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VOLUME 2

ISSUE 1

FEBRUARY 2004

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Forecast

Emerging issues in public education

“One-to-One Computing”: Wave of the Future or Expensive Experiment?

By Alison B. Bianchi

“Get used to the term ‘one-to-one computing,’ in which one student works with one computer or one computer-like device. You’ll probably hear it frequently in the next few years” (Vail).

Imagine a classroom where each student has a laptop computer, equipped with wireless Internet technology and loaded with cutting-edge software and educational programs. Here, the students use the computers to work on group projects, put on PowerPoint presentations, and write independently. Throughout the school day, students use their laptops in the cafeteria, study halls and outdoors. At the end of the day, they take their laptops home to complete homework assignments and research lessons on the Internet. Sound like a dream? It might, but in a growing number of school districts and states around the country, this dream is quickly becoming a reality.

Certainly, in today’s climate of fiscal stress and increasing federal and state requirements, more school districts across the country are looking for ways to increase student success while watching the bottom line. Yet technology use in our schools is on the rise. “At a time when budget woes have forced music, arts and physical education programs to be slashed, teachers to be fired, and class sizes increased, states are investing lavishly in technology, including some \$2.7 billion in federal monies [in 2003] alone, up from \$81 million in 1996” (Kleiner).

In 1994, about 35 percent of public schools in the United States had access to the Internet (Kleiner, Lewis & Greene, p. 3). By 2002, this number skyrocketed to 99 percent (Kleiner, Lewis & Greene, p. 3). Also in 2002, “the ratio of students to instructional computers with Internet access in public schools was 4.8 to 1, an improvement from the 12.1 to 1 ratio in 1998” (Kleiner, Lewis & Greene, p. 7).

Now that nearly all public schools have computer access, some have begun to take the next step: providing students with individual access to laptops or handheld devices 24 hours a day, seven days a week.

Laptop Initiatives

Right now, only Maine and New Hampshire have implemented statewide programs for individual computer access in their public schools. However, the minority is growing quickly as school districts in a number of states – including Arizona, California, Florida, Illinois, Minnesota, New York, Oklahoma, Pennsylvania and Virginia – have launched pilot programs of varying sizes and scopes. Lawmakers in Massachusetts are also considering a statewide laptop program, while a few individual schools have started their own initiatives (Arvidson, Maguire).

In 2003, legislation was signed in Texas that paves the way for one-to-one computing programs throughout the state. Under the new law, such programs should “provide a wireless mobile computing device to each student in a participating school and implement the use of software, on-line courses, and other appropriate learning technologies that have been shown to improve academic achievement.” Texas is currently planning a \$12 million state-wide “immersion” pilot.

Also in 2003, both houses of the Iowa legislature passed measures to establish a “new century technology initiative,” the goal of which is to “ensure one-to-one access to and ubiquitous use of a fully configured laptop computer for all seventh and eighth grade students and educators in the public and

accredited nonpublic schools in Iowa.”

In addition to these burgeoning initiatives, several areas of the country currently have full-scale laptop programs up and running. In Virginia, the Henrico County School District has been running its “Teaching and Learning Initiative” since September 2001, when each high

“The bottom line is that our children are ready. The world is moving forward and our purpose is to do everything possible to ensure our children will thrive in that future world with the experience they receive today. The future is now. Our children can’t wait” (Henrico County Public Schools Superintendent Mark Edwards).

school student and teacher (about 24,000 total) was provided with a laptop (*Scholastic Administrator*). By February 2003, every middle school student and teacher in the state had a laptop, and by June 2003, so did each of the state’s elementary teachers (Joyner).

In May 2001, Henrico entered into a four-year, \$18.6 million contract with Apple (Cook, p. 13). Henrico uses about 4 to 5 percent of its operating budget to fund the program (Trotter). The contract allows the district to spread the cost over several years, and it also includes replacements, repairs and technical support from Apple (*Scholastic Administrator*). Parents are required to purchase a \$50 insurance policy to cover loss and theft, and low-income families can pay for this through an installment program (Cook, p. 14).

In the fall of 2002, Maine distributed Apple laptops to 17,000 seventh-graders, and the program was expanded to include all of the state’s eighth-graders in the following year (Joyner). The state currently provides laptops to about 33,000 students and 3,000 teachers (Kleiner). In 1999, then-Gov. Angus King decided to use a budget surplus of more than \$50 million to get the laptop program off the ground. A year later, the

state legislature approved a \$30 million endowment for the program. The state’s initial four-year contract cost about \$37.2 million, and the difference has been made up through donations (Mehren).

In September 2003, New Hampshire Gov. Craig Benson announced plans to provide laptops to about 600 seventh graders in five poor and low-performing schools (Recht, Rudavsky). The four-year pilot program will cost about \$1.2 million, and is being financed through donations from private businesses (Rudavsky).

But not all planned laptop initiatives have taken flight. Michigan’s “Freedom to Learn” initiative would have provided all of the state’s sixth-grade students with wireless computers or handheld devices. The state initially agreed to contribute \$22 million to fund the program and federal funding would have totaled \$17 million (Cain & Hornbeck).

Under the plan, the state would have given districts a grant of \$250 per student (Schimke). Districts would have been required to contribute \$25 per student for a leased wireless computer or handheld device (Schimke). However, because of the state’s current budget crisis, and in spite of the strong support lent to the program by House Speaker Rick Johnson, Gov. Jennifer Granholm announced in October 2003 that state funding would not be available for the program (Hornbeck).

The Case for Laptop Learning

Just how does one-to-one computing stack up against the costs? Advocates cite numerous benefits of laptop learning. For example, laptops allow students to work collaboratively with each other, to conduct research on a larger scale than books permit, and to do these things anytime, anywhere. In a 2002 survey of schools across the country, 80 percent of respondents said that “[t]he number one benefit of wireless and mobile computing...was portability. By untethering the machines, districts are able to send laptops...on field trips with groups of students, home with individuals for 24-hour learning, and from class to class in the form of mobile computer labs” (Hammond & Salpeter, p. 1).

*** Impact on student performance**

While many say it is still too soon to tell whether one-to-one computing can actually improve student achievement, some claim that early results are encouraging. For example, during a 2001 trial run at a rural school in Maine, “absenteeism dropped 50% with the arrival of state-issued laptops. Pre-laptops, seventh-graders...received 28 detentions in 96 days. With laptops, the same students numbered just three detentions in 79 days. Using the laptops, 91% raised their grades in at least one academic area; 82% improved in two subjects; 73% in two or more fields” (Mehren).

Experts predict that during the 2004-05 school year, sales of laptop computers to America’s public schools will outstrip those of desktop computers (Webber).

In 2000, the Deer Valley school district, near Phoenix, Ariz., distributed laptops to 200 fifth-grade students at low-income schools. Two years later, a district spokesperson said that “the students who had the computers are retaining the increases they made in fifth grade. The schools that are part of the project do better than those that are not” (Cook, p. 15).

Mark Edwards, Henrico County’s (Va.) superintendent, echoes these sentiments: “In 11 core curricular tests, students improved on nine, remained level on one and lost two points on another...The greatest one-year gains on the end-of-course tests came in the three history subjects, reading and writing – contents areas where laptops were used the most...Couple the state test results with the lowest-ever dropout rate in Henrico’s history – 1.52 percent – and even the greatest skeptics of one-to-one laptop use take another look.”

*** Bridge the technology divide**

One-to-one computing is also seen as a way to level the playing field between students who have regular access to computers and those who do not (Cook,

p. 14). In American public schools, the average number of students per Internet-connected computer in 2002 was about 5.6 (Education Week). However, in high-poverty and high-minority schools, this number rose to 6.3 and 6.7 respectively.

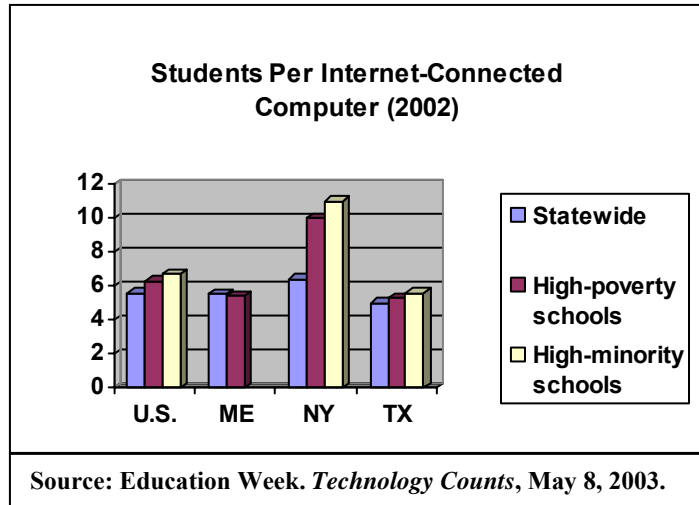
In New York State, the gap is much wider. While the average number of students per Internet-connected computer is 6.4, this figure balloons to 10 in high-poverty schools and to 11 in high-minority schools. In Maine and Texas, by comparison, access is more even (see graph).

“One-to-one...computing is a powerful way of addressing the digital divide that plagues so many communities. By underwriting the cost of mobile computers to be used by all students at school and at home, educational institutions can counter the equity challenges that separate the technology ‘haves’ from the ‘have nots’” (Hammond & Salpeter, p. 5).

*** Prepare for college and beyond**

As technology continues to evolve, employers are concerned with making sure that their workers are able to use what tools exist while being able to adapt to new developments. For example, in a 1998 survey of employers in New York State, 84.5 percent of respondents said that their existing workforce needed technology skills (The Business Council of New York State, Inc.).

In response to such statistics, increasing numbers of colleges and universities around the country have begun to develop their own computer policies. According to a 2002 survey, 17.7 percent of private and 4.1 percent of public universities in the U.S. require students to purchase computers (Campus Computing Project). For example, Dartmouth College requires all incoming undergraduates to own computers; Rensselaer Polytechnic Institute in Troy, N.Y., requires all undergraduates to own or lease laptops. These colleges have made the commitment to learning with computers, with an eye toward the future their students will face upon entering the workforce. Thus, school board members thinking about preparing public school students for the future must consider the



role that technology can play in expanding their educational opportunities.

Lessons Learned

While those who have first-hand experience with the laptop trend generally laud its effectiveness as a learning tool, they are also quick to point out that these programs must be carefully considered before a school district commits itself to the challenge.

Two of the greatest concerns with laptop programs are security and distraction. If students are able to download games and other materials inappropriate for use during the school day, teachers will have an uphill battle keeping attention on school work. Henrico County experienced this first-hand when several students were caught downloading pornography onto their laptops. “[I]f there is anything we could take back and do differently, it would be making the laptops more secure to prevent these types of things from occurring,” superintendent Mark Edwards said (Cook, p. 14).

Content filtering programs are one way to guard against this risk. And more and more schools are using “snooping” programs that allow teachers to see what’s happening on students’ laptops from their own computers (Joyner).

Training – for teachers, students and parents – is another issue that must be considered. “While computers are becoming more common in schools,

some teachers still need instructions on basic computing skills, and almost all must be taught how to integrate laptops seamlessly into instruction” (Joyner).

Finally, districts must also plan for the everyday mishaps that can befall any tool placed in the hands of students. Wear and tear, battery charging and replacement, and equipment

mistreatment are all issues that a district should consider in advance (Joyner).

Where Does NYS Stand?

In April 2003, the Public Policy Institute, the research arm of the New York State Business Council, issued a report recommending that New York State’s public schools move more quickly to provide laptops to individual students. According to the report, “it seems increasingly clear that...every student getting individual access to a computer for research and work, wherever he or she needs it...is going to become the norm in American education over the next decade or so. It is also clear, however, that in New York, the education system is moving in this direction more slowly than most” (Public Policy Institute [PPI], p. 2).

But while New York State has not begun a statewide laptop initiative, several laptop programs have sprung up across the state – from Niagara Falls to the Bronx. The Troy City School District recently teamed up with Apple to provide laptops to nearly 80 sixth-grade students and their teachers. The Petrides School on Staten Island has provided all of its 805 middle and high school students with laptops (PPI, p. 2). Community School District 10 in the Bronx has distributed about 140 laptops to five middle school classes (PPI, p. 6). The Half Hollow Hills school district on Long Island provided 213 laptops to middle school students in the spring of 2003. And the Honeoye

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