E-Learning in Massachusetts

October 2005

Massachusetts Department of Education
350 Main Street, Malden, MA 02148
781-338-3000 TTY 800-439-0183
www.doe.mass.edu

TABLE OF CONTENTS

Introduction 1

Examples from Massachusetts Schools

- Online Student Courses 2
- Online Professional Development 5
- Online Events and Projects 8
- Online Resources 11

Massachusetts Online Network for Education (MassONE) 17

Issues in E-Learning

- 21st Century Skills 19
- Intellectual Property 22
- Security 25
- Safety 26

Conclusion 30

Appendix: Resources and Contacts 31

INTRODUCTION

E-learning offers incredible opportunities for students and teachers. Through e-learning, students are able to use online resources and tools to access the curriculum at their individual levels, using multimedia to support their learning needs. Teachers are able to differentiate instruction, engage today's students, and communicate with students outside the school day. Schools and districts are able to expand the courses they provide for students and the professional development they provide for teachers.

The National Education Technology Plan states, "E-learning offers flexibility in the time, place and pace of instruction. It provides teachers the opportunity to create an instructional environment that adapts to students wherever and however they need to learn, at home or in school."[1] E-learning is impacting student achievement by improving instructional methods, enriching curriculum content, and expanding learning communities.

E-Learning in Massachusetts presents some of the many ways schools are using online technologies. This report illustrates how Massachusetts educators are taking advantage of e-learning opportunities to improve student learning. Educators across the state are using online courses and resources, online events and projects, and online professional development. Included in this report is a description of issues related to e-learning, such as 21st century skills, intellectual property, and Internet safety. This report also discusses how e-learning will impact the future of education for Massachusetts' students and teachers. These instructional models will help increase educators' and community members' awareness of the potential e-learning has to impact teaching and learning.

[1] National Education Technology Plan, page 35

EXAMPLES FROM MASSACHUSETTS SCHOOLS

The possibilities of e-learning are extensive. According to the National Education Technology Plan, "We see dramatic changes taking place … a new excitement in the vast possibilities of the digital age for changing how we learn and how we teach."[2] Instruction can occur through online distance learning courses or by combining online components with a traditional program. Massachusetts teachers are using e-learning in areas that include online courses, professional development, events and projects, and resources. Presented below are examples from each of these areas.

Online Student Courses

With online courses, school districts are able to expand the learning opportunities they offer students, and students are able to take classes that might otherwise not be available to them. Some courses integrate online and face-to-face instruction, while others are strictly online with all instruction occurring through the Internet. Most courses utilize online learning environments, which are shared workspaces that have discussion forums and/or web-based videoconferencing to facilitate student and teacher interaction. Students typically submit work electronically through online storage spaces called drop boxes or through email. Massachusetts Online Network for Education (MassONE)[3] offers an online environment at no cost to Massachusetts school districts, and other online environments can be secured as paid subscriptions through vendors or through colleges and universities.

Management of online student courses varies, but school districts generally determine when and where students attend online courses. Students access courses from a variety of settings, including school computer labs, school libraries, public libraries, and homes. In some schools, students are assigned a specific class block when they work in school on their online courses. In others, students are able to complete course requirements at any time from school or using any Internet-connected computer. Massachusetts students take courses that are taught online by teachers in their own districts, in other districts in the state, and in other parts of the country. Schools that offer online courses typically have site coordinators to help students register for courses, supervise student attendance, and help solve problems that may arise for the students. These staff members support student learning and monitor student progress. Massachusetts offers guidance to help educators, students, and families effectively utilize

[2] National Education Technology Plan, page 9
[3] MassONE, available: http://massone.mass.edu/

quality online courses in the *Massachusetts Recommended Criteria for Distance Learning Courses*.[4]

Online courses enable small districts to collaboratively meet student needs by sharing resources. AP (Advanced Placement) Language and Composition is one of the courses that are available through Virtual High School (VHS), a collaborative provider for student and professional development courses. A high school English teacher from Wareham teaches this course for students from a variety of schools in Massachusetts and other states. Through this course, students learn what constitutes a sound argument and how to recognize and develop a strongly written argument. The students participate online in VHS's virtual learning environment and work from an Internet-connected computer at school or any other location. One way the teacher helps students succeed in the online environment is by including links to definitions and other supportive information within readings and assignments. Another way he assists students is by using a variety of grading levels: *informal*, *semi-formal*, and *formal*. For example, because of the difficulties of quickly typing responses in online discussion forums, the initial online stages of an assignment are graded *informally* and spelling does not count. However, to emphasize the importance of accuracy and carefulness, proper spelling is required for the *formal* grading of the final products.

The Western Massachusetts Distance Learning Network provides a videoconferencing system that enables eighteen districts to share distance learning courses. Through this network and with Hampshire Educational Collaborative (HEC) as a coordinating agency, Gateway Regional School District offered an advanced placement history course for students from Gateway and from Mohawk Trail Regional School District. The instructor met with eleven students for eighty-five minutes daily, utilizing web-based instruction, videoconferencing, and occasionally face-to-face instruction. As one part of the course, the instructor and two colleagues helped students research Andrew Carnegie, J. D. Rockefeller, J. P. Morgan, and challengers from an historic press conference. The teachers modeled the press conference process for

Videoconferencing courses often use two television monitors to display each participating site. They also use a digital camera and speakers, shown on top of the larger screen.

[4] The *Massachusetts Recommended Criteria for Distance Learning Criteria for Distance Learning Courses* is available online: http://www.doe.mass.edu/edtech/news03/dl_letter.html .

the students, who then held their own mock press conference through synchronous videoconferencing. As a result of this course, students from two different schools had the ongoing opportunity to interact with peers, enriching the learning process and allowing students to interact with a greater diversity of classmates. Furthermore, students improved or enhanced their research, thinking, public speaking, and writing skills.

Technology makes it possible for schools to offer specialized courses for their students. In Mohawk Trail Regional School District, a high school teacher used videoconferencing and Internet technology to teach a course in C++ programming for sixteen high school students in Mohawk Trail and Gateway. The instructor's goal was to conduct a regular C++ programming course as if the two groups were located in one room. The teacher projected his computer image onto the television screen, used a digital whiteboard for explanations, and used email for checking work and helping with any problems. He used the videoconferencing cameras to see the computer screens and check student work at the remote site. Homework was passed in via email, and tests and quizzes were posted on the class web site minutes before they were taken and then passed in via email. To provide support through face-to-face instruction, the teacher went to the remote site five times, giving those students opportunities to interact with him directly. Students who took the class generally did not have any programming skills at the beginning of the course. By the time the course was done, all students could do basic programming, and many of the students were learning more difficult programming on their own.

Online course modules can help homebound students keep pace with their onsite counterparts. In a pilot program in SPS (Springfield Public Schools) Online, Springfield teachers are utilizing online course modules to help provide a smooth, successful transition for the students when they return to school. There are typically 75-100 students each day who are homebound for a variety of reasons, such as severe medical needs, which require them to be instructed in a non-traditional format. Rather than enrolling in complete online courses, students are able to participate in course sections, or modules, for the curriculum units that are being taught in the classroom while they must remain home. Students access SPS Online course modules from home via broadband cable Internet service, and the modules are taught, monitored, and assessed online by content area specialists. As more of the curriculum becomes available online, its use will be expanded until all curriculum in each academic area is available online for all learners. Ultimately, any teacher who believes that his or her students would benefit from the instructional units will have the ability to assign online modules.

The online environment for an SPS Online course module

Online Professional Development

The use of e-learning can improve the availability of professional development courses and activities by increasing educators' access to presenters with specialized knowledge. With e-learning, presenters and teachers can virtually attend workshops, allowing educators to participate in professional development activities across greater geographical areas than would otherwise be possible. Using online professional development to enhance teaching skills and support instructional efforts extends learning beyond the school day and a school's physical location, helping teachers learn anytime, anywhere. The increased opportunities for professional development by e-learning help teachers to become highly qualified, as required by No Child Left Behind.

Supporting Instructional Efforts

By taking online professional development courses, teachers are able to collaborate online and improve instructional methods. Cambridge Public Schools provided a yearlong professional development program for teams of educators from fourteen schools to develop standards-based curriculum units. Through this district-wide program, ninety teachers had access to technological tools and courses designed to help them develop skills and knowledge to enhance instruction and student performance. The curriculum development teams consisted of classroom teachers, technology specialists, and library media specialists, who worked both offline, on a weekly basis, and online, through professional development courses. Harvard Graduate School of Education provided rigorous courses from its online professional development program. The teams used Harvard's pedagogical framework for the development of technology-enhanced units. The project helped build Cambridge's capacity to provide assistance to the school-based teams. When implementing the new curriculum units, teachers noticed an improvement in students' engagement, skill development, and inclination to do better work.

E-learning activities can support traditional professional development programs by improving the way participants communicate and share information. In Pentucket, an online learning environment has been used to support a district-wide curriculum mapping project. High school curriculum maps were shared online to provide staff access to the information. During a professional development day at the high school, the staff worked in teams to analyze and discuss the maps. They viewed and downloaded curriculum maps, shared their ideas in a discussion forum, added essential questions, and then uploaded the new enhanced maps for more collaboration activities. Sharing the curriculum maps online promoted discussion and refinement of the curriculum across the high school grades, and the district is continuing to use this process to map the middle school curriculum. By using e-learning to support face-to-face professional development sessions, the district increased the degree of staff participation and feedback for the curriculum mapping project.

Using synchronous audio and video technology to provide professional development enables people in different locations to attend and interact in virtual workshops. The MassCUE (Massachusetts Computer-Using Educators) Handheld Special Interest Group participated in such a workshop to learn how to use handhelds to support the instructional process. Nauset Public Schools' administrator for technology presented the training from Nauset, using Internet communication software, a camera, and a microphone. The MassCUE group used the same equipment, meeting in Worcester where the group's chair is an instructional technology specialist. During the virtual workshop, the Nauset presenter showed a slideshow, talked to the group, lead an online chat discussion, and controlled the computer screens at both ends, all in real time. The Worcester leader projected the slideshow to the group, and she facilitated the arrangements at the site. The chat session was logged to create a record of the typed discussions. For upcoming sessions, the presenter will record the entire presentation so others can see and hear everything in an archived format.

This image from the handheld videoconferencing session shows the Nauset presenter in the top left window. Other windows display text, presentations, and additional information.

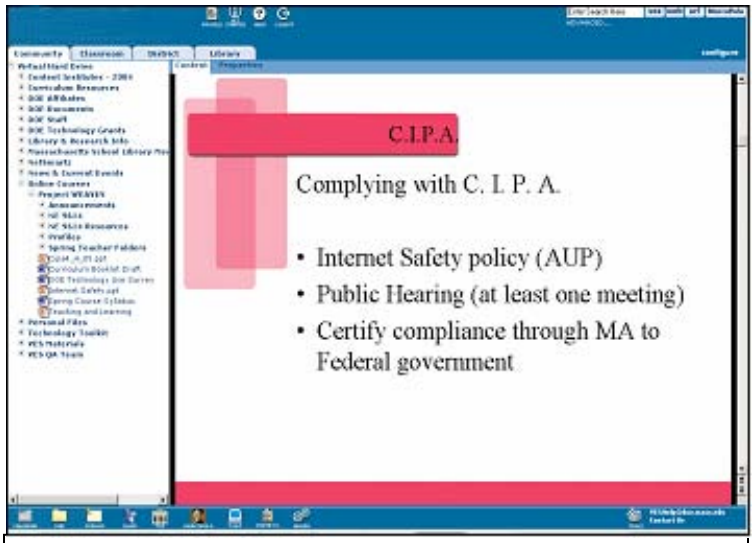
E-learning can help districts collaborate to provide instruction that meets individual student learning needs. Beverly Public Schools, on the north shore, and North Central Charter Essential School, in central Massachusetts, used a discussion forum on MassONE to collaboratively reflect on the usefulness of various educational software to help struggling students. As part of the evaluation process, Beverly's director of technology posted anonymous samples of student work for the participants to evaluate. For example, the director posted the student assessment reports from a language arts software system on the Virtual Hard Drive for the teachers to examine. Then she asked the teachers to post responses to the discussion forum explaining what instructional areas they would focus on to meet students' needs. Using the discussion forum enabled teachers from two school districts, usually too distant to collaborate, to easily share ideas for strengthening instruction.

Enhancing Online Teaching Skills

Through online professional development courses, teachers can learn how to support student learning in online courses. ACCEPT Collaborative has been working with Virtual High School (VHS) to provide two online professional development

opportunities for its members. One is a fifteen-week online program for certified teachers, which prepares those teachers to teach courses themselves. The other is a four-week program for site coordinator training. By participating in this training, educators learn to act as effective contact people between VHS teachers and VHS students. Site coordinators help support student learning and the effectiveness of online courses. Taking these online courses helps teachers better meet student needs because they experience for themselves the unique advantages and challenges of learning online.

With online professional development courses, districts are able to foster self-directed, self-paced study for teachers. Plymouth teachers participated in an online course delivered through MassONE about developing online student courses and understanding copyright issues. To participate in the course, teachers logged in to MassONE, where they were directed to resources they needed for each week's activities. For example, one week teachers viewed a slide presentation, completed a self-evaluated quiz, and then posted a response to a question about copyright in a discussion forum. The topics and resources changed each week as the teachers prepared online course materials. For one of the culminating activities, teachers were asked to write a single-page reflection on copyright, fair use, and file sharing in the classroom. Then they uploaded their responses to a folder in the Virtual Hard Drive so that all of the teachers could read them. This course engaged teachers through the use of discussion forums and file-sharing on the Virtual Hard Drive, allowing teachers to better understand the mechanics of online course delivery. As a result of this course, teachers developed their own online courses for students, as well as online content to include in their traditional classes.



Plymouth participants were able to view presentations that the instructors placed in the Virtual Hard Drive.

Providing Professional Development for Administrators

Online technologies offer opportunities for administrators to participate in training and collaboration that support the unique needs and challenges of their positions. The Superintendent's Academy was created through a partnership with the Massachusetts Association of School Superintendents (M.A.S.S.), the University of Massachusetts Boston, and several school districts. The overarching goal of the Superintendent's Academy is to demonstrate how school leaders can solve real problems and facilitate team building through the use of online communication technologies. The academy uses

an online environment for threaded discussions, file sharing, online resources, video streaming of interviews, and narrated slide shows. In one course, a staff member from MassONE conducted a videoconferenced training session, which was archived so that new participants could watch the presentation at any time. The project provides quality instruction to future superintendents and expands access to the M.A.S.S. mentoring program for current superintendents. Through the Superintendent's Academy, administrators are able to take advantage of online professional development opportunities that fit their unique needs and work schedules.

Online Events and Projects

The Internet makes it possible for students and teachers to participate in national events and projects. These activities range from one-time or annual occasions like the Iditarod to regularly scheduled programs, such as MysteryQuest, that are created to foster student interaction with the curriculum and the community. By participating in online events and projects, teachers connect their students to people in other parts of the country and the world, and students are able to participate in authentic learning experiences.

Participating in Online Events

Online educational events allow educators to immerse students in real-world applications of reading, writing, estimation, computation, problem solving, and research. A fifth grade class in Taunton has joined hundreds of classes throughout the country and in Canada, England, Germany, and Iceland to participate in the eIditarod. The eIditarod project and web site, created by a Massachusetts-based educational consultant, are open to students in grades K-8 and can be adapted to any classroom based on the needs of the students. Using the official Iditarod web site, classes study the trail and the mushers and then select one team to follow online for the race. Each time the Iditarod team pulls into a new race checkpoint, the class emails the project team, and the team responds to the classes with problem-solving tasks related to the race. The Taunton teacher has her class complete an Internet treasure hunt, create individual and class wall maps, read books about the Iditarod, and craft scrimshaw soap carvings and dogsled models. Making maps to scale, determining elapsed time, and collaborating to create original structures and artwork help the students apply everyday

The eIditarod Project web site © Walter McKenzie

skills to real-world situations. Students show a great deal of enthusiasm for the online project, improving attendance and thinking skills.

Online projects can expand the classroom far beyond the school walls, and they can be very motivating for students. Clarksburg students used videoconferencing to participate in MysteryQuest, an interactive project designed for middle school students studying world geography. Each session of MysteryQuest includes several mystery locations, which are researched and presented by different student groups. Students from other schools then use maps, the Internet, textbooks, and other resources to discover each mystery location as it is presented. To prepare for their own presentation the students conducted research, made props, arranged the videoconferencing presentation, and created a PowerPoint slide show with clues about their mystery country and city. On the day of the MysteryQuest videoconference, the students ran the communication equipment, presented their mystery location, and then participated in finding other schools' mystery countries. Students voluntarily arrived at school before the start of the day and stayed in their classroom during lunch, at recess, and after school to complete the project. All the students were motivated to be actively involved in their education and walked away from this activity feeling a great sense of accomplishment and excitement.

Interacting with Experts Online

Incorporating email into curriculum projects can enable students to use community experts as resources for learning. In Shutesbury, a fifth/sixth grade teacher led his students in a research project involving a study of science fields. During the five-month project, each student selected a local scientist to interview. The students visited in person with their scientists, seeing their work environments, asking about their jobs, and taking digital pictures. Back in the classroom, the students wrote drafts of the information they gathered about each scientist's life, research, and branch of science, incorporating the digital pictures and answering questions about their scientists. The students emailed questions to the scientists to fill gaps in their drafts and check their facts and then presented information about their scientists to the class. The individual drafts were then combined to create a published book titled *Meet Local Scientists: A Book for Kids, by Kids*.

E-learning activities can open up opportunities for teachers and students to communicate with each other and with members of the community. High school teachers in Holliston and Framingham collaborated on a project to enable art and architecture students to share authentic learning experiences. They taught their students about the aesthetics involved in good photography, how technology is used in visual arts, and about the significance of

Student picture of stairwell in Holliston town hall
© 2004 Marie Grunbeck, Holliston High School

architecture and its relationship to the community. The teachers used an online learning environment to post discussion questions and to have the students reflect on their work in online journals. A professional photographer served as an artist-in-residence, working with the students to plan photo shoots and visit sites. Students photographed architectural examples in Holliston and Framingham, talking with many community members in the process. Then the students used photo-editing software to adjust aspects such as perspective and lighting. The culmination of the project included exhibitions in the schools' art galleries, a series of handmade books of photo essays, and virtual photo galleries on the school web sites. The images were shared not only with the schools and families, but also with the community members of both towns. The teachers found that the visual aspects of the class helped special needs students thrive; in fact, they frequently assisted other students with both the process and the technology.

Working with Online Media

Interactive online events can help students understand and cope with social and ethical issues. Halifax students participate in the Van Go Radio program, which is broadcast online through the program's web site and in Marshfield through a Massachusetts-based non-profit radio station. The project presents skits and dilemmas relevant to fifth and sixth graders, such as conflicts children may face at recess or a new student being picked on in the cafeteria. Topics are presented in a series of three broadcasts, and participating teachers receive a loose-leaf binder with teaching resources for each topic. During each broadcast four registered classes work with the show's host. The Halifax students have worked with their classroom teachers and library media specialist to tune in to the broadcasts. When they are scheduled to participate, students are able to interact in a live discussion by phone and a synchronous discussion by email. After each show, students may keep the discussion going by emailing their comments to Van Go Radio. Emailed comments are saved and posted online as a blog, and each is archived and placed on the web site, enabling students to listen later at home with family and friends.

Van Go Radio web site

E-learning activities can help prepare students for the workplace by giving them authentic ways to interact with the media and the community. In West Springfield, students learn how to write and produce an online school newspaper. The high school newspaper, the *Terrier Times*, has been published in print format for many years, but the advisors decided to begin publishing an online edition to teach students how to create

effective, informative, and eye-catching web presentations, something crucial not only in the realm of journalism but also in other multimedia workplaces. The online version is published weekly and informs the school community of timely issues, while the print version is published monthly and now includes investigative news, lengthier profiles and features, and opinion pieces. Web presentation, like web copy, is quite different from print in terms of layout, image formats and resolution, and article length. Having both mediums creates a beneficial learning opportunity. In addition, publishing the online *Terrier Times* weekly gives students more practice in true deadline writing, a crucial learning experience for any future journalist. With the technological resources and online publishing, more students are drawn by the opportunity to learn and develop a wider range of journalism skills.

"Terrier Times Online" web page

Online Resources

A wealth of online educational resources are available to support student learning. Using resources such as online news outlets, databases, and primary sources enables teachers to support curriculum content, improving the quality and appropriateness of information available for students. Web-based interactive tools and applets encourage students to become engaged in the curriculum and use higher order thinking skills. Online discussion forums, lesson modules, teacher Web pages, and streaming multimedia presentations help teachers provide students with richer and differentiated instruction.

Using Online Content

Online primary sources such as historical journals, legal documents, and photographs make authentic information easily accessible for teaching and learning. Examining online primary sources enables students to better understand historical events and the perspectives of the people involved in those events. Online digital collections of primary sources have the added advantage of making the resources available to students in any location and letting students quickly search extensive collections. In Frontier Regional School District, high school students use a digital collection of primary documents, such as excerpts from an agricultural almanac, and historical artifacts, such as a picture of an antique ditch plow, to research the ways eighteenth-century agriculture was improved by gentleman farmers to create a healthy, growing agrarian society. The

students study the primary documents and objects to discover the practices of progressive farmers in the Connecticut River Valley and understand how the farmers saw the improvement of land, improved husbandry, and increased production as one step in the movement toward a market economy. The library teacher has found that through the use of the digital collection students are able to move from the acquisition of basic content to higher order thinking skills, which they express both verbally and in their writing.

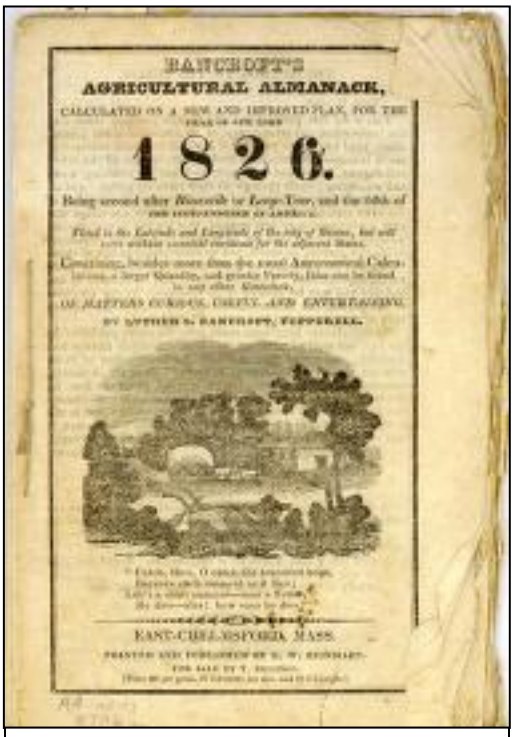

BANCROFT'S
AGRICULTURAL ALMANACK,
1826.
EAST-CHELMSFORD, MASS.

Image of "Bancroft's Agricultural Almanack" from the online collection © Memorial Hall Museum - Pocumtuck Valley Memorial Association

Online news outlets, such as news agencies and organization web sites, enable teachers to enrich classroom instruction and provide students with meaningful applications for knowledge. After the deadly tsunami in December 2004, teachers were able to use Internet resources to find the timely information they needed to discuss this natural disaster with students. A sixth grade teacher in Somerset had her students visit the Doctors Without Borders website to see what was being done by the organization for tsunami victims and their families. In Sudbury, a school librarian conducted a mini-webquest for middle school students, gathering information about the tsunami from news, weather, and charity web sites.

Online reference databases, typically available by subscription or through a regional library system, are easily searchable collections of published articles and resources. They provide information for particular topics, levels, or audiences, and they are updated as needed to provide information on timely events. Databases help reduce the amount of time students spend searching for resources, because students can easily find appropriate, authoritative articles that are already identified and organized. In Chelmsford, a library teacher uses online databases to provide resources for at-risk students. One of the databases she uses includes lower-level encyclopedia entries, which are helpful to at-risk students because the text is written at lower reading levels and supported by illustrations and animations. Another online database she finds helpful presents current information about high school issues like homework or drinking and driving.

Online lesson modules give each student the ability to complete work at his or her own pace, receive individualized support, and learn through interactive simulations. Dover students who are studying how climate, physical geography, and natural resources affect the people of Canada use a teacher-created module to create a travel brochure or radio commercial to demonstrate their learning. The embedded links in the module

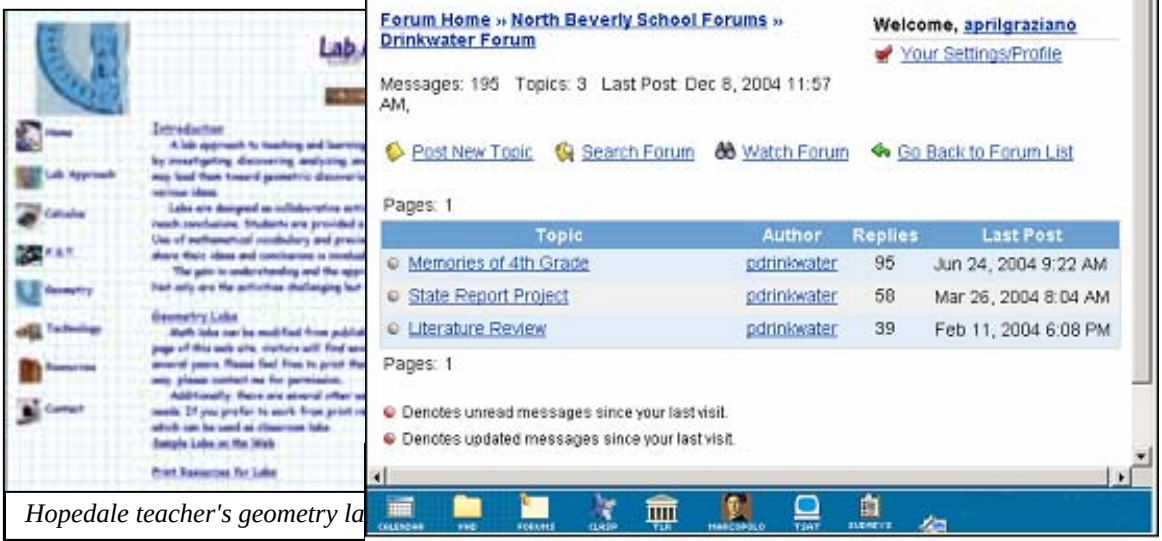
support student learning by providing additional information when students need it. For example, when reading about gathering information from multiple sources, students can click on a link to a resource page, read a description of resource types, and follow links to online resources. Students can also access tutorials to review the skills needed to complete the assignment. In Malden, students are learning about rocks and minerals through an online project-based unit. Students follow links to teacher-tested web sites to learn about the rock cycle and to learn how to identify rocks and minerals. Teachers combine the online unit with hands-on study of rock samples and a visit to the Saugus Iron Works National Park. These online lessons are useful to students because they make information accessible through the Internet at any time, and they allow students to revisit the lessons they might have missed.

Teacher-created web pages are frequently used to enrich traditional instruction. They enable teachers to customize instruction to meet a variety of student needs, providing links to helpful web sites or online resources. In Marshfield, fourth grade teachers use their own web pages to help students efficiently and effectively complete assignments and interact with each other. Elementary students visit the web pages to follow links to Internet resources and to learn what school library resources the teachers recommend for their projects. In Hopedale, a high school geometry teacher customizes instruction by publishing geometry lab directions for the students as they explore concepts such as vertical angles and linear pairs. Each class begins with face-to-face instruction, and then the students work online to explore a problem, use geometry software applications, gather and analyze data, and draw conclusions. With the online publishing of worksheets, rubrics, and links to Internet resources, the high school students quickly find the information they need for their group assignments. The teacher has found it is well worth the time and effort spent preparing her web site. By using realistic data and the online information the teacher provides, the students are able to discover important theorems for themselves and learn much more than they would using just the textbook.

Online modules provide support resources for student learning. Students are able to follow links to get resources or review lessons on specific skills.

Using Online Tools

Online discussion forums facilitate communication and



Hopedale teacher's geometry la

contribute to teaching and learning. The forums provide a space for teachers to post assignments, lead discussions, and gather student writing samples. Students share ideas and collaborate with peers. A middle school science teacher in Tyngsborough uses a discussion forum on MassONE to continue classroom discussions outside the school day. Her students discuss science concepts and share articles they have read. The teacher has found that students are frequently less reluctant to share their opinions when discussions occur online. In Beverly, as part of a social studies unit, a fourth grade teacher uses MassONE to hold discussions with students as they research individual states. She uses MassONE's announcement feature to give detailed instructions to students and to direct them to the discussion forum, where she asks them to describe their state research results. Then she asks students to read other students' posted answers and compare the characteristics of their states to others. Saving the announcements and resources for each unit on the Virtual Hard Drive lets the teacher easily retrieve them the next time she teaches the unit.

Online applets are interactive tools that can be used to illustrate or animate curriculum concepts. These resources can help students simulate problems or experiments. Boston Public Schools supports math instruction through web-based applets that were identified and aligned with the district's math curriculum. Boston developed a web site to provide access to the applets, which address specific skills and help students interact with data and visualize curriculum concepts. For example, students use a virtual manipulative called Algebra Balance Scales to experiment with simple linear equations and test problem solutions. Students represent an equation by placing the appropriate portions of the equation on the two sides of a virtual balance beam. Once the equation is properly illustrated, students perform algebraic operations on both sides, and they check their work by seeing the effects of the changes on the balance beam. Boston teachers have found that using online applets helps students scrutinize more examples, practice skills in an engaging way, and view mathematical ideas from multiple, interconnected perspectives.

Algebra Balance Scales © 1999-2005 Utah State University

Online collaboration tools can provide valuable

opportunities for students to become more fully engaged in the curriculum. In Pioneer Valley Regional School District, a technology integration specialist utilizes a visual ranking tool to help students work collaboratively and understand historical events. After studying how the original settlers were important in the founding of our country, the students use the online tool to compare how the Native Americans, British, and French had different views about ideas like home, land, and agriculture, and how their differing views impacted events in history. Student groups each study one cultural group and, based on knowledge of the time period and people, put the ideas in order of importance for their cultural groups. Then the visual ranking tool graphically shows how the views of one cultural group compared to the views of another group. This helps the entire class work together to compare how the cultural groups' values were similar and different. The collaboration tool provides an avenue for teachers to see how the students interpret historical material and to quickly identify areas of misconception. Moreover, this tool provides an exciting and non-threatening basis for student discussion and interaction, enabling the students to become actively involved in the curriculum.

Instructional Data Systems

Some schools are using comprehensive instructional data systems and tutorials, which are typically web-based and use data to guide instruction. These learning management systems, typically available as subscription services, can provide resources to address complete curriculum areas or selected skills and topics. Instructional data systems integrate tools for curriculum mapping, formative and benchmarking assessment, reporting, and analysis. They allow schools to store student data, retrieve it, and then create customized reports for analysis. As a result, these systems offer an efficient way to track growth in individual students' skills and abilities, which allows educators to plan instruction that will better meet the students' needs.

Worcester Public Schools is using an online delivery system to support English and mathematics instruction for ninth and tenth grade students. The system is a methodical and incremental program with activities directed toward specific learning objectives. The teachers have found it beneficial because it is very user-friendly, and it is focused on individual students and local curriculum. Palmer Public Schools started using a web-based software system with students who had failing or borderline MCAS scores for math and English language arts. The software targeted skills the students needed to develop, and the initial group of students were able to improve their scores. As a result, the district has expanded the project so that additional students can benefit from it. Once the students have accounts, they can access the instructional data system at any time from school or home. In Somerville, an instructional technology specialist helps teachers use an instructional data system in the school's computer lab. The software was first piloted with students who performed at the "Warning" or "Needs Improvement" levels on the math section of the MCAS test. The sixth, seventh, and eighth grade students in the pilot project demonstrated improvement after using the software, and now every student in the middle school has a login account so teachers can use the system to support math instruction as it is needed.

MASSACHUSETTS ONLINE NETWORK FOR EDUCATION

Massachusetts has successfully built Massachusetts Online Network for Education (MassONE), a secure portal for PreK-12 education. MassONE represents Commissioner David Driscoll's vision for an online suite of tools that enable communication, collaboration, and sharing among educators, students, and DOE staff---creating ONE statewide community.

Commissioner David Driscoll described the idea behind this web-based portal, stating that it was "designed to extend face-to-face instruction during the school day with a virtual environment at any time of the day or night." He went on to say, "With one click this remarkable tool facilitates curriculum alignment, assessment, easy access to high-quality, targeted, education content and provides integrated communication and collaboration tools."[5]

MassONE offers a collection of tools and resources for Massachusetts educators and students, consolidating them into one statewide teaching and learning environment:

- Curriculum Tools - help schools develop standards-based curriculum and lesson units.
- Resources - provides nationally reviewed and annotated online teaching and learning resources to students and teachers.
- Discussion Forums - support online courses and complement face-to-face classroom teaching. Teachers can engage students in online debates and allow them to communicate with one another.
- Virtual Hard Drive - offers shared and personal file storage that can be accessed from any Internet-connected computer.
- Survey Tool - helps educators create online data collection forms such as online quizzes or surveys for students.
- Technology Self-Assessment Tool (TSAT) - allows teachers to assess their technology proficiency and professional development needs.

The Massachusetts Department of Education provides professional development opportunities for teachers and administrators to learn to use MassONE's many tools. Through regional training sessions and online courses, the Department partners directly

[5] Address by Commissioner David Driscoll to the Web-based Education Commission headed by Senator Kerry and Congressman Isakson in 2000

with school districts and organizations to provide customized professional development for teachers, administrators, and students.

The first section of this report included examples of how schools have been using MassONE to enhance existing courses, provide online courses for students, and offer online professional development. An additional example comes from the summer content institutes for teachers sponsored by the Department of Education, which are held at locations throughout the state. Teachers who participate in the institutes use discussion forums to communicate with one another during and after professional development sessions. For example, as part of an elementary English language arts course, *Teaching Fiction and Nonfiction in a Readers' Workshop*, the participants used the course discussion forum after the institute ended to extend their support for each other. They provided feedback from classroom implementation efforts and shared resources they found about children's authors.

Professional development participants use the Virtual Hard Drive to share curriculum resources and information. During an elementary mathematics content institute titled *Bridges Classroom Mathematics*, participating teachers in Winchendon used the Virtual Hard Drive to share the lessons they created during and after the workshop. In total, participants posted fifty lessons, which were then accessible to each teacher. In another content institute, *New Technologies in the Visual Arts*, teachers used the Virtual Hard Drive to create online portfolios of the images they created. After the workshop ended, the participants continued posting digital art to the Virtual Hard Drive to showcase samples of student work that resulted from the teachers' summer training.

Although MassONE has proved valuable, it will need to continue evolving to keep pace with new technological developments and to serve the needs of educators and students in new ways. By continuing to improve the tools and resources available through this online learning environment, Massachusetts is supporting e-learning to help prepare all students to succeed in a standards-based environment and prepare them to be productive citizens in the 21st century.

ISSUES IN E-LEARNING

There are many benefits from using e-learning, but there are also important issues that educators must consider in order for students to benefit from e-learning. Among these issues are 21st century skills, intellectual property, security, and safety. Educators must help ensure that students master technology skills and that intellectual property rights are observed. Educators must also ensure that student, teacher, and school information is secure and that students are safe. By carefully considering and planning for these issues, schools can provide e-learning opportunities for students and staff that support their learning needs.

21st Century Skills

In order to participate in e-learning, students must have the knowledge and skills necessary to benefit from online technology. Among the 21st century skills are the ability to use computers, navigate the Internet, and evaluate and use the information and resources that can be found online. The Enhancing Education Through Technology Act, which was created as part of the No Child Left Behind Act, set a goal that all students will become technologically literate by the time they finish eighth grade.

Technology Skills

Commissioner David Driscoll has stressed how it is important for Massachusetts students to develop technology skills, stating, "In this age of rapidly changing information technology, students need to acquire technology skills in order to function effectively in their adult lives. When students leave high school, whether they enter the workforce or college, they will be expected to use computers and the Internet."[6]

The Massachusetts Department of Education has worked with teachers, administrators, and other K-12 educators to develop guidelines presenting what students should be able to do with technology. These guidelines, *Massachusetts Recommended PreK-12 Instructional Technology Standards*, help school districts ensure that their students develop technology skills and use information appropriately. The technology standards outline the skills students need to be effective technology users. These skills are grouped into three standards, with performance indicators specific to PreK-4, Grades 5-8, and Grades 9-12:

---

[6] *Massachusetts Recommended PreK-12 Instructional Technology Standards*, available online: http://www.doe.mass.edu/edtech/standards/itstand.pdf

Standard 1. *Demonstrate proficiency in the use of computers and applications as well as an understanding of concepts underlying hardware, software, and connectivity.*

Standard 2. *Demonstrate responsible use of technology and an understanding of ethics and safety issues in using electronic media.*

Standard 3. *Demonstrate ability to use technology for research, problem-solving, and communication. Students locate, evaluate, collect, and process information from a variety of electronic sources. Students use telecommunications and other media to interact or collaborate with peers, experts, and other audiences.*

The ability to use computers and the Internet is essential for millennial students, who are growing up in a time of rapidly changing technology. Phillip Bond, Under Secretary of Commerce for Technology at the U.S. Department of Commerce, has stated that education and training cannot be left behind the technology developments that occur in other areas of society. He further states, "Unless something changes, the gap between technology's potential and its use in education and training will only grow as technological change accelerates in the years ahead."[7]

Today's students seem to have an understanding of the value of technology to help them with schoolwork and with their interests. In an English class essay, a Massachusetts high school student wrote about the usefulness of the Internet: "The Internet helps us to communicate from long distances or far away from each other. We can do homework online and do research for important subjects. There are teenagers that use the Internet for e-mail, chat, or playing games…" Another student wrote, "You find out information you need to complete daily needs…. When using the Internet you are connected to the world around you, and all of that is possible due to the click of a button."

Information and Media Literacy Skills

The Partnership for 21st Century Skills stated, "Using technology to communicate… is not the same as mastering the skills of effective communication."[8] In other words, in addition to technology skills, students need information and media literacy skills. For example, students need technology skills to create multimedia slideshows, but they need information and media literacy skills to select relevant content and develop a logical slide sequence to effectively express ideas.

It is important for students to develop information and media literacy skills so they can effectively locate information, correctly evaluate the information they find, and responsibly use that information in their own work. When students use school or library resources, they use resources that have already been identified as valid and authoritative. However, when students use the Internet as their primary source of information, they do

[7] Quoted in *The Road to 21st Century Skills*, page 22
[8] The Road to 21st Century Learning, page 5

not have the benefit of pre-selected resources. Although students can find resources on the Internet, they cannot always evaluate the validity and authority of the information they find. In fact, an article in *eSchool News* reported that only one in six adult Internet searchers could recognize paid advertisements when they were included in search results.[9] This finding shows how important it is for teachers to train their students to evaluate Internet information.

The need for information and media literacy skills is presented in the *Massachusetts English Language Arts Curriculum Framework.* The introduction to the Media Strand states, "An understanding of how media productions are created prepares students to view the advertisements, movies, videos, web sites, and television shows that surround them with an appreciative but discriminating eye." The Composition Strand's introduction explains, "Students need to learn criteria for evaluating the quality of online information as well as standards for ethical use of the resources they find." Specifically, Standard 24 states, "Students should gather information from a variety of sources, analyze and evaluate the quality of the information they find online, and use it to answer their own questions."[10]

The *Information Literacy Standards for Student Learning*, prepared by the American Association of School Librarians and the Association for Educational Communications and Technology, define three standards for information literacy skills:

> Standard 1: *The student who is information literate accesses information efficiently and effectively.*
>
> Standard 2: *The student who is information literate evaluates information critically and competently.*
>
> Standard 3: *The student who is information literate uses information accurately and creatively*.[11]

Developing technology and information literacy skills enables students to take advantage of the resources that are available on the Internet. Specific information literacy skills include identifying sources, note-taking, and organizing information. Classroom and library media teachers can help students develop information literacy skills by teaching them, for example, how to select appropriate web sites from Internet search results, as well as appropriate print resources from library catalog search results. Teachers can also design assignments that, rather than report a summary of other people's information about a topic, require students to research the topic to answer an essential question, i.e., How did North American explorers impact where early American

---

[9] "Users Confuse Search Results, Ads," *eSchool News online*, from the Associated Press, accessed March 16, 2005, available: http://www.eschoolnews.com/news/showStory.cfm?ArticleID=5471&page=1 .

[10] *Massachusetts English Language Arts Framework*, available online: http://www.doe.mass.edu/frameworks/current.html

[11] Information Literacy Standards for Student Learning http://www.ala.org/aaslTemplate.cfm?Section=Information_Power&Template=/ContentManagement/ContentDisplay.cfm&ContentID=19937

communities developed? This type of assignment requires students to determine what information they need to locate, helps them evaluate the relevancy of resources, and enables them to use the information they locate to create and support their own opinions.

The Massachusetts School Library Media Association has gathered resources from Massachusetts library teachers to develop an online source for information literacy instruction, providing ready-to-use lessons and support materials.[12] Included in these resources are student guides, web-based lessons, and online inquiry modules. For example, the resource page presents a Boston library teacher's guidelines for selecting reference databases and source logs for keeping track of citations. The source logs are simple forms students can use to record bibliographic information, take notes, and evaluate the usefulness of resources such as web sites, reference databases, and books. The online resource page also presents lessons to address specific information literacy skills, such as developing essential and supporting questions. Educators can use these materials to help students develop information literacy skills. In addition, school administrators and library teachers can use program planning resources available from the American Association of School Libraries to develop instructional programs that integrate and support information literacy skills. [13]

Intellectual Property

E-learning involves many different types of electronic products, such as audio and video files, images, text, and broadcasts; and each type of file is protected by copyright laws. In many situations, fair use guidelines allow educators to use print and multimedia files to help enrich instruction without obtaining permission from copyright owners. However, schools and educators still need to carefully observe copyright laws to avoid copyright infringement and prevent plagiarism. Schools, districts, and individual teachers can be sued for using copyrighted work illegally. Educators must determine when they need to obtain permission from copyright holders and when they may use information under fair use guidelines.

Copyright

Students are often confused about what types of information are protected by copyright laws. In an informal survey by several library media teachers, several Massachusetts high school students were asked how copyright law impacts their use of Internet resources. Their responses demonstrate that some students know there are restrictions for using copyright-protected information, although they are not always correct about the details of the restrictions.

---

[12] Integrated Literacy Instruction resources are available from the Massachusetts School Library Media Association: http://www.mslma.org/CAR/curriculum.html .

[13] AASL Information Literacy resources, available: http://www.ala.org/aaslTemplate.cfm?Section=resourceguides&Template=/ContentManagement/ContentDisplay.cfm&ContentID=15288

"How does copyright law impact your use of Internet resources, such as articles, pictures, music, and multimedia files?"

- "I make websites for fun and it at times crosses my mind as to whether I can freely use images." Brandon, grade 11
- "Articles I make sure to cite. Pics [pictures], music, and multimedia files I don't bother with – unless I'm doing a project. Then I make sure to cite it." Albert, grade 12

The first response mentions using information for personal interests, and the second response mentions using citations only for schoolwork. However, fair use guidelines only apply to information that is used for educational purposes. While it might be appropriate for a student to use bird images and calls from the Internet, for example, to create a multimedia product for school, it is not appropriate for the student to use the files with or without citations "for fun" unless specific permission is granted for that use. In addition, it is not legal to post copyrighted works on the Internet without permission, even for educational purposes.

Sometimes knowledge of copyright restrictions does not prevent students from gaining or using information illegally. In an article titled "Study: Most Kids Admit to Stealing Digital Content," *eSchool News* reports that many students download copyrighted material even though they know it is illegal. Students who were surveyed in the nationwide poll justified illegal downloading with reasons ranging from not being able to pay for software (51 percent) to being allowed to do so by parents (8 percent.) [14]

In an essay about the risks and benefits of using the Internet, a high school student wrote, "While using the [Internet] for your own personal reasons…you could be downloading music and be unaware that you actually have to have permission to do so or have to pay for that action." Educators must carefully consider how they and their students use audio and video files, images, text, and broadcasts. Obtaining or using illegal copies of resources that would otherwise be purchased is copyright infringement, which can result in fines, seizure of any property used for infringement, or imprisonment.

Fair Use

Fair use of copyrighted work refers to the ability to use information for educational purposes without seeking permission from the copyright owner. These guidelines enable teachers and students to use print and multimedia information to support and enhance education. Fair use guidelines have developed as the result of court decisions regarding copyright, but they are not unrestricted permission for use by educators and students. Instead, the applicability of fair use is determined by the intended purpose, audience, format, amount, and length of use of the copyrighted material.

[14] *eSchool News*, v7, no7, July 2004

Four factors help determine when a copyrighted work can be used under fair use guidelines:

1) The purpose and character of the use, including whether such use is of commercial nature or is for nonprofit educational purposes;
2) The nature of the copyrighted work;
3) The amount and substantiality of the portion used in relation to the copyrighted work as a whole;
4) The effect of the use upon the potential market for or value of the copyrighted work.[15]

Each individual is legally responsible for his or her own use of copyrighted information and must seek permission to use information in situations were fair use does not apply. However, school districts are responsible for their roles in participating in copyright infringement. For example, if a teacher uses a copyrighted cartoon character on a classroom resource without obtaining copyright permission, the teacher is liable. If the copyrighted cartoon character is placed on a school- or district-sponsored web site, the district is also potentially liable and subject to large fines. School districts have been required to pay hundreds of thousands of dollars in court-demanded fines for unauthorized use of copyrighted characters, music, and other information.

When an intended use does not clearly meet one of the four factors listed above, permission must be secured from the copyright owner. Permission to use a copyrighted work can only be obtained through the copyright owners, but the U.S. Copyright Office web site[16] provides information about fair use that can help educators determine if fair use applies to a particular situation. In addition, some districts, such as Nauset Public Schools, post links on their district web sites to help teachers understand copyright and fair use guidelines.[17]

Plagiarism

Some students do not understand that when a person uses someone else's information and presents it as his or her own, the person is plagiarizing. The State Student Advisory Council published a newsletter with an article that explained, "Although many people understand what plagiarism is, not enough understand the consequences of such behavior."[18] Not knowing that plagiarism could result in failing grades or expulsion could be a reason why some students knowingly plagiarize.

Another reason for plagiarism might be that some students are confused about what plagiarism is and when documentation is needed for material that is paraphrased or

[15] U.S. Copyright Office, Fair Use: http://www.copyright.gov/fls/fl102.html
[16] U.S. Copyright Office, Fair Use: http://www.copyright.gov/fls/fl102.html
[17] Nauset Public Schools' "Copyright and Fair Use Links," available: http://www.nausetschools.org/fairuse.htm
[18] State Student Advisory Council Newsletter, April 2004, available: http://www.doe.mass.edu/hssss/sac/newsletter1.pdf

quoted. When asked about plagiarism and using online information, the students' responses showed that some incorrectly think any information can be used in any way, and others think that it is acceptable to use text portions without citations, as long as the document is not used in its entirety.

"Can you copy online files and place them in your work without plagiarizing?"

- "It depends on what I'm putting in. If it's an article that was written by someone else, and I just copy it, then I'm plagiarizing. If I just cut sections out, then I'm not." Brad, grade 11
- "Yes, but sometimes it can be hard to put what they say in your own words because they put the words so perfectly." Jayme, grade 9

The second student response explains why some students copy text rather than take notes to create original materials. In addition, technology makes it easy to copy text. In seconds, students can plagiarize Internet information by copying and pasting it into their own files. They need to be taught to avoid the temptation to do this. Teaching students about academic integrity helps them understand the importance of creating original work and demonstrating their learning, and helps prepare them for the work they will do in college and in careers. Teachers can help students develop information literacy skills, such as taking notes in their own words, to give students success in using information without plagiarizing. In addition, teaching students about copyright laws helps students use information in ethical ways.

Security

School districts must ensure that their networks are secure from harm. Not only are Internet-connected computers at risk from problems like viruses and hacking, but also all other equipment they are connected to through networks. The following security incidents per day were found by Michigan's Department of Information Technology: approximately 1,500 email viruses; 75 scans/probes; 140 web-defacement attempts; and 15 computer hijack attempts by remote control/Trojans.[19] Many of these problems are faced on a smaller scale by school districts. Security tools, such as firewalls, virus-detection software, filters, and spyware protection, are available to help districts proactively handle security incidents.

Network security is a crucial issue; school networks must protect personal information and prevent unintended use by people inside or outside the school system. An online resource page[20] created by the Consortium for School Networking (CoSN) is one example of the tools available to help superintendents and technology leaders evaluate, protect, and maintain security for school networks. In an article about network

[19] "Daily Dose" *Government Technology*- Vol. 16, Issue. 14 (November 2003)
[20] Cyber Security for the Digital Age web page, available: http://securedistrict.cosn.org/

security, the directors of CoSN detail five steps to help protect network information: Hatch contingency plans, build a security team, check the tech, promote stronger policies, and think big picture. [21] Network administrators should know exactly what they will do if something goes wrong, such as the theft of students' or teachers' personal information. Planning specifically to strengthen network security will prevent some problems and will help schools cope with other problems that do occur.

Unsolicited email messages, known as spam, can be very harmful to school networks, disrupting teaching and learning. These messages sometimes include viruses that can potentially corrupt or destroy confidential student and personnel information, curriculum and administrative documents, and network resources such as software and databases. Spammers often create deceptive subject lines for their messages, implying that the information was requested or is being sent by a friend. Opening spam can sometimes trigger computer viruses or display violent or pornographic images. Spam that does not contain viruses can also disrupt education because it can clog available computer storage and slow the network speed and efficiency.

To protect students, staff, and computer networks against spam and viruses, schools can use specialized software to help identify subject lines with offensive language or computer-generated information. Students and staff can be taught not to open email messages if they do not recognize the name of the sender, and district policies should outline this for various groups of technology users. To minimize the potential use of network resources for criminal or harmful use, schools should maintain computer firewalls, use virus-detection software, and monitor networks for unexpected activity levels, such as evening or weekend periods when resources should not be in use.

Safety

Educators must help keep students safe from the many dangers, such as predators, hate groups, and cyberbullying that exist on the Internet. Standard 2 of the state's instructional technology standards says that students should demonstrate an understanding of ethics and safety while using the Internet.

Predators pose a particularly dangerous threat to students. Online predators are able to communicate directly with children through the Internet, often logging into chat rooms and pretending to be children themselves. By doing this, a predator can spend time befriending a child and gathering personal information from the chat room dialog (i.e., names of schools and school sport teams). This information helps the predator further befriend the child and build trust and dependency. Predators try to move the conversations to private chat rooms, instant messaging, email, and phone calls. Even if

[21] "Safe & Secure?" *Scholastic Administrator*- Vol. 4, Issue 4- Dec/Jan 2005
The resource page, "Cyber Security for the Digital District," is available at http://securedistrict.cosn.org/ .

the child does not reveal a full name and address, the conversations often give predators enough information to locate and harm the child.

Student responses to a survey question demonstrate that student concepts about Internet safety vary greatly. One eleventh grade student stated that to be safe on the Internet, students need "street smarts." Some students know dangers exist, while others are not aware of any personal danger.

> *"Have you encountered a situation on the Internet that you thought might be unsafe? If so, what did you do about it?"*
>
> • "I can sense whether a site is unsafe or not by the number of popups, fake links, etc. These are the unsafe sites - I stay away from them." Albert, grade 12
> • "No, it's online, they're not going to jump through the computer and get me." Tom, grade 12

The first student knows that some sites are misleading, but does not mention predators. As the second response shows, some students feel protected because they are distanced from other people who use the Internet. In an essay about the possible dangers of using the Internet, a high school student wrote, "Risks involved with the Internet and email usage involve people who are getting on the Internet or email to start trouble with other people. They start trouble with other human beings by harassing, threatening, sexually harassing, and being [prejudiced] towards the innocent person on email or online." Teaching students how they can stay safe helps students avoid these dangerous situations.

Cyberbullying, or using technology to bully or slander someone, is an area of concern to educators because students sometimes use the Internet to continue harassing a classmate beyond the end of the school day or to reach a greater number of peers and harm a student's reputation.[22] Cyberbullies can easily reach entire communities, sending email and instant messages to classmates, slandering a student in chat rooms, or posting web pages to lambaste the student. All bullying is harmful, but the nature of cyberbullying makes it so invasive and extensive that families are sometimes forced to relocate to distance their children from their harassers. Schools can help prevent cyberbullying by teaching students how to ethically use technology and by enforcing policies that protect their students.

Students need to be taught how to critically evaluate web sites and understand that anyone can create and post web sites to communicate their own opinions and beliefs. Organizations such as hate groups use the Internet to reach and recruit teenagers. The March 2005 school shooting in Minnesota, in which ten people died, was committed by a student who communicated with a neo-Nazi group through the Internet.[23] In this situation, the student's email postings indicate that he knew he was communicating with a

---

[22] Additional cyberbullying information is available: http://www.mcgruff.org/Grownups/cyberbullying.htm.
[23] "Internet Postings Linked to Student Highlight Interest in 'Hate Groups'" *Education Week*, accessed 3/30/05 http://www.edweek.org/ew/articles/2005/03/24/29hate.h24.html

hate group. But in other cases, students may search for information and find web sites that have been created to intentionally deceive them. One example of this is a site that claims to be a true history of Martin Luther King, Jr. and appears to be a legitimate source of information. Close examination reveals that the site is actually hosted by a white supremacy group. An article in *techLEARNING.com* explains that, "Educators need to spend as much time teaching students how to analyze what they [find] as they spend teaching them how to find it in the first place."[24] Without information and media literacy skills, students are often unable to recognize whether a site is authoritative, harmful, or a site created in jest.

Sometimes students find inappropriate sites because they mistype a URL. The creators of purposely misleading sites take advantage of this easy mistake by using web addresses that are misspelled versions of popular sites students use, or by using a different domain extension for a web site's URL, i.e., ending with ".com" instead of ".org". A Sudbury teacher helps students with special needs such as dyslexia and small motor issues by creating files of project URLs so the students can follow the links to the appropriate web sites. Teachers can also help prevent typing errors by providing site bookmarks for students to use. In Winchester, fifth grade teachers create hot lists of project web sites and publish the lists on classroom web pages. The teachers work with instructional technology specialists to teach students how to evaluate web sites before beginning research projects. They also visit several sites with the students to evaluate whether or not the sites would be good online resources.

School districts need to create acceptable use policies to outline their expectations for student and teacher use of technology and to comply with the Children's Internet Protection Act (CIPA). CIPA, created in December 2000 to help protect children from harmful or inappropriate information when using the Internet, specifies that schools and libraries receiving discounts for Internet access or wiring must block or filter sites that contain obscenity, child pornography, and other information harmful or inappropriate to minors. Districts are also required to monitor students' electronic communications, hacking, and unauthorized disclosure of students' personal information.[25] In addition, schools that receive state or federal technology funding must comply with CIPA requirements.

According to data reported by school districts, almost 99% of Massachusetts schools have an acceptable use policy for students, 85% include the policies in their student handbooks, and 81% post the policies on district or school web sites. According to this data, 98% of schools districts have an Internet filter that is in compliance with CIPA regulations.

NetSmartz, i-SAFE America, and other organizations have created Internet safety curricula for educators and parents to use to teach students how to stay safe. The state of Massachusetts is working with NetSmartz, a nonprofit organization that provides

[24] "Intentionally Misleading Web Sites," *techLEARNING.com*, accessed 4/14/05
Available online: http://www.techlearning.com/story/showArticle.jhtml?articleID=159901583
[25] Children's Internet Protection Act, http://ftp.fcc.gov/cgb/consumerfacts/cipa.html

engaging, interactive web activities and related worksheets for educators and parents. In Longmeadow, a library teacher uses NetSmartz with middle and high school students in a private school. I-SAFE America, which was developed in conjunction with the U.S. Department of Justice, provides resources for trainers and teachers to use with students in grades K-12. Organizations, such as MassCUE (Massachusetts Computer Using Educators) and the Massachusetts Regional Library System, host i-SAFE training sessions for educators who then train people in their districts. Three educators from Waltham attended i-SAFE training sessions, and they are now using materials provided by i-SAFE to present Internet safety information to parents and community members.

Other than formal Internet safety programs, school districts can use community resources to help students learn how to stay safe online. In Frontier Regional School District, a middle school library teacher teaches Internet safety during small group orientation sessions for incoming students. In Carver, a middle school library teacher works with the school's DARE officer. They spend several days discussing news articles about local safety issues with students in each grade level, and use an online safety activity to reinforce the lessons.

Internet safety issues are important at school and home, and teaching students and parents about online dangers plays a large role in protecting children. Some basic strategies for students when they are confronted with inappropriate sites are to close the Internet browser window or press the "Back" key to return to the previous screen. These simple actions can give students a quick way to leave harmful sites. Parents can help their children develop neutral screen names that don't give identity hints to predators, and they can keep computers out of their children's rooms.

Carefully planned arrangements of school computer workstations can help promote student safety. In Swampscott, student computers are placed in high traffic areas. A library teacher arranges computers in a highly visible area of the school library to help staff members monitor Internet usage. In many schools, library computers are arranged in front of the circulation desk, and school computer labs are set up with all monitors facing the instructor so that the web sites students visit may be easily monitored. Computer workspaces should also include easily accessible information about staying safe online. For example, technology specialists in Malden display safety strategies on a large bulletin board in the computer lab, and in Frontier Regional, safety tips are provided on cards next to computer workstations.

Schools should carefully consider issues of 21st century skills, intellectual property, security, and safety. By planning for these issues, schools can help ensure that students are able to use technology effectively and safely, and schools can protect their network resources and private information.

CONCLUSION

As this report has shown, e-learning can provide many opportunities for enhancing teaching and learning. E-learning helps students and teachers participate in authentic learning experiences, interact with one another outside the school day, and take courses that might not be available otherwise.

However, in order for online technologies to impact teaching and learning, they must be used appropriately. The *Massachusetts Recommended Criteria for Distance Learning Courses*[26] developed by Department of Education offers guidelines that schools can use in planning or selecting online courses and professional development offerings.

In addition, a number of issues must be carefully considered by school districts so that they can help keep students safe and networks secure. Districts must also help students develop the technology and information and media literacy skills they need to effectively use the vast amount of information available online.

E-learning will undoubtedly continue to impact education. The Massachusetts Department of Education encourages educators to continue taking advantage of the opportunities afforded by e-learning to help all students succeed. The ongoing efforts of schools, along with the resources and support provided by the Department, will enable educators to take advantage of new developments in technology, helping students achieve proficiency through a standards-based educational system.

[26] Available online: http://www.doe.mass.edu/edtech/news03/dl_letter.html

APPENDIX: RESOURCES AND CONTACTS

INTRODUCTION

National Education Technology Plan http://www.ed.gov/about/offices/list/os/technology/plan/index.html

EXAMPLES FROM MASSACHUSETTS SCHOOLS

Online Student Courses

MassONE http://massone.mass.edu/	(781) 338-3020 massonehelp@doe.mass.edu
Virtual High School http://www.govhs.org/website.nsf	
Wareham Public Schools	J. D. Wilson, Jr. wilsonjr@massed.net
Western Massachusetts Distance Learning Network	Mike Rooney mrooney@collaborative.org
Hampshire Educational Collaborative http://www.collaborative.org/	
Gateway Public Schools	James M. Duggan jduggan@grsd.org
Mohawk Trail Regional School District	Peter Otten peotten@mohawk.mtrsd.k12.ma.us
Springfield Public Schools	Donna Boivin boivind@sps.springfield.ma.us

Online Professional Development

Supporting Instructional Efforts

Cambridge Public Schools	Dr. Joanne Krepelka jkrepelka@cpsd.us
Harvard Graduate School of Education http://gseweb.harvard.edu/	

Pentucket Public Schools	Lindsey Barlow lbarlow@prsd.org
MassCUE web site http://masscue.org/	
Nauset Public Schools	Kathleen Schrock schrockk@nausetschools.org
Worcester Public Schools	Deborah Donohue donohued@worc.k12.ma.us
Beverly Public Schools	Judy Miller jmiller@beverlyschools.org
North Central Charter Essential School	Peter Garbus garbusp@ncces.org

Enhancing Online Teaching Skills

ACCEPT Collaborative http://www.accept.org/	Daniel Kehoe dankehoe@neaccess.net
Virtual High School web site http://www.govhs.org/website.nsf	
Plymouth Public Schools	Nancy Dawson ndawson@plymouth.k12.ma.us

Providing Professional Development for Administrators

The Superintendent's Academy University of Massachusetts Boston	Robert Kelley robert.kelley@umb.edu
Massachusetts Association of School Superintendents (M.A.S.S.) http://www.massupt.org/	

Online Events and Projects

Participating in Online Events

Taunton Public Schools	Jeanne Follett jfollett@tauntonschools.org
eIditarod Project web site http://surfaquarium.com/eIDITAROD/	Walter McKenzie walter@surfaquarium.com

Official Iditarod web site http://www.iditarod.com/	
Clarksburg Public Schools	John Estes estesjj@yahoo.com
MysteryQuest web site http://www.remc11.k12.mi.us/dl/MysteryQuest/	

Interacting with Experts Online

Shutesbury Public Schools	Carol S. Holzberg, PhD carolh@anthro.umass.edu
Holliston Public Schools	Kathy Dooley dooleyk@holliston.k12.ma.us
Capturing Architecture Past & Present web site http://www.holliston.k12.ma.us/high/CAPP/Intro.htm	
Framingham Public Schools	Steve Eaton seaton@framingham.k12.ma.us

Working with Online Media

Halifax Public Schools	Linda Redding linredding@aol.com
Van Go Radio web site www.vangoradio.org	
West Springfield Public Schools	Christina Bousquet cbousquet@wsps.org
Terrier Times web site http://my.highschooljournalism.org/ma/westspringfield/westsidehigh/	

Online Resources

Using Online Content

Frontier Regional School District	Janice Dore dorej@frsd.deerfield.ma.us
Memorial Hall Museum Online, Digital Collection http://www.americancenturies.mass.edu/collection/index.html	

Somerset Public Schools	Sarah Alexander zbooklady@cox.net
Doctors without Borders web site http://www.doctorswithoutborders.org/	
Willow Hill School (Sudbury, MA)	Carol Holley axebros@rcn.com
Massachusetts Regional Library System web site http://mblc.state.ma.us/mblc/regional/index.php	
Chelmsford Public Schools http://www.chelmsford.k12.ma.us/chslib/databases1.htm	Valerie Diggs vdiggs@comcast.net
New Book of Knowledge database web site (within Grolier Online database) http://auth.grolier.com/cgi-bin/authV2?bffs=N	
CQ Researcher Online database web site http://library.cqpress.com/index.php	
Dover Public Schools	Cheryl Caskie Chase chasec@doversherborn.org
Oh, Canada! module web site http://www.doversherborn.org/doverelementary/Library/CANADA/index.html	
Malden Public Schools	Robert Simpson rsimpson@malden.mec.edu
Saugus Iron Works module web site http://tritec-inc.org/pbu/std.cfm?id=110	
Marshfield Public Schools	Karen Vaughan kvaughan@mpsd.org
Teacher Resources web page (Social Studies- Grade 4 link) http://mail.mpsd.org/Collab/WEBPAGE/teacherresourceindex.htm	
Hopedale Public Schools	Nancy Johnson mathlc@aol.com
Geometry Lab web page http://www.hopedale.k12.ma.us	

Using Online Tools

Tyngsborough Public Schools	Donald MacIntosh donmac@mec.edu

MassONE http://massone.mass.edu/	(781) 338-3020 massonehelp@doe.mass.edu
Beverly Public Schools	Judy Miller jmiller@beverlyschools.org
Boston Public Schools	Natalie Rivkin Nrivkin777@aol.com
SELECT Math web site http://boston.k12.ma.us/teach/technology/select/index.html	
Pioneer Valley Regional School District	Beth Dichter BDICHTER@northampton-k12.us
Visual Ranking web site http://www.intel.com/education/visualranking/	

Instructional Data Systems

Worcester Public Schools	Arnold Pulda puldaa@worc.k12.ma.us
Pearson Digital Learning NovaNET web site http://www.pearsondigital.com/novanet/	
Palmer Public Schools	Tom Barnes tbarnes@palmerschools.org
Plato Learning web site http://www.plato.com/products.asp	
Somerville Public Schools	Jared Perrine jperrine@k12.somerville.ma.us
Riverdeep Destination Math web site http://www.riverdeep.net/products/math/index.jhtml	

MASSACHUSETTS ONLINE NETWORK FOR EDUCATION

MassONE http://massone.mass.edu/	(781) 338-3020 massonehelp@doe.mass.edu

ISSUES IN E-LEARNING

21st Century Skills

Technology Skills

Massachusetts Recommended PreK-12 Instructional Technology Standards http://www.doe.mass.edu/edtech/standards/itstand.pdf

Information and Media Literacy Skills

Massachusetts School Library Media Association, Curriculum resources http://www.mslma.org/CAR/curriculum.html
Information Literacy Standards for Student Learning http://www.ala.org/aaslTemplate.cfm?Section=Information_Power&Template=/ContentManagement/ContentDisplay.cfm&ContentID=19937

Intellectual Property

Copyright

U.S. Copyright Office web site http://www.copyright.gov/
Nauset Public Schools, Copyright and Fair Use Links web page http://www.nausetschools.org/fairuse.htm

Fair Use

U.S. Copyright Office, Fair Use web page http://www.copyright.gov/fls/fl102.html

Plagiarism

U.S. Copyright Office, Fair Use web page http://www.copyright.gov/fls/fl102.html

Security

Consortium for School Networking (CoSN) http://www.cosn.org/
Cyber Security for the Digital District web page http://securedistrict.cosn.org/

Safety

McGruff.org's Milstein Child Safety Center web site http://www.mcgruff.org/	
Sudbury Public Schools	Carol Holley axebros@rcn.com
Winchester Public Schools	Annamaria Schrimpf aschrimpf@winchester.k12.ma.us
Children's Internet Protection Act (CIPA) http://www.fcc.gov/cgb/consumerfacts/cipa.html	
NetSmartz web site http://netsmartz.org	
Yeshiva Academy, Longmeadow	Judy Williams judewill@comcast.net
i-Safe America Inc. web site http://isafe.org	
Waltham Public Schools	Kathleen Finnerty finnertyk@k12.waltham.ma.us
Frontier Regional School District	Janice Dore dorej@frsd.deerfield.ma.us
Carver Public Schools	Bonnie Staiger-Matatall StaigerB@mail.carver.org
Swampscott Public Schools	Elyse Cregar elyse@palousepalette.com
Malden Public Schools	Thong Phamduy tphamduy@malden.mec.edu

Massachusetts Department of Education

This document was prepared by the Massachusetts Department of Education
Dr. David P. Driscoll, Commissioner of Education

This report was written by April Graziano and edited by Susan Hargrave.

Connie Louie, Director of Instructional Technology

Susan Hargrave, Instructional Technology Specialist

April Graziano, Instructional Technology Consultant

Carol Lach, Instructional Technology Specialist

Baiba Ozols, Instructional Technology Specialist

LeRoy Wong, Instructional Technology Specialist

Nicole Cirino, Administrative Assistant

Maureen Chew, Chief Information Officer

Bob Bickerton, Senior Associate Commissioner

The Massachusetts Department of Education, an Affirmative Action employer, is committed to ensuring that all of its programs and facilities are accessible to all members of the public. We do not discriminate on the basis of age, color, disability, national origin, race, religion, sex, or sexual orientation.

Copyright © 2005 Massachusetts Department of Education
Permission is hereby granted to copy any or all parts of this document for non-commercial educational purposes. Please credit the "Massachusetts Department of Education."

This document printed on recycled paper

350 Main Street, Malden, Massachusetts 02148-5023 #781-338-3000