



Educational Technology in Massachusetts *2001-2002*

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Contents

Introduction.....	1
Teaching and Learning	3
Educator Preparation and Development.....	4
Models of Professional Development	4
Funding Professional Development	4
Content of Training	5
Administration and Support Services.....	6
Vision and Planning	6
Budget Allocated for Technology	6
Technical Support	7
Curriculum Integration Support	8
Infrastructure for Technology.....	10
Hardware	10
Assistive Technologies and Universal Design.....	11
Connectivity	12
Access Outside the School Day	12
Emerging Technologies.....	13
Appendix A – Benchmark Standards for the Year 2003	14
Appendix B – District Statistics.....	16

Introduction

In January of 2002, President George Bush signed into law the No Child Left Behind Act, which aims to reform education and ensure that all students are educated to their fullest potential. Recognizing that technology can help advance these goals, creators of the legislation included a component called Enhancing Education Through Technology.

The Enhancing Education Through Technology Act of 2001 reminds educators that the primary reason for using technology in schools is to increase student achievement. A secondary goal of the law is to ensure that all students are technologically literate by the time they finish eighth grade. The legislation also encourages the integration of technology with teacher training and curriculum development, with the objective of establishing proven best practices that can be widely replicated.

The goals of No Child Left Behind's technology component should not come as a surprise to Massachusetts educators who are involved with technology. For some time the Massachusetts Department of Education has encouraged school districts to develop technology plans that promote the effective use of technology, with the ultimate goal of improving learning. In addition, the Department has urged districts to include the state's *Recommended PreK-12 Instructional Technology Standards for Students* in their technology planning to ensure that students develop technological literacy.

Recent statewide efforts have focused on *the Local Technology Plan Benchmark Standards for the Year 2003* (see Appendix A), which were developed in 2000 with the help of district technology specialists from across Massachusetts. The benchmark standards are not mandates but rather recommended guidelines describing conditions that are needed in order for technology to be used effectively in schools. Over the past school year (2001-2002), school districts continued to make progress towards meeting the benchmark standards, as illustrated by the following examples:

- There was a rise from 49% to 53% in the percentage of districts meeting the benchmark of at least a 5:1 ratio of students to "modern computers." Although the improvement might seem small, it is significant because the specifications for modern computers were upgraded in 2002.
- The percentage of districts meeting the benchmark of an Internet connection in every classroom went from 60% to 66%.
- There was an increase from 26% to 35% in the percentage of districts meeting the benchmark of one full-time equivalent person providing technical support for 100 to 200 computers.
- 52% of districts up from 41%, now meet the benchmark of at least a half-time staff person to support every 30-60 teachers in integrating technology into the curriculum.

To help schools continue to gauge their progress, the state's Educational Technology Advisory Council (ETAC) has developed the *Massachusetts STaR (School Technology and Readiness) Chart*.¹ Derived from the chart created by the CEO Forum² and adapted by Texas³, the *STaR Chart* was adapted locally in collaboration with district technology directors. The chart helps identify the many elements that contribute to the effective use of technology in schools. These elements are grouped into four key areas:

- Teaching and Learning
- Educator Preparation and Development
- Administration and Support Services
- Infrastructure for Technology

Using data submitted by districts for the 2001-2002 school year, this report will also show how schools are progressing in implementing their technology plans.

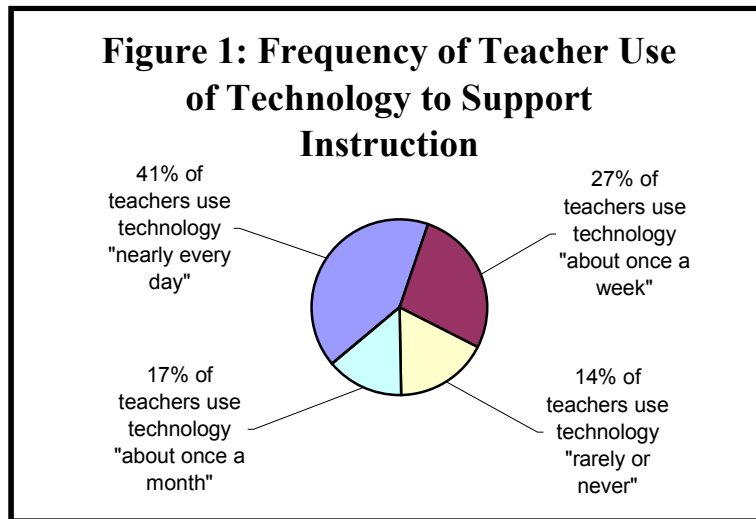
¹ The Massachusetts STaR Chart is available on the Massachusetts Educational Technology Advisory Council's Web page (<http://www.doe.mass.edu/boe/sac/edtech/star.html>).

² The CEO Forum on Education and Technology, founded in 1996, was comprised of chief executives from both the industry and education communities. The STaR Chart is part of the CEO Forum's final report, which was published in June, 2001. (<http://www.ceoforum.org/downloads/report4.pdf>) The International Society for Technology in Education (ISTE) now offers an interactive version of this chart (<http://ww2.iste.org/starchart/>).

³ The Texas STaR Chart (http://www.tea.state.tx.us/technology/etac/campus_txstar/) is "a tool for technology planning, budgeting for resources, and evaluation of progress in integrating technology into the school curriculum and infrastructure." It was patterned after the chart developed by the CEO Forum.

Teaching and Learning

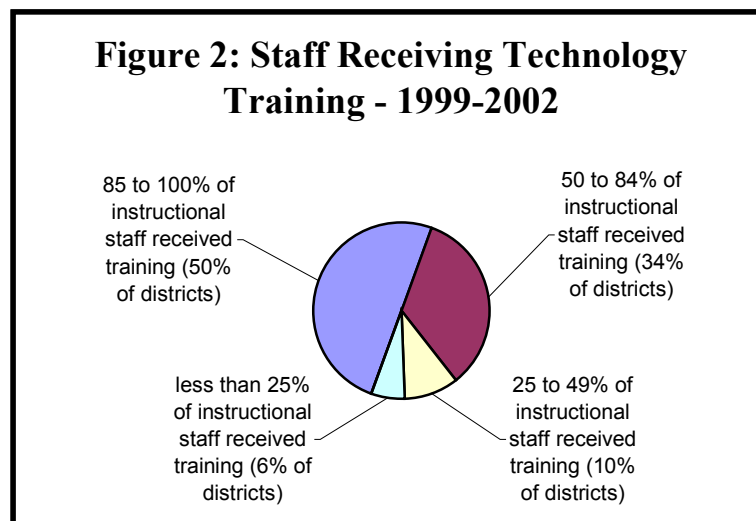
One of the focus areas in ETAC's *STaR Chart* is "patterns of teacher use," which refers to the percentage of teachers using technology in various ways. According to estimated data submitted by districts, over two-thirds of teachers use technology for instruction about once a week or more. Of these teachers, more than half use technology nearly every day. Just under one-third of teachers use technology about once a month or less. Although most respondents said their data were from informal observation, about one-third used data from teacher surveys to inform their answers.



Research, collaboration, lesson planning, and general productivity are just a few of the ways teachers use technology. Virtual Education Space (VES), the state's online service for educators and students, offers a collection of tools that educators can use for these purposes. In 2002, nearly 50% of districts reported that some of their teachers were using VES. Although most districts reported that fewer than 20% of their teachers used VES, 24 districts said that at least 20% of their teachers used it.

Educator Preparation and Development

On average, districts report that 75% of teachers have received professional development over the past three years (1999-2002). Moreover, 50% of districts reported that they met the 2003 benchmark standard of having at least 85% of their teachers participate in district-sponsored technology training in this time period. In approximately half of these districts, 100% of teachers had received technology training.



Models of Professional Development

Districts are employing various models of professional development. Formal professional development, which includes workshops, summer institutes, credit courses, or study groups, is the most common, with an average of 46% of teachers participating in this kind of professional development. Almost as widespread is “ongoing” professional development, such as coaching, mentoring, and co-teaching, with 43% of teachers reached in this way. Online professional development appears to be a growing trend, with over half of the districts using it. Still, the number of teachers reached through online programs is small, at 5%.

Funding Professional Development

No Child Left Behind (NCLB) has created a useful guideline for funding technology professional development, with its requirement that 25% of any monies received through NCLB technology grants be spent on professional development. Districts receiving NCLB funding have fulfilled this requirement, allocating one-quarter or more of their grant funds to technology professional development activities.

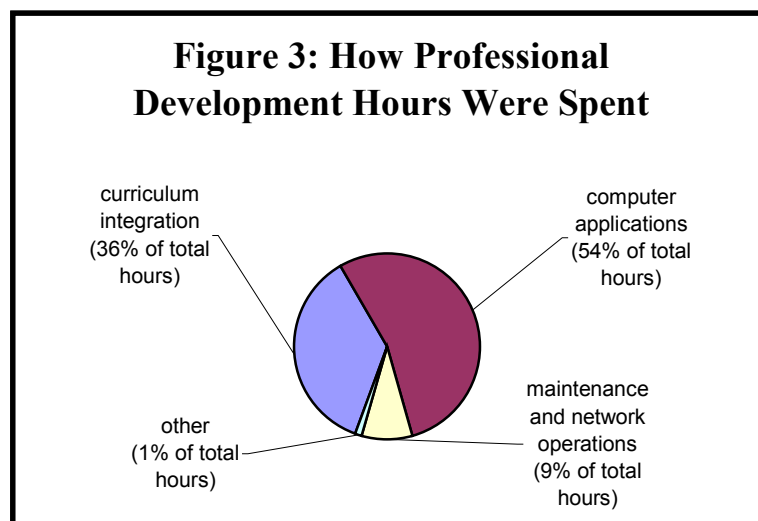
Because professional development is a key component in using technology effectively, the Department of Education encourages districts to set aside 25% of their total technology budgets (including funds from all sources) for professional development. Determining districts’ expenditures for professional development is complex, however, because the expenses associated with ongoing professional development, such as

mentoring and co-teaching, may overlap with expenses for curriculum integration support.

On average, Massachusetts districts spend approximately 6% of their technology budgets on formal professional development, such as workshops and courses. In addition, districts spend an average of 54% of their technology budgets on instructional technology, which includes salaries for technology integration specialists and library teachers. Since these staff often provide ongoing support to teachers, it makes sense to consider at least a portion of these costs as professional development expenses.

Content of Training

Looking at the content of technology professional development, computer applications account for about half of the professional development. Although this is an increase from last year, the change could be due to the kinds of topics that were included in this category in 2002. For example, in addition to computer basics and productivity tools, this category included use of the Internet (a topic offered by 91% of districts), presentation tools (90% of districts), Web page construction (66% of districts), and assistive technology (52% of districts). In addition, some of this training dealt with newer technologies such as multimedia peripherals (included in 78% of districts) and handheld computers and peripherals (25% of districts).



The second most common area, accounting for just over a third of districts' technology professional development, was integration of technology into the curriculum. Although this is a slight decrease since last year, the change may have resulted from an increased need to train teachers on newly acquired technologies instead. Topping the list of topics in technology integration were mathematics, science, and English language arts, with three-quarters of districts offering professional development in these areas. In addition, half of all the districts also included the Massachusetts Recommended PreK-12 Instructional Technology Standards in their professional development. Many districts (43% of the total) also offered training in the use of technology for assessment.

Administration and Support Services

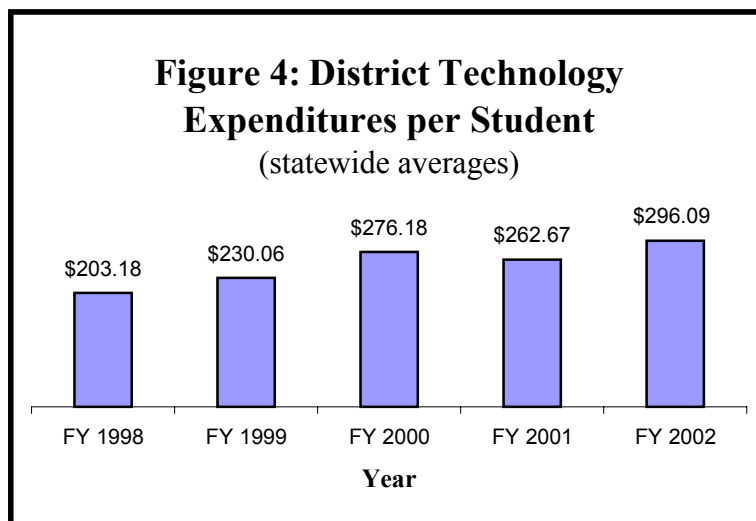
Vision and Planning

An important aspect of administration for technology is thoughtful planning involving administrators, teachers, parents, and community members. A district's technology plan should focus on how technology can support student learning, teacher professionalism, and data management.

School districts are required to have a state-approved technology plan in order to be eligible for technology grants and E-rate discounts. In order to approve districts' technology plans, the Massachusetts Department of Education asks districts to keep a long-range plan on file in the district office and to provide data on the implementation of the technology plan electronically every year. Updating the technology plan provides an opportunity for districts to review the progress they have made, set new goals, and identify the resources and strategies that will help them use technology effectively. In 2002, 95% of school districts submitted updates to their technology plans, using the Department's online system.

Budget Allocated for Technology

Before a district can carry out its technology plan, it needs to have a commitment to fund it. The technology budget needs to include not only monies for hardware and software purchases, but also for the costs of hardware and software upgrades, maintenance, support, and professional development. In 2002 the statewide spending on technology was up more than 12%, with a per student average of \$296. These expenditures included monies from the district's operational budget, municipal bonds, and grants from federal, state, local, and private sources.



E-rate - In tough economic times technology grants and discounts are especially useful to schools. The federal E-rate program provides discounts for Internet services, telecommunications, and wiring. With discounts based on economic disadvantage and

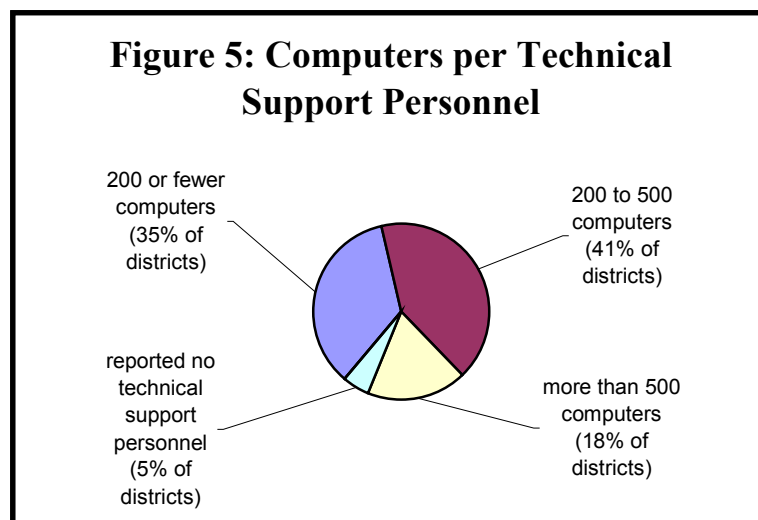
location (urban or rural), some Massachusetts districts are eligible for discounts as high as 90%. In 2002, approximately 49% of schools received E-rate discounts, receiving an average discount rate of 48%. Still, many districts did not take advantage of this program, and the average discount rate available to those districts was 47%.

In order to receive E-rate discounts and federal grants, schools must comply with the Children’s Internet Protection Act. Enacted in 2000, the law requires schools to certify that they have an Internet safety policy and that they are using filtering technology before they will be considered eligible for these programs. To be in compliance with CIPA, the Internet filter must block all visual descriptions that are obscene, child pornographic, or harmful to minors. In 2002, districts reported that 69% of elementary schools were using such filters, while 76% of high schools used them. To further protect students, 70% of elementary schools and 77% of high schools are teaching students about the responsible use of technology, including safety and ethics issues.

Technical Support

The benchmark standards and the *STaR Chart* recommend that districts have at least one full-time person to support every 200 computers. Over the past year, the percentage of districts offering this level of support rose from 26% in 2001 to 35% in 2002. On the other hand, 5% of districts reported no technical support services at all.

Staffing - According to statewide data, the average technical support person maintains approximately 407 computers. Although this is an improvement over last year, when one person supported 439 computers, this level of staffing may not be sufficient to keep the computers and networks in working order so that teachers can rely on them on a consistent basis. Clearly, if it takes several days to fix a technical problem, it is likely that there will be a disruption to curriculum activities involving technology.

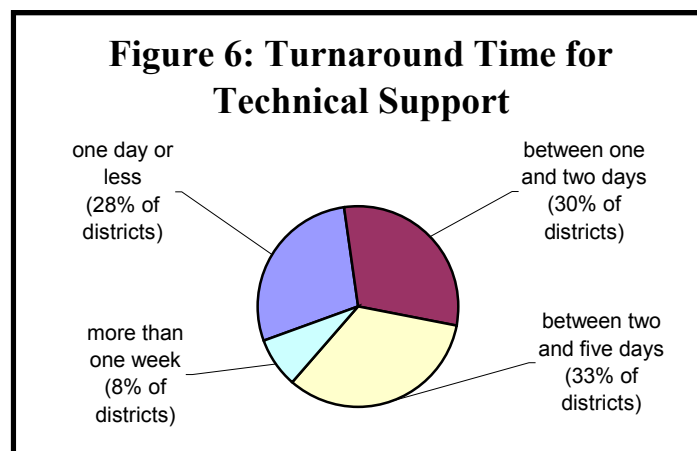


Staffing for technical support can vary greatly from district to district. Approximately one-third of school districts employ teachers (who are paid stipends) or outside contractors for at least some of their technical support. In addition, about one-quarter of

districts use volunteers and students for a portion of their technical support. On average, these other means of technical support account for about one-third of the support provided in the districts using them.

School districts are using various strategies to help users with technical problems. While over 80% of districts provide technical support staff at the district level, 55% of districts also employ such staff in individual school buildings, increasing the likelihood that technical problems will be resolved quickly. However, in 30% of schools, there is either no building-level technical support or no support at all, making it difficult to schedule repairs in a timely fashion.

Turnaround time - A useful way to gauge the adequacy of a district's technical support is to look at the average turnaround time for resolving problems. The *STaR Chart* suggests that same-day technical support is a reasonable goal, and some school Massachusetts districts are currently meeting this goal, with 28% of districts reporting their turnaround time to be one day or less. Still, the average turnaround time is 3 days, which can make it difficult for schools to use technology effectively.



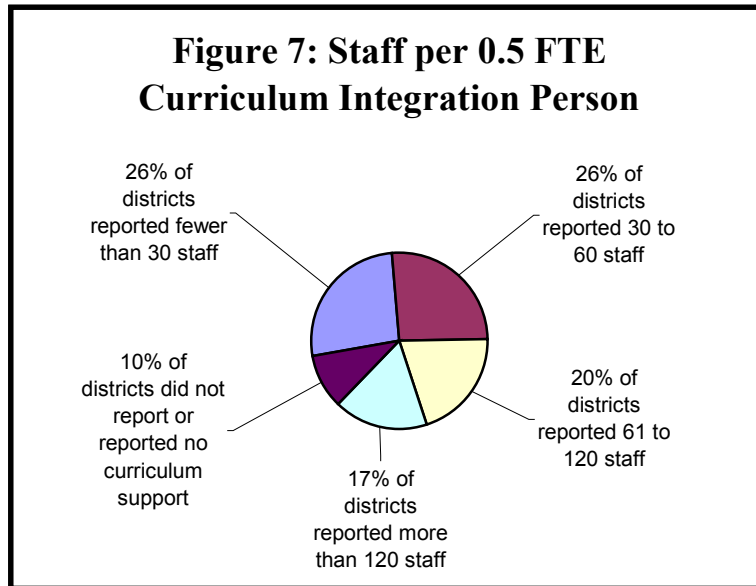
Strategies - Many districts are using technology to facilitate the process of reporting and responding to technical support requests. Nearly half of all districts use a telephone help desk, and over half of those districts also use an online system. About a third of the school districts use an online system alone. These reporting systems make it easier for the technical staff to prioritize service requests. Also, online systems can include troubleshooting guides that help computers resolve their own problems, reducing the demands placed on the technical support staff.

Curriculum Integration Support

To help ensure successful integration of technology into the classroom, the benchmark standards and the *STaR Chart* recommend that schools employ at least one half-time person to support every 30 to 60 professional staff persons. The staff person providing this support might have a title such as instructional technology specialist, technology integration specialist, media specialist, or library teacher. The person's activities may include consulting with teachers, modeling effective teaching with technology,

collaborating with teachers to develop technology-rich lessons, and providing workshops on technology integration.

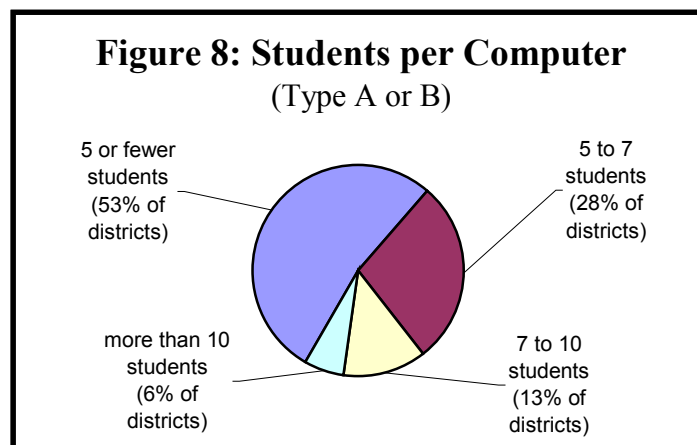
Currently 52% of districts have met the benchmark standard, with a half-time curriculum integration specialist supporting no more than 60 teachers. Although this is an improvement over last year, when 41% of districts achieved the benchmark, providing this level of support continues to be a challenge for many districts. Across the state, on average, a half-time curriculum integration specialist supports 90 teachers, and 10% of schools provide no support at all in this area.



Infrastructure for Technology

Hardware

School districts continue to make progress in providing students with access to modern computers, referred to as Type A and B computers on the data collection forms. More than half of all districts now meet the benchmark standard of no more than five students for every instructional computer. Statewide, the average ratio of students to computers is approximately 5.6. When considering these data, it is important to keep in mind that the specifications for Type A and B computers were updated this year to reflect the advances in technology. For example, in 2000-2001 a computer needed to have 64 megabytes of RAM in order to qualify as a Type A computer, while in 2001-2002 the minimum RAM was 128 MB.



In order to maintain the recommended ratio of students, schools need to replace older computers on a regular basis. The *STaR Chart* recommends that districts include a replacement policy in their technology plan and that the replacement cycle be six years or less.

Strategies to increase access - Having a replacement policy does not necessarily mean that all of the older computers need to be discarded. Some schools find that older computers are useful for specific tasks, such as word processing, keyboarding practice, or using older software packages. The advantage of using older computers is that it improves a school's student-to-computer ratio, meaning that students' access to computers is better. Statewide, the student-to-computer ratio falls to 4.4 when older machines are counted. On the down side, maintaining many different kinds of computers can be more challenging than supporting a collection of newer, similar computers.

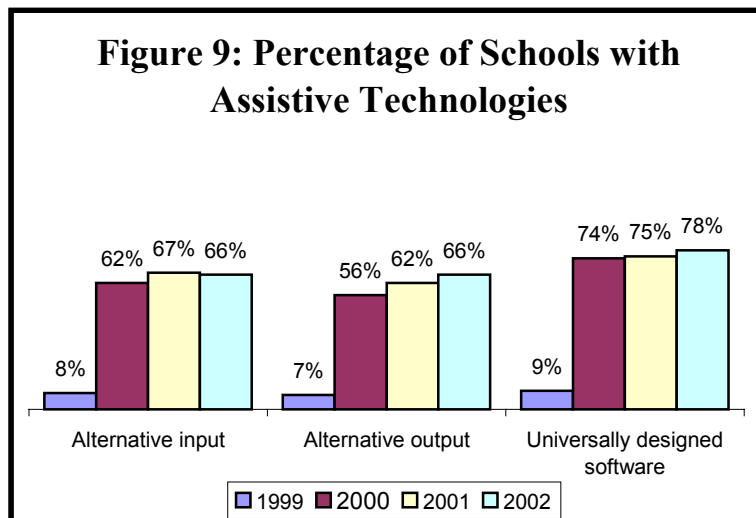
Another way that schools are providing increased access to technology is by purchasing portable word-processing devices, such as the AlphaSmart and DreamWriter. While the majority of schools have at least one of these devices, 26% of schools have 20 or more word-processing devices. In some schools, the use of these devices increases access to word processing by 50% or more.

The use of laptop computers can make it more convenient for teachers to integrate technology into their teaching. Some schools are purchasing sets of laptop computers, which are stored on carts that can be wheeled from one classroom to another as needed. The use of laptops varies greatly from district to district, with some schools having none and others using them fairly extensively. On a statewide basis, laptops make up about 6% of the total number of computers of all types.

Assistive Technologies and Universal Design

A range of technology tools are available to help provide access to the curriculum for students with disabilities, including learning disabilities. For example, text-to-speech software makes it possible for students to listen to virtually any text that is in a digital format, which can be useful for students who have difficulty reading printed text.

In 2002, 88% of schools reported that they consider accessibility for all students when purchasing technologies. Approximately two-thirds of all schools indicated that they have alternative input devices in their buildings. These include devices such as modified keyboards, alternative mice, switches, speech-to-text software, touch screens, and so on. Two-thirds of schools also have alternative output devices, including communication devices, text-to-speech software, large monitors, and sound amplification systems. In addition, 78% of schools said they have universally designed software, which is designed for the widest possible spectrum of students.

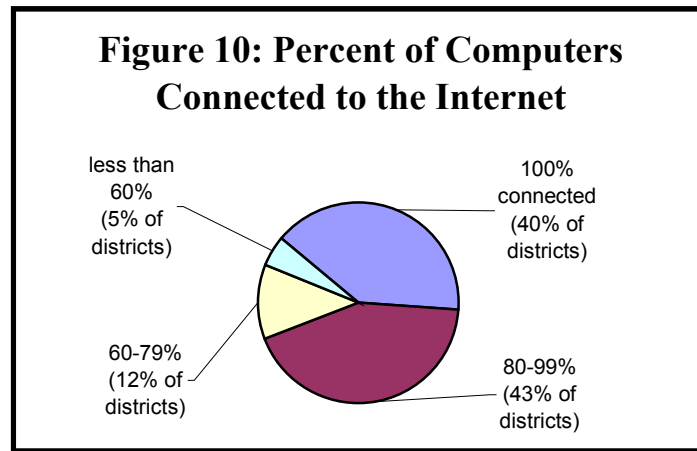


Because many assistive technology devices and software programs need to be used in conjunction with computers and other devices, schools need to have an infrastructure that supports the use of assistive technology. For example, in order to use text-to-speech software, students need text that is in a digital format, which may require that curriculum materials be scanned. Over 80% of schools reported that they have hardware, such as scanners, that can be used to help make curriculum materials accessible to all students.

Connectivity

The *STaR Chart* and the benchmark standards recommend that every classroom have a connection to the Internet. Massachusetts school districts are making steady progress towards this goal. In 2002, an average of nearly 92% of classrooms across the state were connected to the Internet. Moreover, 66% of districts had all of their classrooms connected, up six percentage points from last year.

Some districts have focused on providing Internet connections in classrooms, while others believe it is more important to have multiple connections in places like computer labs and libraries. For this reason, it is useful to look also at the number of instructional computers connected to the Internet. In 2002, more than 98% of school districts reported that most of their computers were connected to the Internet. The vast majority of districts (83%) have at least 80% of their computers connected.



The use of wireless connections appears to be on the rise, with 48% of districts reporting at least one wireless device. Still, for the vast majority of districts (83%), the use of wireless is in its early stages, with fewer than 1 in 5 computers using wireless connections.

Access Outside the School Day

It is not uncommon for students to need a computer in order to complete their homework. Although most households now have computers, numerous studies have shown that students from low-income households are less likely to have access to computers at home than their peers from higher-income households.

Ways to increase access - To increase computer access for all students outside the school day, school districts are using various strategies. The majority of schools—57% of elementary schools and 66% of high schools—allow students to use the school’s computers before and/or after school. At the schools that provide this kind of access, students are allowed to use the computers 7 to 8 hours per week. In addition, approximately 6% of schools allow students to take computers home with them. The benchmark standards recommend that school districts provide students with information

on where they can access the Internet outside of school hours. Slightly more than half of districts reported that they do this.

VES - Virtual Education Space (VES) is a convenient tool for both students and teachers who work at computers in more than one location. VES allows users to set up personal workspaces on the Internet, where they can store their work and then access it from any computer through the VES Web site. Using VES, students and teachers are able to begin work on a project on a school computer and then complete it on a computer at a library, home, or community center, without having to copy files onto a disk.

School Web sites - The benchmark standards also recommend that every school maintain an up-to-date Web site so that students, parents, and community members will be able to access information about the school at any time and on any computer. In 2002, approximately 70% of schools reported that they have Web sites.

Emerging technologies

Many districts reported that their schools have devices such as handheld computers, electronic whiteboards, digital cameras, and projection devices. Approximately 20% of schools have at least one handheld device. Often used by administrators to manage data, these devices are also used by students in some schools. Another growing trend is the use of electronic whiteboards, which digitally capture whatever is written or drawn on the board. Electronic whiteboards can be useful for students with disabilities, as well as other students who may have difficulty taking notes. About 19% of schools have at least one video camera for teleconferencing, paving the way for rich online learning experiences. When schools reported “other technologies” not listed on the survey form, the most commonly listed item was a digital camera, which is handy for documenting students’ activities and for creating images related to curriculum projects.

Appendix A

Local Technology Plan Benchmark Standards for the Year 2003

Background

In 1995, school districts were asked to submit a Local Technology Plan (LTP) so that they would be eligible to receive state and local technology funding. The federal government requires that districts have a state-approved and updated Local Technology Plan to be eligible for E-rate discounts. From 1995 to 1996, the Massachusetts Department of Education approved all the technology plans submitted by school districts. Since then, the Department has asked school districts to update their plans and report on their progress annually. Since 1998, districts have submitted their *Tech Plan Updates* on-line.

To help districts develop purposeful plans, the Department established a set of benchmark standards. These standards are not mandated but rather represent the minimum conditions for districts to meet by 2003.

With the guidance of a group of district technology specialists from across the state, the Department outlined six benchmark standards to guide districts in establishing goals for their Local Technology Plans. The six standards are as follows:

Benchmark Standard 1: Commitment to a Clear Vision and Mission Statement

- A. The district has a realistic and clearly stated set of goals. It is committed to achieving its vision by the target year 2003.
- B. The district has a technology team.
- C. The district has a budget for its local technology plan. The district's operational budget includes a line item for technology.
- D. The district leverages the use of state, federal, and private resources.

Benchmark Standard 2: Access

By the year 2003, every district will have achieved at least a 5:1 student-to-computer ratio of modern, fully functioning, Internet-enabled computers and devices.

Benchmark Standard 3: Infrastructure for Connectivity

The district ensures that every classroom and every administrative office have at least one computer with a high-speed connection to the Internet by the year 2003. A building's electrical service must be sufficient to support the computers and networks installed.

Benchmark Standard 4: Technical Support, Technology Curriculum Integration, and Professional Development

TECH SUPPORT: The district ensures that every administrator, teacher, and student receives high-quality user and system support so that by the year 2003 there will be at least one FTE (full-time equivalent) person to support 100-200 computers. Technical support can be provided by dedicated staff or equivalent services.

CURRICULUM INTEGRATION: The district provides at least 0.5 FTE staff person to support every 30-60 users (staff only) in their efforts to achieve technology competency and to integrate technology into the curriculum.

TECHNOLOGY PROFESSIONAL DEVELOPMENT: By the year 2003, at least 85% of district staff will have participated in technology training sponsored by the districts.

ACCEPTABLE USE POLICY: The district has an Acceptable Use Policy regarding Internet use.

Benchmark Standard 5: Accurate Data Reporting

The district maintains accurate data that meet state IMS (Information Management System) standards.

Benchmark Standard 6: Access to the Internet Outside the School Day

- A. The district works with community groups to ensure that by 2003, students and staff will have sufficient access to the Internet, which will enable them to work outside of the school day. The school must maintain a catalog of places in the community (“points of access”) where students and staff can gain access to the Internet after school hours.
- B. The district maintains an up-to-date Web site and every educator has an Internet account with the capability of sending e-mail and accessing the World Wide Web.

Appendix B

District Statistics

Districts Reporting

School districts that updated their technology plans in 2002 are included in the following tables. Districts that did not update their plans are not included.

Student Computer Ratios

The ratio of students per Type A/B computer is based on the number of instructional computers of these types reported on the 2002 individual school profile forms. The ratio of students per all types computers is based on the total number of instructional computers reported in all categories: Types A, B, and C. The enrollment figures used were those reported by the districts for the 2001-2002 school year. The ratios reported here are based on data aggregated from the school profile forms and validated by school districts. We advise districts to calculate a student computer ratio for each school to ensure equitable access across the entire district.

During the period that this data was collected, Type A computers were defined as “multimedia computers with CD-ROM and Internet capability using a browser, capable of running high-end applications and streamed video” and having at least 128 MB RAM and a processor speed of 500 MHz or greater (350MHz for Macintosh). Type B computers were defined as “multimedia computers with CD-ROM access and Internet capability using a browser” and having at least 32 MB RAM and a processor speed of 225 MHz or greater (133 for Macintosh). Type C computers were defined as machines with less than 32 MB RAM and a processor speed of less than 225 MHz (133MHz for Macintosh), with or without Internet capability.

Connections to the Internet

The percentage of classrooms connected to the Internet is based on reporting by individual schools on the school profile forms. Since some districts prefer to provide more connections in computer labs, the percentage of instructional computers connected to the Internet is also reported, using data from the school profile forms. This data was validated by school districts.

E-rate

The information on which schools received E-rate discounts is based on data provided by the School and Libraries Division of the Universal Service Administrative Company, which administers the E-rate program. This data was validated by school districts.

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Abby Kelley Foster Regional Charter District	17.33	17.33	100	100	No
Abington	11.5	9.39	14.05	59.18	Yes
Academy Of Pacific Rim Charter District	12.08	6.59	100	100	No
Acton	5.08	4.95	100	100	No
Acton-Boxborough	4.69	4.46	100	100	No
Acushnet	2.39	1.96	100	100	Yes
Adams -Cheshire	7.42	5.85	100	88.96	No
Agawam	7.44	5.42	32.18	66.25	No
Amesbury	5.34	4.65	97.18	93.09	Yes
Amherst	4.69	3.89	100	100	Yes
Amherst-Pelham	7.86	3.63	100	100	Yes
Andover	6.19	3.87	100	100	No
Arlington	4.85	4.17	99.72	100	Yes
Ashburnham-Westminster	8.48	6	100	100	Yes
Ashland	6.66	4.97	100	99.61	Yes
Assabet Valley	2.61	1.73	20	50.79	Yes
Athol-Royalston	4.88	3.06	66.67	70.1	Yes
Atlantis Charter District	6.29	6.29	100	100	No
Attleboro	8.41	5.76	100	98.99	No
Auburn	6	6	100	100	Yes
Avon	4.36	4.36	100	88.24	No
Ayer	4.14	3.86	100	100	No
Barnstable	4.59	3.84	100	100	No
Barnstable Grade 5 HMCS District	4.97	4.08	100	82.11	No
Bedford	4.09	3.78	100	100	Yes
Belchertown	7.43	7.16	61.15	68.47	No
Bellingham	5.35	5.13	98.04	100	Yes
Belmont	5.97	5.18	100	100	No
Benjamin Banneker Charter District	3.45	3.45	100	100	Yes
Benjamin Franklin Classical Charter District	8.9	7.06	100	100	No
Berkley	5.21	5.05	90.32	80.31	No
Berkshire Hills	4.34	4.24	100	90.61	No
Berlin	4.65	3.56	100	100	Yes
Berlin-Boylston	6.29	4.86	97.14	100	Yes
Beverly	5.1	4.94	86.63	94.83	Yes
Billerica	8.52	5.6	100	90.13	Yes
Blackstone Valley Regional	2.3	2.24	100	100	Yes
Blackstone-Millville	5.8	5.8	100	99	Yes
Blue Hills Voc	1.84	1.5	100	100	Yes
Boston	4.79	4.73	88.8	96.47	Yes
Boston Evening Academy HMCS District	2.11	2.11	84.62	75.81	No
Boston Renaissance Charter District	3.52	3.52	100	94.81	Yes
Bourne	3	2.93	100	100	Yes

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Boxborough	6.3	4.2	100	100	No
Boxford	10.66	5.76	94.12	100	No
Boylston	2.26	2.26	100	90.63	Yes
Braintree	7.05	5.95	32.53	92.72	No
Brewster	8.19	3.49	100	100	Yes
Bridgewater-Raynham	5.46	5.38	97.39	85.7	No
Brimfield	4.6	4.22	100	86.3	Yes
Bristol-Plymouth Voc Tech	1.49	1.49	100	100	No
Brockton	6.4	6.12	68.17	40.59	Yes
Brookfield	3.7	3.7	100	92.77	Yes
Brookline	5.13	3.82	88.42	90.45	Yes
Burlington	4.81	3.23	100	90.56	No
Cambridge	4.94	3.77	100	98.18	No
Canton	2.72	2.72	100	99.71	No
Cape Cod Lighthouse Charter District	5.65	4.17	92.86	100	No
Cape Cod Region Voc Tech	3.09	3.03	100	100	No
Carlisle	12.26	5.39	100	38.22	Yes
Carver	6.42	5.39	100	100	Yes
Central Berkshire	4.91	4.61	100	93.81	Yes
Champion HMCS District	5.35	5.35	100	100	No
Chatham	1.97	1.97	100	100	No
Chelmsford	5.72	4.53	100	100	Yes
Chelsea	4.12	3.98	100	94.04	Yes
Chesterfield-Goshen	5.16	5.16	100	100	No
Chicopee	6.39	5.05	97.83	86.52	Yes
City On A Hill Charter District	3.17	3.17	100	100	Yes
Clarksburg	5.28	4.8	100	97.73	No
Clinton	3.84	3.06	97.74	89.38	Yes
Cohasset	4.41	4.41	100	99.68	No
Community Day Charter District	20.85	5.21	100	100	Yes
Concord	5.1	4.89	100	100	Yes
Concord-Carlisle	4.45	4.33	100	100	No
Conservatory Lab Charter District	6.6	6.6	100	100	No
Conway	4.84	2.82	100	58.18	Yes
Danvers	6.96	6.96	100	100	Yes
Dartmouth	7.69	3.79	100	100	Yes
Dedham	3.55	3.55	100	98.35	Yes
Deerfield	5.41	5.05	100	93.18	Yes
Dennis -Yarmouth	7.36	5.39	100	99.15	Yes
Dighton-Rehoboth	5.94	5.94	100	96.35	No
Douglas	7.34	4.84	100	100	Yes
Dover	2.34	2.34	100	100	Yes
Dover-Sherborn	4.06	3.58	100	99.25	Yes

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Dracut	4.94	4.63	95.68	88.13	Yes
Dudley-Charlton Regional	3.23	3.11	100	98.77	No
Duxbury	4.69	3.98	100	100	No
East Bridgewater	5.1	5.1	100	98.57	Yes
East Longmeadow	2.58	2.58	100	100	Yes
Eastham	6.83	3.79	100	100	Yes
Easthampton	16.62	5.06	64.03	75.38	Yes
Easton	7.21	6.01	100	79.39	No
Edgartown	7.57	3.35	100	33.65	No
Erving	2.4	2.4	100	100	Yes
Essex Agr Tech	3.97	3.48	85.71	73.45	No
Everett	6.48	5.34	43.01	84.46	No
Fall River	9.29	5.77	33.07	44.18	Yes
Falmouth	6.85	5.4	77.78	71.38	Yes
Farmington River Regional	2.52	2.52	100	89.23	No
Fitchburg	8.59	7.37	98.94	79.12	No
Florida	3.61	3.61	100	100	No
Foxborough	2.5	2.5	100	100	No
Framingham	5.79	5.18	100	97.28	No
Francis W Parker Charter District	5.73	5.73	100	95	No
Franklin	4.97	3.92	100	99.44	Yes
Franklin County	2.11	1.72	100	100	Yes
Freetown-Lakeville	3.65	3.32	54.21	95.39	No
Frontier	1.64	1.64	100	97.67	Yes
Gardner	5.06	4.58	100	98.55	No
Gateway	2.87	2.77	100	90.19	Yes
Georgetown	4	4	100	100	Yes
Gill-Montague	4.43	4.3	100	94.46	Yes
Gloucester	4.37	3.66	100	63.94	No
Grafton	5.02	4.25	100	99.81	Yes
Granby	8.23	6.11	100	99.44	No
Granville	6.75	6.75	100	100	Yes
Greater Fall River	2.2	2.02	100	87.52	Yes
Greater Lawrence Rvt	2.49	2.4	93.46	66.91	Yes
Greater Lowell Voc Tec	4.95	3.02	95.68	97.16	No
Greater New Bedford	2.96	2.91	100	100	No
Greenfield	6.51	4.36	96.15	87.12	Yes
Groton-Dunstable	6.56	5.06	85.99	93.03	Yes
Hadley	3.35	3.35	100	100	No
Halifax	6.72	5.1	100	73.76	No
Hamilton-Wenham	5.16	3.75	100	97.96	No
Hampden-Wilbraham	5.76	3.57	100	100	Yes
Hampshire	4.34	3.68	100	99.1	No

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Hancock	3.05	3.05	100	73.68	No
Hanover	3.77	3.34	100	89.13	Yes
Harvard	6.29	4.22	90	63.93	No
Harwich	6.06	4.59	80.58	84.98	Yes
Haverhill	9.25	5.54	75.19	52.76	No
Hawlemont	1.91	1.91	100	100	Yes
Health Careers Academy HMCS District	5.83	5.83	9.09	100	No
Hilltown Cooperative Charter District	4.6	4.6	100	80	No
Hingham	5.78	4.6	100	92.32	No
Holbrook	4.97	4.97	100	100	No
Holland	8.88	4.9	100	100	Yes
Holliston	2.44	2.44	100	100	No
Holyoke	7.02	4.3	99.13	98.02	Yes
Hopedale	2.96	2.96	100	100	Yes
Hopkinton	3.91	3.86	100	100	No
Hudson	3.61	2.7	100	77.98	Yes
Hull	7.34	3.93	100	100	No
Ipswich	3	2.73	100	100	No
King Philip	5.05	4.45	100	94.84	Yes
Kingston	3.47	2.94	100	100	No
Lakeville	7	6.07	100	0	No
Lanesborough	3.89	3.89	100	96.34	No
Lawrence	4.55	4.55	75.12	98.93	Yes
Lawrence Family Development Charter Dist.	9.45	7.09	100	89.71	No
Lee	3.49	2.76	60	81.96	No
Leicester	4.75	4.75	100	100	Yes
Lenox	6.59	3.9	98.51	83.8	Yes
Leominster	9.51	6.26	97.79	100	No
Leverett	3.67	3.67	100	100	No
Lexington	4.69	3.69	98.81	92.45	No
Lincoln	6.39	2.84	100	89.27	No
Lincoln-Sudbury	5.24	4.16	10.11	100	Yes
Littleton	5.22	2.98	77.78	77.78	No
Longmeadow	5.96	4.57	98.7	95.76	Yes
Lowell	5.43	4.07	92.76	84.13	No
Ludlow	9.39	6.38	98.53	73.59	Yes
Lunenburg	6.27	6.05	100	97.06	No
Lynn	9.52	4.54	82.93	80.3	No
Lynnfield	3.72	3.62	83.65	92.89	Yes
Malden	3.11	2.63	87.59	100	No
Manchester Essex Regional	14.46	14.46	100	100	No
Mansfield	9.99	9.76	96.32	97.42	Yes
Marblehead	3.62	3.45	97.51	94.57	Yes

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Marion	3.17	3.17	100	98.73	Yes
Marlborough	5.57	4.89	100	100	No
Marshfield	8.03	7.16	100	100	No
Marthas Vineyard	2.43	1.98	100	91.87	No
Martha's Vineyard Charter District	4.05	3.36	100	80.85	No
Masconomet	2.49	2.49	100	99.6	No
Mashpee	13.84	3.17	100	84.52	No
Mattapoissett	4.2	3.91	100	76.55	Yes
Maynard	3.41	3.41	100	100	Yes
Medfield	10.57	6.41	100	93.33	No
Medford	3.48	3.36	39.92	89.94	Yes
Media And Tech Charter District	1.7	1.59	100	100	Yes
Medway	9.81	4.69	100	95.14	Yes
Melrose	3.19	3.19	95.26	97.5	Yes
Mendon-Upton	9.79	5.2	100	99.33	Yes
Methuen	3.58	3.58	99.79	99.65	Yes
Middleborough	3.04	2.99	100	93.46	Yes
Middleton	6.53	4.85	44.44	50.68	No
Milford	6.47	6.47	82.29	70.91	No
Millbury	8.67	5.96	99.12	97.13	No
Millis	4.42	3.62	100	93.63	Yes
Milton	6.6	5.81	93.75	87.85	No
Minuteman Voc Tech	1.25	1.23	100	82.8	Yes
Mohawk Trail	4.14	3.21	94.57	93.71	Yes
Monson	3.49	3.29	100	96.17	Yes
Montachusett Voc Tech Regional	2.29	2.29	100	100	Yes
Mount Greylock	4.82	4.16	100	100	No
Murdoch Middle Charter District	5.95	5.95	100	100	Yes
Nahant	4.68	2.24	100	56.12	No
Nantucket	2.62	2.53	100	100	No
Narragansett	5.97	4.88	78.81	79.17	Yes
Nashoba	3.54	3.27	100	97.18	Yes
Nashoba Valley Tech	5.48	2.86	100	75	Yes
Natick	4.46	4.46	100	87.93	Yes
Nauset	10.83	3.48	94.12	74.22	Yes
Needham	4.85	4.2	99.69	99.63	Yes
Neighborhood House Charter District	9	5.5	97.22	97.22	No
New Bedford	4.43	4.01	77.68	92	Yes
New Salem-Wendell	5.64	5.17	100	97.22	Yes
Newburyport	8.47	5.05	100	82.39	Yes
Newton	5.73	4.34	74.57	42.8	Yes
Norfolk	4.83	4.83	100	100	Yes
Norfolk County Agr	3.53	3.53	84.38	100	No

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
North Adams	4.03	3.68	54.85	95.38	No
North Andover	8.55	3.33	100	98.76	Yes
North Attleborough	4	3.58	100	98.18	Yes
North Brookfield	4.72	3.02	100	100	No
North Middlesex	5.98	5.4	99.02	81.12	Yes
North Reading	6.79	6.14	59.6	69.19	Yes
North Shore Regional Voc	3.09	3.09	100	100	Yes
Northampton	6.77	5.11	87.23	86.01	No
Northampton-Smith	3.88	3.19	72.73	75	No
Northboro-Southboro	4.78	3.78	100	94.59	Yes
Northborough	4.65	3.31	100	91.75	Yes
Northbridge	3.46	3.01	97.84	98.15	Yes
Northern Berkshire Voc	1.58	1.58	100	97.78	No
Norton	6.2	4.76	99.5	54.53	Yes
Norwell	4.52	3.02	100	92.59	Yes
Norwood	5.98	5.98	100	100	No
Oak Bluffs	5.54	3.23	100	94.44	No
Old Colony Regional Voc Tech	2.86	2.86	100	94.36	No
Old Rochester	5.93	4.41	79.69	66.67	Yes
Orange	3.36	3.13	100	84.64	No
Orleans	3.28	3.28	100	100	Yes
Oxford	5.49	5.36	100	96.32	No
Palmer	6.4	6.4	100	100	No
Pathfinder Voc Tech	2.62	1.84	100	98.32	No
Peabody	7.67	6.1	76.43	82.2	Yes
Pelham	3.43	3.1	100	100	Yes
Pembroke	5.36	5.1	100	100	No
Pentucket	7.43	4.75	100	62.15	No
Petersham	19	19	100	100	No
Pioneer Valley	2.46	2.38	92.86	90.39	No
Pioneer Valley Performing Arts Charter Dist.	9.41	9.41	71.43	100	No
Pittsfield	4.33	3.88	96.61	77.55	Yes
Plainville	3.62	3.62	100	91.89	No
Plymouth	3.33	3.33	100	100	Yes
Plympton	7.31	4.65	100	61.82	No
Provincetown	2.93	1.9	90.24	86.54	Yes
Quabbin	15.56	9.42	53.01	63.45	No
Quaboag Regional	2.47	2.47	100	94.25	Yes
Quincy	6.84	4.17	100	83.98	Yes
Ralph C Mahar	6.67	4.36	93.88	57.58	Yes
Randolph	4.28	3.86	100	98.08	Yes
Reading	6.51	4.99	97.64	66.82	Yes
Revere	4.23	4.23	100	95.59	Yes

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Richmond	2.64	2.21	80.6	67.5	No
Rising Tide Charter District	3.58	3.58	100	100	Yes
River Valley Charter District	4.77	4.07	100	69.09	No
Rochester	3.58	3.18	100	100	Yes
Rockland	6.8	4.44	100	100	No
Rockport	3.49	3.01	100	98.27	Yes
Rowe	2.04	1.62	100	100	Yes
Roxbury Preparatory Charter District	4.24	4.24	100	100	Yes
Sabis Foxboro Regional Charter District	16.14	16.14	42.86	100	No
Sabis International Charter District	30.43	20.28	3.08	80	No
Salem	4.52	3.25	75.12	61.06	Yes
Sandwich	5.26	4.55	87.9	100	Yes
Saugus	5.97	5.76	63.86	71.68	No
Savoy	6.11	5.5	80	100	No
Scituate	6.75	5.24	100	100	No
Seekonk	4.37	3.12	100	100	No
Seven Hills Charter District	2.2	2.2	100	75.17	Yes
Sharon	10.12	6.31	100	96.41	No
Shawsheen Valley Voc Tech	3.69	2.12	100	100	No
Sherborn	4.28	3.47	100	100	Yes
Shirley	9.86	3.55	96.3	96.68	Yes
Shrewsbury	3.87	3.18	100	100	No
Shutesbury	6.52	5.77	92.31	97.14	Yes
Silver Lake	22.14	4.81	100	99.66	No
So Middlesex Voc Tech Regional	2.12	1.96	75.82	61.6	Yes
So.Boston Harbor Academy Charter District	10.82	10.82	5.88	100	Yes
Somerset	5.03	3.82	100	100	Yes
Somerville	3.51	3.14	84.02	88.68	Yes
Somerville Charter District	21.73	21.73	0	100	No
South Hadley	5.22	4.76	86.39	91.49	No
South Shore Charter District	5.61	3.6	100	100	No
South Shore Regional Voc Tech	3.77	3.77	76	35.46	Yes
Southampton	8.1	8.1	73.68	66.67	No
Southborough	5.15	3.93	100	92.47	Yes
Southbridge	6.71	3.94	94.44	70.57	No
Southeastern Regional Voc Tech	1.67	1.67	100	100	No
Southern Berkshire	2.68	2.66	100	97.11	Yes
Southern Worcester Cty Vt	3.34	3.17	100	95.02	Yes
Southwick-Tolland	6.92	6.92	100	100	Yes
Spencer-E Brookfield	5.61	4.03	69.23	79.85	Yes
Springfield	4.06	3.3	57.66	87.4	Yes
Stoneham	5.05	5.05	91.7	100	Yes
Stoughton	2.67	2.67	100	99.74	Yes

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Sturbridge	8.15	4.87	100	60.92	Yes
Sudbury	3.05	3.05	100	100	Yes
Sunderland	5.51	5.51	100	100	Yes
Sutton	3.27	2.59	100	91.65	Yes
Swampscott	5.02	5.02	63.79	95.97	Yes
Swansea	6.03	6.03	100	100	No
Tantasqua	4.95	4.78	98.32	90.38	Yes
Taunton	2.74	2.74	100	99.9	Yes
Tewksbury	7.28	4.12	58.18	52.71	Yes
Tisbury	2.47	2.22	100	100	No
Topsfield	4.47	3.23	100	100	No
Tri County	1.69	1.69	100	100	Yes
Triton	3.67	3.24	100	83.47	No
Truro	2.88	2.88	100	92.86	No
Tyngsborough	3.05	2.93	88.67	91.16	No
Up-Island Regional	2.06	2.06	100	99.08	No
Upper Cape Cod Voc Tech	2.31	1.99	100	100	Yes
Uxbridge	7.44	5.2	100	100	Yes
Wachusett	3.31	3.03	100	98.88	Yes
Wakefield	5.39	4.92	73.95	99.57	Yes
Wales	4.57	3.76	100	82.22	Yes
Walpole	4.31	3.38	58.09	49.72	Yes
Waltham	16.03	7.22	64.83	97.19	No
Ware	4.48	3.45	71.28	94.86	Yes
Wareham	6.27	3.71	100	99.89	Yes
Watertown	10.1	3.54	100	100	No
Wayland	5.34	4.31	92.16	80.56	No
Webster	8.3	6.43	51.8	73.21	No
Wellesley	3.75	3.39	100	100	No
Wellfleet	3.94	3.6	100	100	Yes
West Boylston	3.06	2.93	100	93.02	No
West Bridgewater	4.25	4.08	100	94.74	Yes
West Springfield	5.23	4.33	60.22	60.86	No
Westborough	6.33	3.91	100	87.01	Yes
Westfield	3.98	3.18	95.44	87.16	Yes
Westford	6.32	4.23	97.99	88.81	No
Westhampton	4.53	4.26	100	73.53	No
Weston	3.9	2.94	100	81.25	Yes
Westport	8.15	4.85	100	85.23	Yes
Westwood	4.26	3.91	100	94.73	Yes
Weymouth	7.77	6.76	98.12	91.72	No
Whately	4.41	4.41	100	100	Yes
Whitman-Hanson	4.08	3.91	100	90.72	No

District Statistics

School District	Ratio of students to "modern" (Type A/B) computers	Ratio of students to computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers connected to the Internet	Did the district receive E-rate discounts?
Whittier Voc	2.59	2.46	100	100	Yes
Williamsburg	4.59	3	100	93.33	No
Williamstown	12.83	6.57	100	100	No
Wilmington	4.41	4.13	100	100	No
Winchendon	6.69	5.04	100	97.86	Yes
Winchester	8.5	7.29	54.55	100	No
Winthrop	5.36	5.36	100	100	No
Woburn	3.65	3.51	94.99	93.78	No
Worcester	5.04	3.58	100	99.96	Yes
Wrentham	2.59	2.59	100	100	Yes