

# 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.

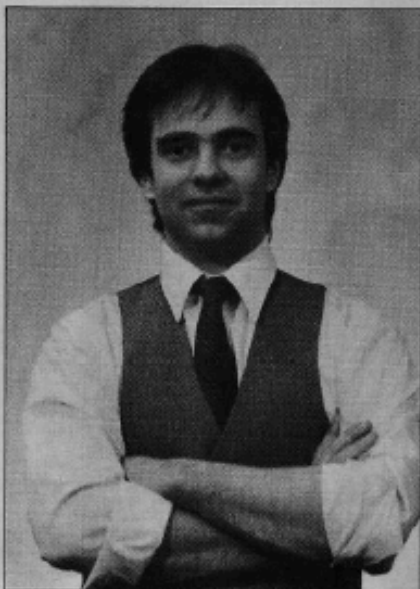
The seeds of such a transformation in education have been planted recently, and consist of an evolution of tools that carry the blueprint for a new order in the structure of learning. The tools of this evolution are the laptop computer and the network. The result will be an entirely new way in which 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.



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**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