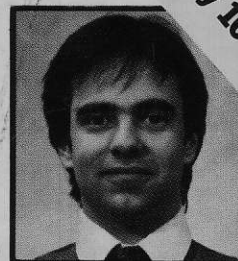


NETWORKS AND DESEGREGATION IN SAN JOSE

ELECTRONIC LEARNING

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Laptop Computers:
Seeds of Change

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SCHOLASTIC

LAPTOPS, NETWORKS, AND THE EVOLUTION OF EDUCATION

By Jason Ohler

In an age when superlatives are cliché, just what constitutes a quantum leap? Which of all the "next waves" of technological innovation washing over us will actually alter the current of our times?

Numbers can tell us some things. For example, the change from single-sided to double-sided disks doubled micro-computer storage capacity, a 2-1 upgrade. This was a welcomed but hardly colossal improvement. The next stage in the evolution of storage, a 10 megabyte hard drive, marked a leap of 27-1 over the double-sided disks. This was a much more dramatic upgrade, and by comparison, extreme enough to earn the title "quantum leap" at the time.

But numbers show these improvements for what they really are: merely amplifiers. CD ROMs, laser disks, high-resolution graphics, voice-to-data technology, et al, only amplify or augment previous activities. They solve old problems with new, more sophisticated tools that yield quantitatively more significant payoffs. But a real quantum leap does not just amplify behavior, it changes it. A real quantum leap alters the quality of human interaction, carrying with it the seeds of social transformation.

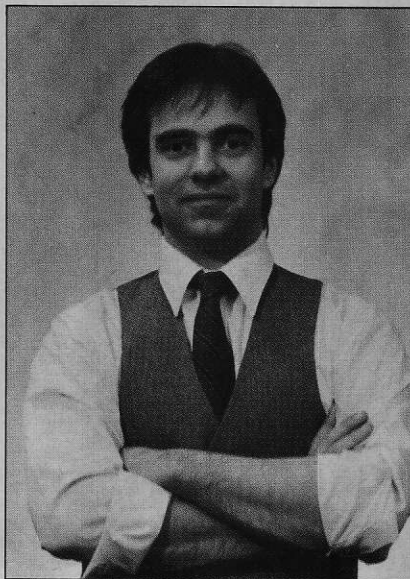
The seeds of such a transformation in education have been planted recently, and consist of an evolution of tools that carry the blueprint for a new order in the structure of learning. The tools of this evolution are the laptop computer and the network. The result will be an entirely new way in which teachers and students structure their relationship. Set in the greater context of an age in which educators are suffering from information overload, a revolution is simply unavoidable.

LAPTOPS AND NETWORKS, THE TOOLS OF CHANGE

In the 19th century the idea that children should have their own textbooks seemed a far off if not impossible dream. Today most would say the same about computers that students tuck under their arms and take to school to use as powerful electronic notebooks. And yet these tools are already here in crude form and improving rapidly. The greatest impediment to educational

computing's success has been the inherent limitations of the machines themselves. Laptop computers successfully address four of the most crucial of these limitations:

1. Cost. Laptops have begun the precipitous decline in price that characterizes high technology in a far shorter amount of time than it took their parents, the desktop computers. Laptops' smaller size and light weight promises to make them cheap under competitive conditions.



"The result will be a new way in which teachers and students structure their relationship."

2. Size. Teachers often find themselves working backwards, from technology to educational objectives, as they develop learning activities around the limitations associated with the physical set-up of computers. With the laptop, this problem is virtually eliminated. A stack of thirty laptops would fit neatly in a supply closet, out of the

way when not needed, but handy when they are.

3. Portability. The implications are staggering. The classroom expands electronically to the furthest reaches of the phone system, and even beyond, as portable transmission facilities, such as direct satellite communications dishes, make their appearance. Decentralization of the school experience increases dramatically.

4. Power. Growth in computing power will impact laptops as much if not more so than desktops. In ten years what will be contained in a box the size of the Tandy 200 would stagger today's mind. Will we have a Mac II or a 80386 machine with graphics, optic scanners, built in networking ports in ten years? At least. The real question is "Will our portable also support two-way interactive video?"

THE OTHER HALF OF THE EVOLUTION

The other half of the evolution in tools, the electronic network, is the glue that keeps the massive amount of information in the communications nervous system bound in an organic structure. It is estimated that of our 400 billion neurons only a fraction are used to maintain the body. The rest are talking to each other. So it is with electronic networks. Mainframes are strategically placed within a communications network in order to maintain the functioning of the overall system, but the bulk of the network's communication happens among network members, providing access to learning opportunities that ten years ago did not even exist in the mind's eye.

Networks are the tool of cooperative learning. So much information is available to our students that they will have to work together to access the data needed to make informed decisions.

The complexity of information tasks will diminish if we train students to work in teams using networks to harness the brainpower of many in a coordinated effort to find solutions to problems. Networks of all kinds, dimensions, and abilities already exist and are simplifying rapidly. Most promising are those which make it possible for different kinds of computers to

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share information easily and transparently, allowing for many individual computing personalities and environments to work as a single information processing organism.

CHANGES

The most obvious change in the social order due to this evolution in tools is the move from hierarchical to lateral communication. The top-down, decision-making structure which typifies business and education is being challenged by the sheer amount of information that we need to access and process and the need for people to interact directly without going through management. Teachers simply cannot be expected to be the channel through which all information flows. Students will become responsible for bringing to class new information to be shared in a cooperative, networked setting.

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unique
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A natural extension of the shift from a centralized to decentralized learning environment is the expansion of the role of the teacher, from information font to coach. In the same way that a track coach does not expect to outpace his/her fastest runner, information-age teachers cannot always expect to be more factually competent in all areas than their students. As a matter of fact, they will expect to learn from them. Teachers' levels of knowledge will always be important, but more and more they will be called upon for wisdom, the kind that can't be tested in the National Teachers Examination.

POINTING INTO THE FUTURE

Educators' ideas of how this technology can be used are marvelously insightful and creative. They envision students working cooperatively inside and outside school, visiting libraries, government agencies, museums, and other community resources, recording notes on their laptops to be shared. They see students from different communities working together on all kinds of projects, from newspapers to weather information exchanges to health cooperatives, with much of the communication being transmitted over the

phone lines. Most importantly, teachers see students opening up to writing and communicating among themselves in new and exciting ways.

PLANNING FOR CHANGE

The point is educators have the unique opportunity to plan for the inevitable, that is, to be proactive rather than reactive about the future of technology and learning. However, in the rapidly developing world of technology, there seems to be little that distinguishes planning from soothsaying. This has contributed greatly to the tendency of educational technology planners to lead reactive rather than proactive campaigns, that is, to project current technology into the unforeseen future (often making master plans obsolete before they are implemented) rather than to assume technology's development throughout and beyond the planning cycle. A graph of trends in microcomputer development would show what is perhaps obvious to many: Computers will get cheaper, smaller, more portable and more powerful, the four assets of laptops. This trend must be considered in curriculum development and educational planning. Given the right administrative planning mindset, in a decade's time the laptop computer is virtually guaranteed to become the dominant learning tool in districts that can afford to buy them (and replace them when they are stolen) or who can expect their students to afford them, the way students are expected to have calculators today. As laptops become cheap and plentiful, the distinction between have and have not will diminish, making the issues of affordability and theft less problematic.

All of this should not really take us by surprise. We are seeing a continuation of the shift that began well before the age of laptops, with television, when kids plugged into a network that bypassed their parents as the main sources of information or permission. However, television is not interactive. A network of laptops will provide this missing ingredient, and go one better than incorporating passive students into a mass consciousness. It will activate their talents and empower them to create. The networks they form will carry their own, unique and ever changing messages, like the neurons in their bodies, enabling them to produce original communities. Students will finally have the tools to recreate learning in their own image.

—Jason Ohler is Educational Technology Program Director, University of Alaska-Juneau.