



Educational Leadership

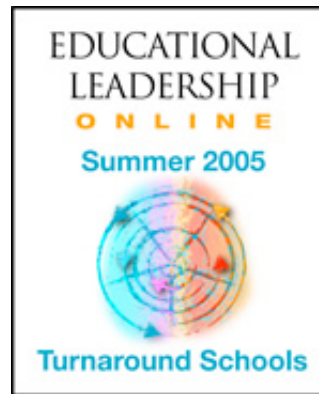
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Turnaround Schools (online only)

Special Topic: Learning with Laptops

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The Maine Learning Technology Initiative has given a laptop to every 7th and 8th grade student and teacher in the state, with impressive results.



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It's just another day in a typical middle school. Students file into class, backpacks slung low. While you rummage on your desk for your class materials, the students pull out their laptops to launch their projects or get off a brief message to a friend before class starts. You quickly check your laptop for new e-mail before turning to the students and saying, "OK, class, let's get started." The students pick up where they left off the day before, searching for resources online and adding to the multimedia presentations they will make later this week. As the students work, you circulate throughout the room facilitating their efforts.

Futuristic vision? Not in Maine. Here, middle school classrooms like this one have become the norm. Through the Maine Learning Technology Initiative (MLTI), Maine has become the first U.S. state to implement 1-to-1 computing. By providing every public school student and teacher in grades 7–12 with a laptop, the initiative aims to transform teaching and learning in Maine.

A Promising Beginning

The seeds of MLTI were planted in the late 1990s, when Maine's governor at the time, Angus King, asked education technology guru Seymour Papert what might be possible in terms of student achievement if Maine's computer-to-student ratio were reduced to 3 to 1. Papert said not to bother: "It's only when the ratio is 1 to 1 that something powerful happens," he asserted.

In early 2000, after learning that Maine had a \$70 million budget surplus, Governor King remembered Papert's words and proposed using the money to furnish every student in the state with a laptop computer. Although his idea was initially greeted with skepticism, Governor King maintained that the schools could progress only by developing and implementing radical new practices. With the help of the Task Force on the Maine Learning Technology Endowment, which was established by the state legislature in 2000, Governor King moved his radical idea forward. By the beginning of the 2003–2004 school year, every 7th and 8th grade student and teacher in Maine's 239 middle schools—about 37,000 people in all—had received a laptop.

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Despite this promising beginning, there have been challenges. When the project was first conceived, many stakeholders in Maine did not support delivering this kind of technology and information access to middle school students. Some saw it as a misguided hardware buy and claimed that the money could be better used elsewhere. Others warned that students might destroy or steal the equipment. But the project's growing success has won over many former skeptics, and parents and community members have begun to demonstrate a marked change in attitude toward the initiative. When several members of the state legislature tried to kill the project in 2003, the community outcry was overwhelming: "Are you crazy? This seems to be working! Keep it going!" By this time, parents had seen the impact of the initiative on their children. The community's perception had changed: MLTI was not a waste of money but a valuable venture.

Although it is too early to draw conclusions on the basis of student achievement data, research already suggests benefits. The Maine Education Policy Research Institute's initial evaluation of the program (Silvernail & Harris, 2003) reported a dramatic increase in the use of technology within classrooms and noted that teachers "are finding that their lessons are more extensive, use more up-to-date resources, and provide more opportunities to explore knowledge and information in more depth" (p. ii). And a case study of one middle school, conducted by the University of Maine at Farmington and the University of North Texas (Muir, Knezek, & Christensen, 2004), found that students receiving laptops through MLTI showed a significantly more positive attitude toward school than did students at a technology-rich comparison school in Texas.

MLTI differs from other technology-rich programs and has achieved success because of the combination of four crucial factors:

- Access to technology.
- Focus on learning.
- Emphasis on leadership.
- Context-embedded professional development.

Access to Technology

Access to technology is clearly key to our success. The initiative gives each student and teacher in the 7th and 8th grade—and in about one-third of high schools—an Apple iBook with Internet and e-mail access, a CD-ROM drive, and a full complement of software. During the program's second year, school librarians were also equipped with laptops, and they now actively engage teachers in information literacy staff development. Apple has worked with the Maine Department of Education and MLTI staff to install wireless connectivity, create a sophisticated hardware management system to record and track equipment, and improve the system for repairing and replacing malfunctioning or damaged hardware. Apple also provides annual workshops for technology coordinators in Maine's middle schools.

This new access to technology has had a powerful effect on Maine's middle school students. For example, Donna Gagnon, a social studies teacher at Indian Township School, was blown away by the effect that the laptop program had on one academically disengaged student who never

completed assignments. After receiving his laptop, this newly motivated student started actively conducting project research and regularly submitting written work. And Ann Luginbuhl, a teacher at Charlotte Elementary School, described how one nearly illiterate special education student who had never participated in class produced an incredible iMovie telling the story of a bomber run in World War II.

Amid the high-tech hubbub, it is easy to forget that access to technology is also a crucial equity issue. The National Educational Technology Goals recommend that "all students and teachers will have access to information technology in their classrooms, schools, communities, and homes" (U.S. Department of Education, 2000). Maine is a diverse state; most of its northern half is rural, whereas much of the southern part is becoming "suburban Boston." Because Maine is economically diverse, the division between the "haves" and the "have-nots" is also a concern. Accordingly, MLTI's focus on equity of access is a vital component of the program's success. Providing every 7th and 8th grade student and teacher across the state—not just those who can afford it—with such a powerful learning tool means that everyone has an equal opportunity to learn.

Although efforts like MLTI are helping to ensure that all students have increased access to technology within schools, access to technology at home is another story. Many school districts do not allow students to take the laptops home with them. This situation does not affect students who already have access to computer technology at home; these students can continue to conduct Internet research and use word processing and graphics programs for projects and, in the process, become more knowledgeable about technology and experience increased success in school. Unfortunately, students without home computers are at a distinct disadvantage. As Freeport Middle School principal Chris Toy pointed out,

If my child could take his textbook home and your child were not allowed to take it home, whose child would have the advantage and whose child would be disadvantaged?

If students in MLTI schools are to succeed, they must have access to the technology all the time—not just between 8 a.m. and 2 p.m. Otherwise the equity gap between the privileged and the not-so-privileged will widen.

Fortunately, many districts have established policies that do allow students to take their laptops home. In addition, a privately funded foundation has been established to provide home Internet access to economically disadvantaged students. These initiatives have already had an effect on students and their families. For example, Connors Emerson School in Bar Harbor found that parent enrollment in adult education classes increased after the school started letting students take their laptops home.

Focus on Learning

Maine is on a journey to transform teaching and learning in its public schools; we expect to see students learning in ways their parents' generation never imagined possible. But even though this journey is driven by the introduction of new technology, we must keep in mind that "the true value of technology for learning lies not in learning to use technology, but in using technology to learn" (Educational Research Service, 2001). The tools themselves are less important than the opportunities they give educators to rethink the way we teach. Accordingly, MLTI's primary goal is not to improve students' technology skills but rather to engage students in meaningful work and encourage them to take charge of their own learning.

Research provides clear evidence that technology can help meet this goal. In his research analysis on education technology, Schacter (1995) concluded that students who had access to

education technology showed positive gains in academic achievement. Lemke and Coughlin (1998) claim that under the right conditions technology can accelerate, enrich, and deepen basic skills; motivate and engage students in learning; increase the economic viability of tomorrow's workers; and connect schools to the real world.

MLTI combines the use of technology with four distinct instructional practices to enhance student learning—assessment for learning, place-based learning, project-based learning, and online research.

Assessment for learning. Unlike assessment of learning, which addresses the question "Do the students get it or not?", assessment for learning helps teachers answer the question "What do I have to do to help every student get it?" According to Black and Wiliam (1998), student assessment for learning results in higher academic achievement. But for this practice to succeed, teachers need to learn how to use assessment to guide instruction, not just to measure what students have learned. In addition, students must gain an understanding of the learning targets, be able to evaluate high-quality work, and provide evidence that their own learning meets high standards.

Educator and author Anne Davies is a major advocate for making this kind of assessment model accessible to all; accordingly, MLTI has integrated her work into the staff development and assessment resources it provides for teachers and has distributed these materials through online conference boards, the project's Web site, and informational software. Using some of these techniques, Lisa Hogan, a science teacher at Mt. Ararat Middle School, has found a way to use 1-to-1 computing to give her students the feedback they need. Students submit their work electronically on the school's server, and Hogan uses text boxes as floating electronic "sticky notes" to annotate student work. Students can also reflect on their work, demonstrating their knowledge and conducting an electronic conversation on what they are learning.

Place-based learning. Some critics voice concern that working on computers will isolate and disconnect students from friends and the community, but we have experienced the opposite phenomenon. Working in concert with place-based learning, technology removes the classroom walls and opens up possibilities for connecting students to their communities in meaningful and engaging ways. To foster such learning, MLTI has worked with various state and community agencies to develop ways for students to actively engage in real-world problem solving and community-based projects. For example, two schools in Maine's Aroostook County collaborated on a project promoting Maine's potato industry—an integral part of life in these students' communities. The students spent a great deal of their summer vacation collecting information, conducting interviews, and touring local businesses to gather information on the industry and produced a Web site called "TATER ACT: Technology and Teams Educating Researching Aroostook County Tubers" (www.tateract.org). Such projects enable students to apply their knowledge and skills usefully in real-world contexts.

Project-based learning. Project-based learning enables educators to address multiple intelligences and diverse learning styles while giving students more choice in synthesizing and applying their learning. In Maine, students are using multimedia to create presentations, Web pages, and movies to illustrate their knowledge. For example, social studies students at the Orland Consolidated School were assigned to work as publicists for each of Maine's gubernatorial candidates. The students used their laptops to research campaign issues, candidate endorsements, and biographical information and created informational slide shows on the various candidates.

Online research. Research projects are only as good as the content they contain, so it's fortunate that the backpack of every middle schooler in Maine contains a library of information. In addition

to the Internet, MLTI provides access to information databases, such as EBSCO, for all students and educators. One of the program's top priorities is to make students effective and responsible consumers of information. Rather than using the Internet as one big answer key, students learn how to apply information they find to enhance their projects. For example, one project required students to investigate a controversial issue in their region, sort through the information on the issue, and make an informed decision on how to resolve the issue. Students at Skyway Middle School tackled the question "Should windmills be built on the top of Mars Hill Mountain?" Social studies teacher Gary Cole had students conduct guided Internet research on the history of windmills and wind power. Using the information they found, the students constructed models, created posters, and produced electronic presentations demonstrating their knowledge of the history of wind power. In this way, they used the Internet as a springboard to finding their own answers.

Emphasis on Leadership

Large-scale technology projects in schools tend to be led and administered by technical staff rather than educators, but this is not the case in MLTI schools. In the beginning, as we considered the program's vision—improving teaching and learning through the creative use of technology—we decided that classroom teachers needed to take a major leadership role. After all, teachers have the ultimate responsibility for creating rich learning environments. We wanted to define schools as places of genuine intellectual growth and curiosity for students and teachers alike, as places where teachers freely collaborate with one another and are not afraid to take risks.

To create the conditions for this change, we formed the Design Team for Curriculum and Professional Development. This advisory group is made up of well-respected educators from across the state—classroom teachers, technology coordinators, administrators, higher education faculty, and education consultants—who have demonstrated a commitment to school reform and to equity for all students and educators.

One of the Design Team's first tasks was to create a Teacher Leader Network—a group of teacher leaders across the state who would work with principals and technology coordinators to spearhead the project. The main Teacher Leader Network comprises nine smaller networks based in Maine's nine superintendent regions. When forming the network, we sought out teachers who were highly skilled in classroom instruction, collaboration, and relationship building; comfortable with technology; well connected to their fellow teachers; and interested in supporting the growth of MLTI.

Once chosen, these teacher leaders participated in all-day meetings so they could learn about school change and begin to examine and shape the purpose of the work ahead. In peer sessions, they shared challenges and successful strategies for engaging staff in learning to use the new technology. They also received leadership training throughout the school year. Amid all this preparation, MLTI established an Exploration School in each of Maine's nine superintendent regions. These schools were selected according to such criteria as academic records and teachers' willingness to invite the public into their classrooms. We also chose a regional integration mentor at each of these schools to help teachers adjust to the new program and to assume leadership of the region's Teacher Leader Network.

Each of these steps helped build a strong leadership framework for the program and ensured that teachers were connected to a statewide infrastructure of support.

Context-Embedded Professional Development

MLTI represents a significant expansion of the educational tools and resources available to teachers. Despite the enormous potential of these resources to engage students in meaningful learning, however, few of our teachers have had prior experience with this kind of rich technology infusion. As a result, practicing educators and teacher candidates need extensive training in effectively integrating technology into classroom instruction. As one teacher candidate put it, "Computers are expensive instructional tools if all you are going to do with them is bore students."

Staff development has been a priority of MLTI from the beginning. The program's original request for proposals required introductory training for teachers as well as the laptops and wireless connectivity. In addition to this basic training, Apple set up MiddleMaine, an e-mail and conference system that provides every educator in the program with a forum for discussing project-related issues. Forums set up on MiddleMaine include an online helpdesk offering technical assistance and conferences on different academic disciplines, integration projects, career preparation, and assessment.

The Design Team also launched a Web site (www.mainelearns.org) after realizing that teachers needed a resource offering practical information on the project. The site provides professional development, including tutorials and how-tos, teacher-created materials, curriculum resources and links, project information, notices of events, and success stories.

In summer 2002, we held two days of training to teach staff members how to use the tools on their new laptops. We knew that this training would be only the beginning; feedback from the Teacher Leader Network meetings confirmed that the teachers' need for training was enormous. Their learning curves were steep as they struggled not only to catch up to the students' comfort level with the technology but also to learn how to teach effectively with the new tools.

So the Design Team created the Content Leader Network and selected content leaders for every major subject area in each MLTI region. During the school year, these content leaders helped facilitate two rounds of content meetings in each of the nine MLTI regions. These all-day meetings provided opportunities for teachers in each region to connect face-to-face with other MLTI educators, learn new skills, and discover strategies and resources that could help them achieve their curriculum goals.

The design of this professional development has been so successful that we are already planning next year's round of content meetings.

The Journey Continues

MaineLearns, our motto, connotes our continuing journey into learning in new ways. We know that we are on to something good, and we continue to experience increased collaboration and enthusiasm among students and community members. But we also understand that any clearly defined "end goal" of MLTI is nowhere in sight. Maine has embarked on an unprecedented attempt to redefine teaching and learning statewide and across the grade levels, and that mission is not easily or quickly achieved. The framework is built, our focus is clear, and 7th and 8th graders are well on their way. Now it is time to plan for the high school years and beyond.

References

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, 80(2), 1-20.

Educational Research Service. (2001). *Does technology improve student achievement?* Arlington, VA: Author.

Lemke, C., & Coughlin, E. C. (1998). *Technology in American schools: Seven dimensions for gauging progress*. Santa Monica, CA: Milken Exchange on Educational Technology. Available: www.mff.org/pubs/ME158.pdf

Muir, M., Knezek, G., & Christensen, R. (2004). *The Maine Learning Technology Initiative: An exploratory study of the impact of ubiquitous technology on student achievement*. Farmington, ME: Maine Learning with Laptop Study. Available: www.mcmel.org/MLLS

Schacter, J. (1995). *The impact of education technology on student achievement*. Santa Monica, CA: Milken Exchange on Educational Technology. Available: www.mff.org/pubs/ME161.pdf

Silvernail, D. L., & Harris W. J. (2003). *The Maine Learning Technology Initiative: Teacher, student, and school perspectives*. Gorham, ME: Maine Education Policy Research Institute.

U.S. Department of Education. (2000). *E-Learning: Putting a world-class education at the fingertips of all children*. Available: www.ed.gov/about/offices/list/os/technology/reports/e-learning.pdf

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