers, how could this change our conception of the ways teachers and students interact? How could new metaphors of instruction, such as learning communities and reciprocal teaching, better describe and promote these new practices?

Although innovative technologies are no panacea to the challenges of equity and achievement in urban schools, careful investigation of the ways in which these new tools can change our educational practice can offer an renewed affirmation of our belief in the power of using technology to change our world.

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