Technology in Massachusetts Schools

An annual report based on data submitted by districts

April 2009

Contents

"Every so often, throughout our history, a generation of Americans bears the responsibility of seeing this country through difficult times and protecting the dream of its founding for posterity. This is a responsibility that has fallen to our generation.

-- President Barack Obama, March 10th, 2009[1]

Introduction

Although these are challenging times, schools still need to continue working hard to prepare students for higher education, rewarding employment, and responsible citizenship. Technology can play a significant role in addressing those goals. As the Massachusetts Educational Technology Advisory Council pointed out in its vision statement, "In all sectors of society, the instruments of technology have become essential to research, analyze, evaluate, synthesize, create, and communicate. Massachusetts' students must be prepared to use these instruments in learning science, mathematics and the humanities and how to succeed in a global society facilitated by technology."[2]

Fortunately, the federal stimulus funding will include technology funds, which will be available to help school districts increase their commitment to technology. The stimulus funds represent an extraordinary opportunity. As a result, it is especially important that school districts prepare to spend these funds wisely. The Department is please to have recommended guidelines describing the conditions needed for effectively integrating technology into teaching and learning. The *Local Technology Plan Guidelines*[3] can help districts as they grapple with how to most effectively use their technology stimulus funds.

The *Local Technology Plan Guidelines* serve as the basis for the Department's annual technology data collection. This report takes a look at the data submitted by 344 school districts, examining the progress Massachusetts school districts are making in meeting the recommended guidelines. In doing so, it will gauge the degree to which local schools are ready to use technology to enhance teaching and learning. District leaders can use this information, along with their local technology data, to help identify areas where they are falling behind and where the infusion of technology stimulus funds is likely to have the greatest impact. For example, some schools have only a few computers, making them virtually inaccessible for regular use in instruction. In other schools, the Internet bandwidth may not be sufficient to access the rich online resources that engage students and help them learn. Even in schools that have an adequate technology infrastructure, there are teachers who have not had enough training to be able to use the technology effectively for instruction.

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[1] President Obama, speech presented at the at the United States Hispanic Chamber of Commerce, March 10, 2009, available at http://www.whitehouse.gov/blog/09/03/10/Taking-on-Education/
[2] Massachusetts Educational Technology Advisory Council (ETAC), FY 2009 Council Statement, available at http://www.doe.mass.edu/boe/sac/edtech/
[3] The *Local Technology Plan Guidelines (School Year 2007-2008 through 2010-2011)* are included in the Appendix of this report. They are also available online at http://www.doe.mass.edu/edtech/planning.html.

Organization of This Report

Because the report focuses on districts' technology readiness relative to the *Local Technology Plan Guidelines,* its organization follows the five areas covered by the guidelines:

1. Clear Vision and Implementation Strategies

2. Technology Integration and Literacy

3. Technology Professional Development

4. Accessibility of Technology

5. E-Learning and Communications

For more information about the guidelines, see the Appendix of this report.

1. Clear Vision and Implementation Strategies

Technology Planning

Developing a technology plan can help a school district clarify its goals and focus its efforts so that it can best leverage technology to improve student achievement. The plan should focus on both long-term and short-term goals, all of which are aligned with the district's mission, its school improvement plan, the state's education goals, and the goals of No Child Left Behind. The Department's technology guidelines provide recommendations that can help districts in developing their technology plans.[4]

A state-approved technology plan is a requirement for eligibility for Title IID technology grants and E-rate discounts. To receive approval from the Department, a district must first develop a three- to five-year plan. Each year, as part of the approval process, the Department asks every district to submit a Tech Plan Implementation Report through the Department's secure web portal. The Department reviews this information, along with the district's long-range plan, to issue an approval letter. To facilitate this process, the Department asks the district to post its long-range plan on its web site.

Technology Budget

In planning, it is important to take into account all of the costs associated with the use of technology. For example, it would be unwise to purchase technology without allocating funds for things like professional development, maintenance, and technical support.

The Department has tracked districts' per-student expenditures for technology for the past ten years. In previous years, districts were required to submit this data as part of the Tech Plan Implementation Report. In order to consolidate and streamline reporting requirements for school districts, the Department now uses the data collected by the Department's School Finance Office. According to this data, the average Massachusetts school district spent $212 per student on technology-related expenditures in 2007-2008.[5] This figure includes spending from all sources, including school committee appropriations, municipal appropriations, grants, and special funds. Included in the per-student average are expenditures for building technology, networking and telecommunications, district-wide information management and technology, technology maintenance, capital technology, other instructional hardware, classroom instructional technology, and instructional software. Note that, while the expenditure categories include salaries and contracted services, they do not include technology professional development. Because the categories used are slightly different this year, it is not useful to compare the current per-student expenditure with that of past years. The Department will make comparisons from this year forward.

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[4] The *Local Technology Plan Guidelines (School Year 2007-2008 through 2010-2011)* are included in the Appendix of this report. They are also available online at http://www.doe.mass.edu/edtech/planning.html
[5] Further details about district expenditures are available at http://finance1.doe.mass.edu/statistics/function08_note.html .

2. Technology Integration and Literacy

"Anyone who has taken a training course in the use of a spreadsheet, for example, knows how quickly we forget the skills unless we can apply them in our work on a regular basis. Whether technology instruction takes place in the classroom or in the computer lab, it is important that students be able to apply their newly acquired skills to subject matter learning."[6]

Use of Technology

The *Massachusetts Technology Literacy Standards* explain how using technology can add value to instruction: "As technology tools become an integral part of the learning environment, and as students gain the knowledge and skills to use them appropriately, new opportunities for learning open up. Dynamic geometric applets, for example, can help students visualize and understand complex mathematics concepts. Simulation software enables students to investigate models of real-world problems such as climate change and population growth. Basic tools such as spreadsheet and database applications can be applied across the curriculum to analyze and solve problems. Even basic word processing software can encourage students to organize their thoughts and revise their work."

Teacher Use of Computers with Students

The Department's technology guidelines recommend that at least 85% of teachers use technology each week with their students. According to the data submitted by districts, the percentage of teachers using technology with their students "about once a week" or more was about 77%, a modest increase since 2007. The percentage of teachers using technology on a daily basis with students has also increased from 43% to 47%.

To gauge technology use, 31% of districts used the Department's Teacher Technology Use Survey[7]. Nearly half of the districts used more than one method. These methods included things like local surveys, informal observation, and network usage.

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[6] Massachusetts Technology Literacy Standards and Expectation, available at
http://www.doe.mass.edu/edtech/standards.html
[7] The Teacher Technology Use Survey is available at http://www.doe.mass.edu/edtech/techplan/ .

Use of Technology with Students

47% of teachers use technology "nearly every day"

30% of teachers use technology "about once a week"

9% of teachers use technology "rarely or never"

14% of teachers use technology "about once a month"
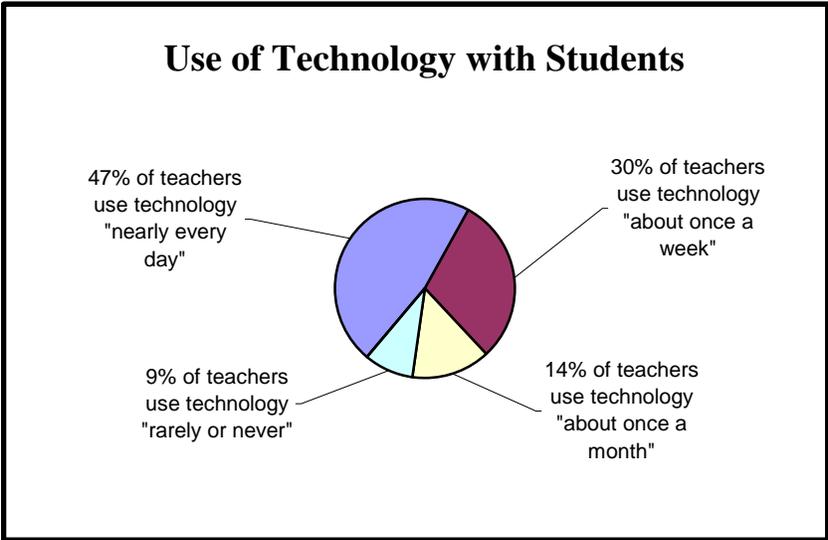
The Department's guidelines also recommend that at least 85% of teachers use technology outside the classroom every day for professional purposes such as lesson planning, administrative tasks, communications, and collaboration. District data for 2008 show that 86% of teachers used technology professionally every day, up from 83% in the previous year.

Use of Technology for Professional Purposes

86% of teachers use technology "nearly every day"

9% of teachers use technology "about once a week"

3% of teachers use technology "about once a month"

1% of teachers use technology "rarely or never"
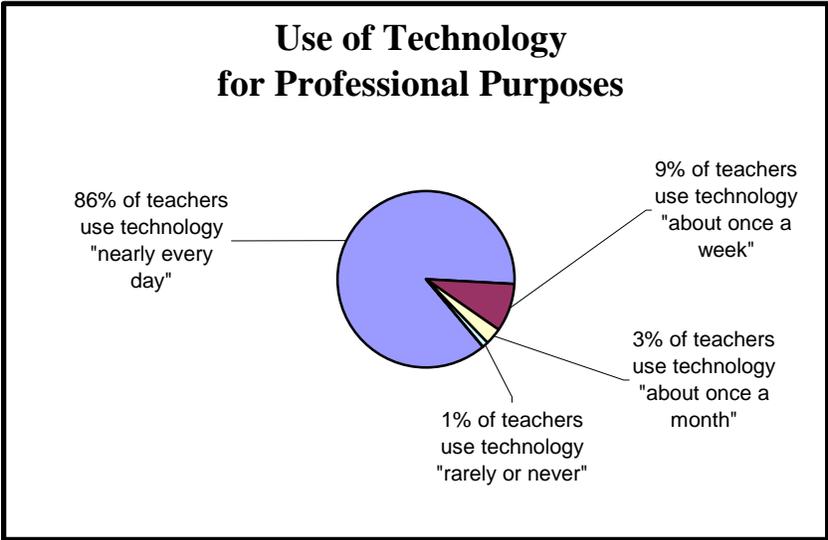
Staffing for Technology Integration

Since technology changes quickly and the number of available resources is immense, it is important for teachers to receive ongoing support. The people usually responsible for curriculum integration support are instructional technology specialists, media specialists, and library teachers. The support they provide typically includes researching, locating and evaluating curriculum resources, identifying effective practices that incorporate

technology, and providing professional development. In addition, these people may take the responsibility for ensuring that teachers and students meet the instructional technology standards. To carry out all of these functions, the curriculum integration person's activities may include consulting with teachers, modeling effective teaching with technology, collaborating with teachers to develop appropriate, technology-rich lessons, and providing workshops on technology integration.

To help teachers integrate technology into their teaching, the Department's technology guidelines recommend that schools have at least one full-time-equivalent person to support up to 80 teachers. Currently 41% of districts meet this recommendation for curriculum integration support, a slight increase since last year. On the other hand, 39% of the districts either have no support or have a full-time-equivalent person supporting more than 160 teachers. However, curriculum integration staff often have multiple responsibilities, so it can be difficult for districts to accurately determine the portion of time that is devoted specifically to curriculum integration support.

Instructional Staff per 1.0 FTE Curriculum Integration Person

36% of respondents reported 20 to 80 staff

20% of respondents reported 81 to 160 staff

5% of respondents reported fewer than 20 staff

24% of respondents reported more than 160 staff

15% of respondents reported no curriculum support
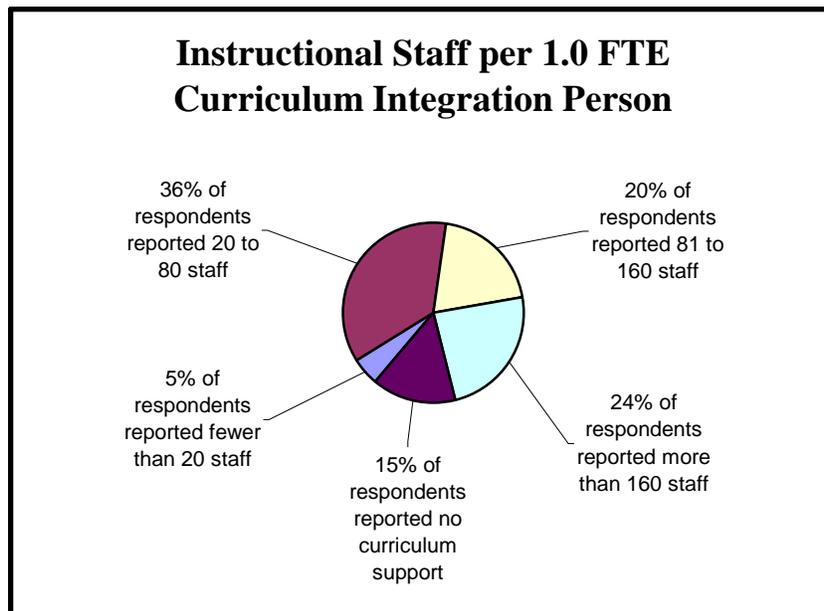
Technology Proficiency

Student Technology Literacy

In order to guide districts in preparing students for a technology-driven world, the Department has updated its technology standards for students. Approved by the Board of Elementary and Secondary Education in 2008, the *Massachusetts Technology Literacy Standards and Expectations*[8] define what students should know and be able to do in order to be considered technologically literate.

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[8] The *Massachusetts Technology Literacy Standards and Expectations* are available at http://www.doe.mass.edu/edtech/standards.html

The technology standards comprise three broad categories. Standard 1 includes proficiency in basic productivity tools as well as a conceptual understanding of technology systems. Standard 2 relates to understanding of ethics and safety issues in using electronic media. Standard 3 asks students to apply a wide range of technology tools to their learning of the curriculum. The standards recommend that students learn technology skills within the context of the curriculum, to enhance their learning of both the technology skills and the subject matter.

Districts were asked to report the percentage of students in grades 8 who fell into each of three categories: those who had mastered all or most of the skills for their grade span, those who had mastered about half of them, and those who had mastered less than half of them.

The most common method used to determine students' levels of technology literacy, used by 60% of the reporting districts, was the use of a teacher survey. In addition, about one-quarter of the districts used more than one method, including informal interviews with staff or observations in their computer labs. To obtain more specific data, 43% of districts assessed technology literacy at the individual student level, with approximately half of the districts using a student survey and half of them using some kind of student assessment.

Student Technology Literacy	
Statewide Averages Based on District Reports	
Students have mastered . . .	**Percent of grade 8 students**
all or nearly all of the skills for their grade span.	59%
half or more than half of the skills for their grade span.	29%
less than half of the skills for their grade span.	12%

Districts have a special responsibility to help students understand Standard 2, which deals with ethics and safety issues when using technology. Standard 2, the Department's *Local Technology Plan Guidelines* state that districts should have an Acceptable Use Policy regarding Internet and network use. According to district reports for 2007-2008, 99% of schools had such a policy, and 93% of districts were providing formal instruction about the responsible use of technology, including ethics and safety issues. In addition, 91% of districts included this policy in their student handbook, while 93% included it on their school or district web site.

Teacher Technology Literacy

In order to help students become technologically literate, teachers must also be fluent with technology. To help teachers determine their own levels of technology proficiency and determine their need for professional development, the Department provides the online Technology Self-Assessment Tool (TSAT)[9]. This interactive tool, which aggregates teacher data, is available through the Department's MassONE portal. (In order to preserve the privacy of individual users, the MassONE TSAT reports only aggregated data, as opposed to data from individual teachers.) For those who prefer to print out a paper checklist, a PDF file is available on the Department's web site.

Districts were asked to use either the TSAT application or their own methods. In 2008 54% of districts used either the TSAT or a locally developed survey aligned to the TSAT. Many districts used multiple methods to determine teachers' technology proficiency. These methods included including observations by the technology staff, teacher requests for professional development and support, and feedback from administrators.

The TSAT has four levels, each of which lists an average of 25 skills. The four levels were created to align with the levels in the Massachusetts STaR Chart[10], a tool that helps districts assess their readiness to use technology to improve student learning. To take the TSAT, teachers begin at the lowest level (Early Technology), checking off the skills they know and progressing to the next level once they have mastered the skills at each level. As the graph and table below illustrate, there has been considerable progress in teacher technology literacy since the TSAT was first used in 2004. The number of teachers who are at the Early Technology level has decreased, while the number at the Advanced level has increased. This is good news, because it means that more teachers will be able to help their students develop the skills they need to succeed in higher education and the job market.

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[9] Information about the TSAT is available at http://www.doe.mass.edu/edtech/standards/sa_tool.html . The Department is in the process of updating the TSAT in 2009 so that it will align with the new standards for students.

[10] The Massachusetts STaR (School Technology and Readiness) Chart is available at http://www.doe.mass.edu/boe/sac/edtech/star.html

Teacher Technology Literacy

Percent of Educators at Each Level

	Early	Developing	Proficient	Advanced
2004	25%	32%	29%	13%
2008	18%	28%	35%	18%

2004 ■ 2008
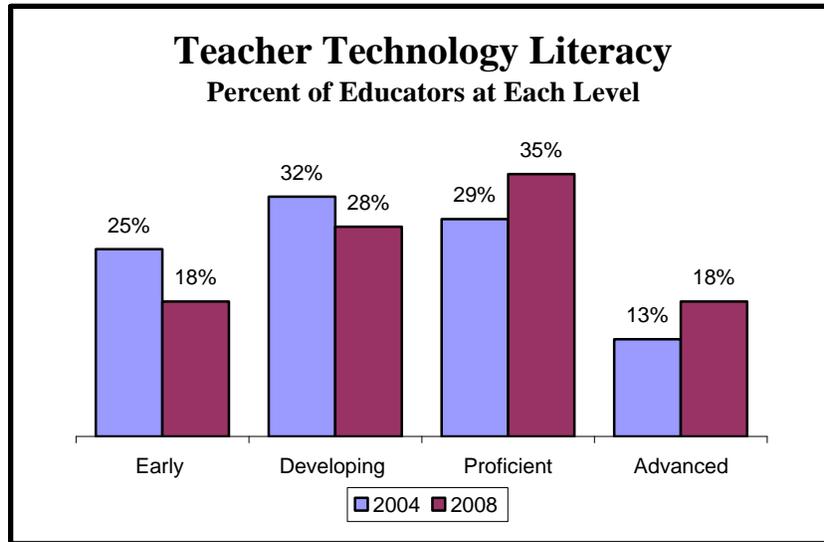
With students increasingly using the Internet both at school and in the community, educators need to teach them about the potential risks associated with being online. The 2008 Broadband Data Improvement Act includes a section designed to protect children. The law adds a requirement to the Internet Safety Policy that each district must have in order to receive funding from E-Rate and technology grants. Districts must educate minors about "appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms and cyberbullying awareness and response." The Department has added this requirement to the CIPA assurance that districts sign when applying for technology funding.

In order to do to teach students about the responsible use of technology, educators themselves need to be informed. According to district reports for 2007-2008, 88% of schools provided formal instruction to staff on this topic.

3. Technology Professional Development

According to numerous studies, in order for technology to impact student learning, teachers need to receive adequate and appropriate professional development[11]. Massachusetts districts are addressing the need for technology professional development, reporting, on average, that 75% of their teachers received some type of technology training in 2007-2008.

Districts indicated that nearly half of their teachers received formal professional development such as technology workshops, summer institutes, credit courses, or study groups. In addition, slightly more than half of the teachers received ongoing technology professional development such as coaching and co-teaching. This use of ongoing professional development is in line with the Massachusetts State Plan for Professional Development's recommendation that professional development provide "on-the-job, informal support throughout the school year."

Although the percentage of educators receiving online professional development is still less than those receiving other types, 87% of districts reported some use of online professional development.

Types of Technology Professional Development Received	
Professional development type	**Percent of staff who received it**
Formal professional development	49%
Ongoing professional development	56%
Online professional development	11%
Any type of professional development	75%

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[11] From *The Learning Return on Our Educational Technology Investment: A Review of Findings from Research*, WestEd, 2002; available at http://www.wested.org/online_pubs/learning_return.pdf .

4. Accessibility of Technology

In order to support teachers as they prepare students for the 21st century, districts need to provide a robust technology infrastructure and ensure its reliability to maximize educational uptime. In Massachusetts, districts can use the Department's technology guidelines to assess their performance in these areas.

Computers

The Department updated the computer specifications in 2008, first surveying technology directors in every district and then analyzing the feedback from the 82 people who responded. With the new specifications, Type A computers continue to be defined as "multimedia computers capable of running virtually all current software, including the latest high-end video and graphics programs." Type B computers continue to be defined as "multimedia computers capable of running most software except for the latest video and graphics programs." The table below shows how the specifications for memory and type of processor have changed. Both Type A and B computers are considered "high-capacity computers."

Updates to Computer Specifications		
Minimum Specifications for Categorizing Computers		
Type of computer	**2004-2007**	**2008-2011**
Type A	Memory: 256 RAM Processor: Pentium 4 or Macintosh G4 (or equivalent)	Memory: 1 GB RAM Processor: Windows 2.0 GHz CPU single or 1.0 GHz Dual Core or Macintosh G5 or better (or equivalent)
Type B	Memory: 128 MB RAM Processor: Pentium 3 or Macintosh G3 (or equivalent)	Memory: 256 RAM Processor: Windows 1.0-2.0 GHz CPU or Macintosh G4 or better running OSX (or equivalent)

The Department's guidelines recommend that districts maintain a ratio of fewer than five students per high-capacity Internet-connected computer. The ratios have been improving since 2004. The ratios worsened only slightly in 2008 when new specifications for high-

capacity computers went into effect. This is good news, because it suggests that schools are purchasing new computers when the old ones are no longer able to meet all of their needs.

Students per Computer

Statewide averages for A/B Computers

Year	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Students per Computer	6.9	4.9	4.2	3.6	4.0
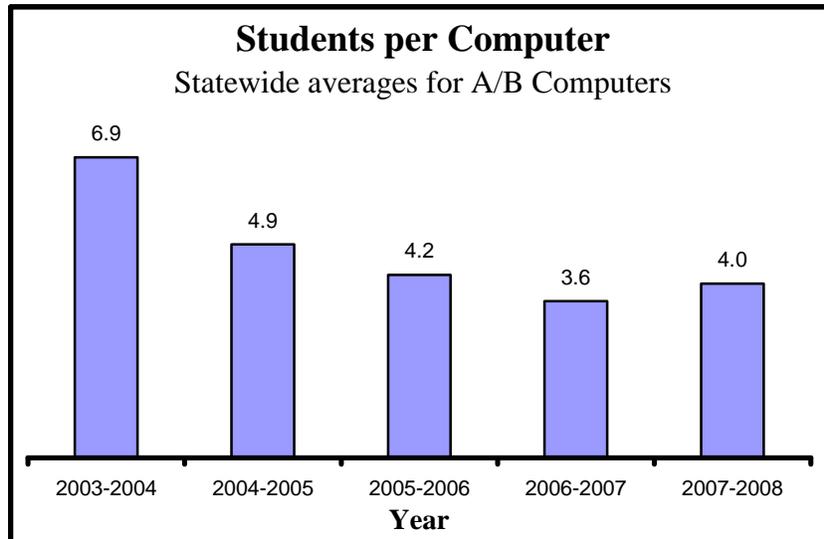
While an average statewide ratio of 4.0 is acceptable for 2007-2008, it's important to note that access to computers can vary from one district to another. The disparity can be just as pronounced within districts, where one school may have a ratio that is five to ten times better than another school in the same district. As the graph and table below illustrate, most schools in Massachusetts are at or near the recommended ratios, while a few schools fall far short of the recommendation. Unfortunately, a number of the schools with the worst ratios are middle or high schools, where students are in their final years of preparation for higher education and careers.

Computers in Individual Schools

Ratios of Type A/B Computers to Students

- 48% of schools have fewer than 4 students per computer
- 24% of schools have from 4 to 5.9 students per computer
- 16% of schools have from 6 to 9.9 students per computer
- 7% of schools have from 10 to 19.9 students per computer
- 5% of schools have 20 or more students per computer or no type A/B computers
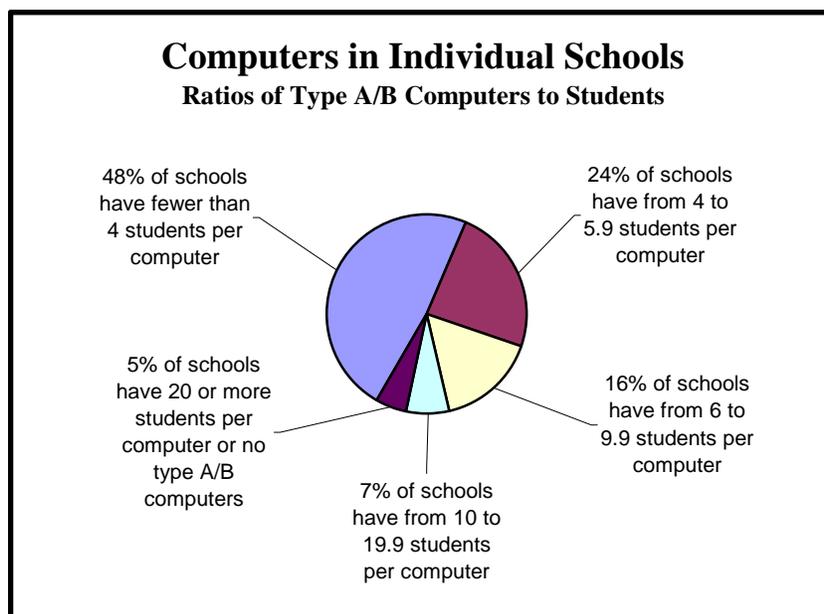
It is important for schools to have up-to-date computers and software. Newer software applications, which are often more intuitive and engaging for students, generally require the use of newer computer operating systems and web browsers. Typically, older computers are not powerful enough to handle these new systems. Also, developers of technology products eventually stop supporting older operating systems, because it is not cost effective.

For school administrators, using older technology may result in difficulty accessing some of the Department's applications for submitting or accessing data. For teachers and students, older systems may preclude the use of some of the most innovative and engaging technology products, such as streaming video collections, interactive curriculum materials, and applications to assist students with disabilities.

According to the state technology guidelines, the goal is to eventually reach a ratio of one high-capacity computer for every student. According to the State Educational Technology Directors Association, research from one-to-one laptop projects in other states has identified a number of positive outcomes, including an increase in student engagement and higher-order thinking skills, better grades and test scores, and higher rates of attending college.[12] Some Massachusetts schools are moving close to the goal of one-to-one computing; however, there is much room for improvement. In 2007-2008, 1% of Massachusetts schools had a one-to-one ratio, while 10% of schools had ratios better than two-to-one, meaning that they had at least one computer for every two students.

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[12] State Educational Technology Directors Association (SETDA), *2008 Gateway to Graduation Toolkit,* available at http://www.setda.org/web/toolkit2008/student-engagement/program-examples .

Computer Replacement Policy

In order to plan for the expenditures needed in order to provide up-to-date computers, it is a good idea to have a computer replacement policy. The percentage of districts that have such a policy has been rising and is currently at 74%. The average replacement cycle for those districts was 4.9 years. It should be noted that in lean budget years, districts may have difficulty implementing these policies.

Computer Replacement Policy
How Often Districts Plan to Replace Computers

37% of districts have a policy of 5 years

13% of districts have a policy of 4 years

17% of districts have a policy of 6 or more years

7% of districts have a policy of 1 to 3 years

26% of districts have no specific replacement policy
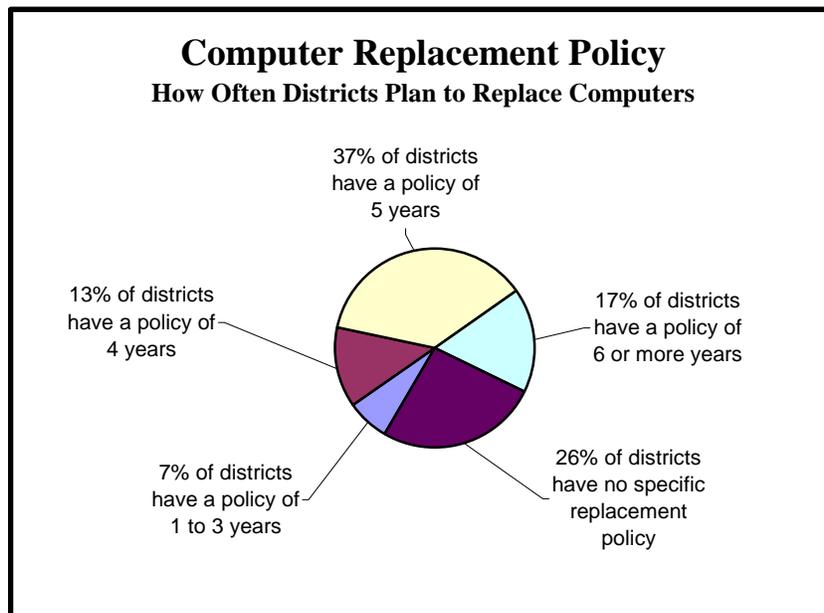
Other Technologies

Many districts are investing in devices that can be used with their existing technologies to provide a richer, more engaging classroom experience. In some cases, these devices can help extend the reach of the existing technologies. For example, a digital projector allows the teacher to project whatever is on a computer, including video clips that relate to the lesson. The use of an interactive whiteboard with a projector enables teachers and students to interact with the projected image, making it possible to implement a variety of group activities. An interactive whiteboard also allows the teacher to save a digital version of anything written on the board; this can be helpful for students who are need extra time to review the material. A digital video camera enables the teacher and students to create their own multimedia, which can be edited on a computer and then presented to the class using the digital projector.

For the 2007-2008 school year, districts reported the number of digital projectors, interactive whiteboard, and video cameras in each of their schools. The table below presents the ratio of the technologies to classrooms. In other words, it shows how many classrooms need to share each device.

Other Technologies in Schools	
Ratios Based on District Reports	
Technology device	**Ratio of devices to classrooms**
Digital projector	one for every 4 classrooms
Interactive whiteboard	one for every 12 classrooms
Video camera	one for every 20 classrooms

Connectivity

Districts continue to make progress in connecting their classrooms to the Internet. In 2008, 94% of districts reported that all of their classrooms were wired, up from 91% in the previous year. In addition, the average district had 99% of its classrooms and 98% of its computers connected to the Internet.

Although the data reported by districts suggests that most schools have high-speed connections, some of these connections may not be adequate for 21st century teaching and learning. Depending on how many computers are accessing the Internet simultaneously, a school's connection may not be sufficient to provide the needed access speeds. Moreover, according to a new national report from the State Educational Technology Directors Association (SETDA)[13], "schools will need to significantly upgrade their systems in order to keep pace with what children are accustomed to at home."

It is also worth noting that many schools are connected to the Internet through their district's wide area network. As a result, users in all of the district's schools are sharing an Internet connection. In several urban districts, for example, more than 2,000 computers are sharing a connection, which may prevent them from accessing some of the rich online resources that are so beneficial in teaching and learning. Districts need plan for current needs and future growth as they build their networks, as well as when they purchase additional computers to connect to existing networks.

The SETDA report recommends that, in order to provide the connectivity needed for technology-rich environments for the next five to seven years, districts need to provide an external connection to their Internet provider of at least 100 Mbps per 1,000 students/staff, and internal wide area network connections of at least 1 Gbps per 1,000 students/staff.

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[13] The report is available at http://www.setda.org/web/guest/class2020actionplan .

Access to the Internet Outside the School Day

It is important that students be able to go online to complete their homework so that they do not fall behind their peers. Since some students may not have Internet access at home, schools need to provide information on places that offer Internet access outside regular school hours.

The state guidelines recommend that schools provide information about places in the community where students can access the Internet before or after school. While 94% of schools provided this information, 66% of schools went a step further, allowing students to use the school's computers to access the Internet outside regular school hours. These schools offered access to student for an average of 7.5 hours per week before or after school. To further increase students' access to technology, 5% of schools (84 schools) allow students to take computers home.

Technical Support

As the national technology plan points out, districts need to provide adequate technical support in order to "maximize educational uptime and plan for future needs." The Department's technology guidelines recommend that districts have the equivalent of one full-time position (which can include contracted services) to support every 200 computers. In 2007-2008, fewer than 18% of the reporting districts indicated that they had this level of support. On average, according to district data, a technical support person maintains approximately 504 computers, up from 445 in 2006-2007.

Even with the increased number of computers to maintain, technical support personnel were able to resolve problems in 2.7 days, on average, which is about the same as last year.


Districts' Turnaround Time for Technical Support

- one day or less (30% of districts)
- between one and two days (31% of districts)
- more than one week (7% of districts)
- between two and five days (31% of districts)
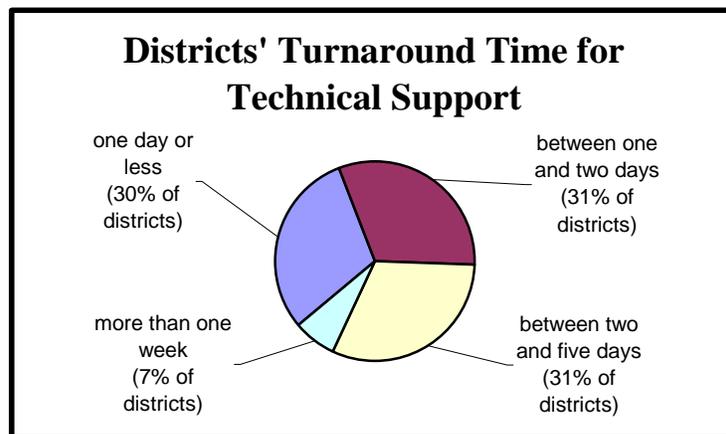
5. E-Learning and Communications

Distance Education

According to district reports, more than 10,000 Massachusetts teachers and students took online courses during the 2007-2008 school year. This includes an estimated 6,560 students and 4,285 teachers. These numbers refer specifically to courses paid for or sponsored by the district.

Student Enrollment in Online Courses

- fewer than 20 students (17% of districts)
- from 20 to 50 students (31% of districts)
- no students taking online courses (64% of districts)
- more than 50 students (6% of districts)
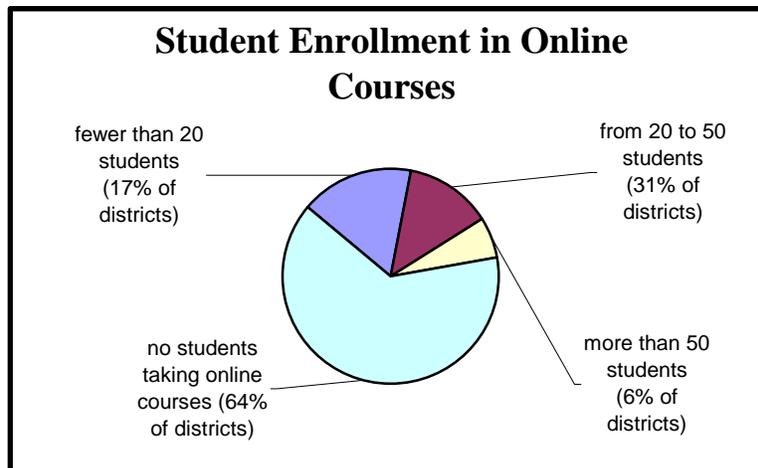
Online courses for students were offered in all curriculum areas, with science courses offered in the greatest number of districts (28% of the districts reporting data), followed by mathematics (26% of districts), English language arts (26% of districts), and History and Social Science (26% of districts).

In approximately three quarters of the districts that offer online courses for students, educators are also taking online courses or workshops. In addition, 121 districts offer online courses for educators but not for students.

Educator Enrollment in Online Courses

- fewer than 20 educators (39% of districts)
- from 20 to 50 educators (19% of districts)
- no educators taking online courses (38% of districts)
- more than 50 educators (6% of districts)
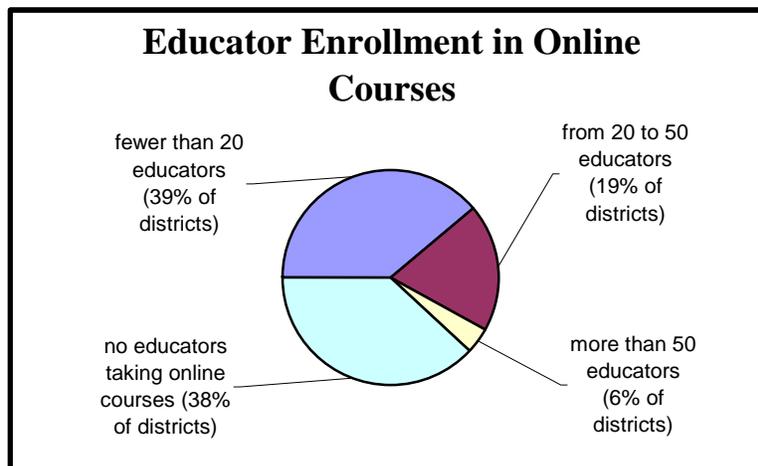
A number of Massachusetts educators are also teaching courses online. For 2007-2008, 21% of districts reported that one or more of their educators taught online professional development courses or workshops. In addition, 16% of districts reported that one or more of their educators taught courses for students online. Many educators teach courses that involve teachers or students from other districts; however, a greater number of educators teach courses within their own districts.

Conclusion

Back in January, when then President-Elect Obama was promoting the passage of the stimulus bill, he stated, "We'll provide new computers, new technology, and new training for teachers so that students in Chicago and Boston can compete with kids in Beijing for the high-tech, high-wage jobs of the future."[14]

Now that the stimulus funds have become a reality, it's up to school districts to determine how to best make use of them. It's also up to technology leaders to collaborate with their colleagues in other disciplines to explore ways that technology can help improve student learning and close the achievement gap. As the Educational Technology Advisory Council (ETAC) stressed in a recent statement, "Technology has created a vast new landscape of teaching and learning potential both in and out of schools. Teaching with technology creates many new opportunities for differentiated instruction that meet the needs of all students, regardless of ability."[15] As districts consider how they can best use their stimulus dollars, technology leaders can provide valuable information on how new technologies can help advance the district's goals.

This report has touched on key factors that contribute to the successful use of technology in teaching and learning, including a robust infrastructure, ample support for the use of technology, and increased professional development for teachers. District leaders need to keep these factors in mind as they plan how to strategically invest their stimulus funds. As U.S. Education Secretary Arne Duncan said when he announced the first round of education stimulus funds, "This is an historic opportunity, a once-in-a-lifetime opportunity, to lay the groundwork for a generation of education reforms."[16]

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[14] President-Elect Obama, speech presented at George Mason University, published January 8, 2009 , available at http://www.nytimes.com/2009/01/08/us/politics/08text-obama.html?_r=2&pagewanted=1

[15] Massachusetts Educational Technology Advisory Council (ETAC), FY 2009 Council Statement, available at http://www.doe.mass.edu/boe/sac/edtech/ .

[16] U.S. Secretary Arne Duncan, speech presented April 1, 2009 at the Doswell Brooks Elementary School in Capitol Heights, Maryland., available at http://www.wpxi.com/education/19061750/detail.html

Appendix

Local Technology Plan Guidelines

(School Year 2007-2008 through 2010-2011)

These guidelines are designed to help districts develop purposeful long-range technology plans. While not mandated, the guidelines represent recommended conditions for effectively integrating technology into teaching and learning.

There are several reasons that a school district should develop and maintain a technology plan. First, comprehensive planning helps the district take advantage of technology's power to improve teaching and learning. Technology has the power to engage and challenge students. Applications such as formative assessment tools can help teachers ensure that students are meeting the standards. By allowing teachers to access information about student learning, information systems make it possible for teachers to support individual students better. Online learning programs can increase the range of learning opportunities available to students, enabling them to study with experts and other students around the globe. Technology can also play a role in ensuring students' safety, by facilitating communication among school personnel and parents.

Funding is another reason technology planning is important. Every school district must have a long-range strategic technology plan approved by the Department of Education in order to be eligible for E-Rate discounts and federal and state technology grants. Each school district is required to develop a 3- to 5-year plan, which should be kept on file locally. Each year, as part of the technology plan approval process, the Department asks districts to report on the progress they have made in implementing their plans through the Department's secure web portal. The Department reviews this data, along with the district's long-range plan, to approve the district's plan. To facilitate this process, the Department asks the district to post its long-range plan on its web site or to email a copy of the plan to the Department.

These guidelines are based on the School Technology and Readiness (STaR) Chart[17] developed by the state's Educational Technology Advisory Council (ETAC). Using the STaR Chart, along with advice from stakeholders across the Commonwealth, the Department has developed this new set of guidelines for schools to use in technology planning. These guidelines are not mandated but rather recommended benchmarks for districts to meet by the end of the school year 2010- 2011. The Department will use these guidelines to gauge the progress of districts' implementation in order to approve their technology plans annually.

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[17] Full text of the StaR Chart is available on the Department's web site (http://www.doe.mass.edu/boe/sac/edtech/star.html).

Benchmark 1
Commitment to a Clear Vision and Implementation Strategies

A. The district's technology plan contains a clearly stated and reasonable set of goals and implementation strategies that align with the district-wide school improvement plan. The district is committed to achieving its vision by the end of the school year 2010-2011.

B. The district has a technology team with representatives from a variety of stakeholder groups, including school committee members, administrators, and teachers. The technology team has the support of the district leadership team.

C. Needs Assessment

   1. The district assesses the technology products and services that will be needed to improve teaching and learning.

   2. The technology plan includes an assessment of the services and products that are currently being used and that the district plans to acquire.

D. The district has a CIPA-compliant Acceptable Use Policy (AUP) regarding Internet and network use. The policy is updated as needed to help ensure safe and ethical use of resources by teachers and students.

E. Budget

   1. The district has a budget for its local technology plan with line items for technology in its operational budget.

   2. The budget includes staffing, infrastructure, hardware, software, professional development, support, and contracted services (including telephone services).

   3. The district leverages the use of federal, state, and private resources.

   4. For districts that plan to apply for E-rate reimbursement, the technology plan specifies how the district will pay for the non-discounted portion of their costs for the services procured through E-rate.

F. Evaluation

   1. The district evaluates the effectiveness of technology resources toward attainment of educational goals on a regular basis.

   2. The district's technology plan includes an evaluation process that enables it to monitor its progress in achieving its goals and to make mid-course

corrections in response to new developments and opportunities as they arise.

Benchmark 2
Technology Integration and Literacy

A. Technology Integration[18]

1. Outside Teaching Time - At least 85% of teachers use technology every day, including some of the following areas: lesson planning, administrative tasks, communications, and collaboration. Teachers share information about technology uses with their colleagues.

2. For Teaching and Learning - At least 85% of teachers use technology appropriately with students every day to improve student learning of the curriculum. Activities include some of the following: research, multimedia, simulations, data interpretation, communications, and collaboration (See the Massachusetts Recommended K-12 Instructional Technology Standards[19]).

B. Technology Literacy

1. At least 85% of eighth grade students show proficiency in all the Massachusetts Recommended PreK-12 Instructional Technology Standards for grade 8.

2. 100% of teachers are working to meet the proficiency level in technology, and by the school year 2010-2011, 60% of teachers will have reached the proficiency level as defined by the Massachusetts Technology Self-Assessment Tool (TSAT)[20].

C. Staffing

1. The district has a district-level technology director/coordinator.

2. The district provides one FTE instructional technology teacher per 60-120 instructional staff.

3. The district has staff dedicated to data management and assessment.

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[18] The Massachusetts Department of Elementary and Secondary Education defines technology integration as the daily use of technology in classrooms, libraries, and labs to improve student learning.

[19] The Massachusetts Technology Literacy Standards and Expectations are available on the Department's web site (http://www.doe.mass.edu/edtech/standards.html).

[20] The Technology Self-Assessment Tool is available as an interactive tool on MassONE, as well as a printable PDF checklist (http://www.doe.mass.edu/edtech/standards/sa_tool.html).

Benchmark 3
Technology Professional Development

A. At the end of three years, at least 85% of district staff will have participated in 45 hours of high-quality professional development[21] that includes technology skills and the integration of technology into instruction.

B. Technology professional development is sustained and ongoing and includes coaching, modeling best practices, district-based mentoring, study groups, and online professional development. The professional development includes concepts of universal design and scientifically based, researched models.

C. Professional development planning includes an assessment of district and teachers' needs. The assessment is based on the competencies listed in the Massachusetts Technology Self-Assessment Tool.[22]

D. Administrators and teachers consider their own needs for technology professional development, using the technology self-assessment tools provided by the Massachusetts Department of Education or similar tools.[23]

Benchmark 4
Accessibility of Technology

A. Hardware Access

1. The district has an average ratio of fewer than five students per high-capacity[24], Internet-connected computer. The Department will work with stakeholders to review the capacity of the computer on an annual basis. (The goal is to have a one-to-one, high-capacity, Internet-connected computer ratio.)

2. The district provides students with' access to portable and/or handheld electronic devices appropriate to their grade level.

3. The district maximizes access to the general education curriculum for all students, including students with disabilities, using technology in

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[21] High quality professional development is described in the Massachusetts 2001 State Plan for Professional Development (http://www.doe.mass.edu/pd/stateplan/).

[22] Details are available on the Department's web site (http://www.doe.mass.edu/edtech/standards/sa_tool.html).

[23] A sample administrator technology self assessment tool is available on the Department's web site (http://www.doe.mass.edu/edtech/standards/tsat_sampadmin.html). The Technology Self-Assessment Tool (TSAT) for teachers is also available as a printable document and as an interactive tool on MassONE (http://www.doe.mass.edu/edtech/standards/sa_tool.html).

[24] In 2007, the Department defined a high-capacity computer as a computer that has at least 256 RAM and either a Pentium 4 processor or a Macintosh G4 processor (or equivalent). The Department also refers to these as Type A computers.

classrooms with universal design principles and assistive technology devices.

4. The district has procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability.

5. The district provides classroom access to devices such as digital projectors and electronic whiteboards.

6. The district has established a computer replacement cycle of five years or less.

B. Internet Access

1. The district provides connectivity to the Internet in all classrooms in all schools including wireless connectivity, if possible.

2. The district provides bandwidth of at least 10/100/1 Gb to each classroom. At peak, the bandwidth at each computer is at least 100 kbps. The network card for each computer is at least 10/100/1 Gb.

C. Networking (LAN/WAN)

1. The district provides a minimum 100 Mb Cat 5 switched network and/or 802.11b/g/n wireless network.

2. The district provides access to servers for secure file sharing, backups, scheduling, email, and web publishing, either internally or through contracted services.

D. Access to the Internet Outside the School Day

1. The district works with community groups to ensure that students and staff have access to the Internet outside of the school day.

2. The district web site includes an up-to-date list of places where students and staff can access the Internet after school hours.

E. Staffing

1. The district provides a network administrator.

2. The district provides timely in-classroom technical support with clear information about how to access the support, so that technical problems will not cause major disruptions to curriculum delivery.

3. The district provides at least one FTE person to support 200 computers. Technical support can be provided by dedicated staff or contracted services.

Benchmark 5
E-Learning and Communications

A. The district encourages the development and use of innovative strategies for delivering specialized courses through the use of technology.

B. The district deploys IP-based connections for access to web-based and/or interactive video learning on the local, state, regional, national, and international level.

C. Classroom applications of e-learning include courses, cultural projects, virtual field trips, etc.

D. The district maintains an up-to-date web site that includes information for parents and community members.

E. The district complies with federal and state law[25], and local policies for archiving electronic communications produced by its staff and students. The district informs staff and students that any information distributed over the district or school network may be a public record.

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[25] Information about state regulations is available from the state's Record Management Unit (http://www.sec.state.ma.us/arc/arcrmu/rmuidx.htm).