



Computer  
Technology  
Services

**Portland Public Schools**  
Portland, Maine

# District Technology Plan

*last updated June 30, 2009*

*The Portland Public Schools' strategy for technology education and implementation*

The [Technology Plan](#) addresses the following:

1. Community and Parental Involvement
2. PPS Vision for the use of Technology
3. Goals and Objectives
4. Assessment of Necessary Technology
5. Collaboration with Adult Literacy Service Providers
6. Strategies for Improving Academic Achievement and Teacher Effectiveness
7. Integration of Technology with Curricula, Instruction, and Assessment
8. Technology Type and Costs, and Coordination with Funding Resources
9. Supporting Resources
10. Steps to Increase Accessibility
11. Promotion of Various Curricula and Teaching Strategies that Integrate Technology
12. Professional Development
13. Innovative Delivery Strategies
14. Accountability Measures

(This is a living document. Major revisions are published annually. Adjustments are made as needed.)

# 1. Community and Parental Involvement

*This section* describes a broad representation of the school community in the technology planning process. It includes a description of how the technology will be used effectively to promote community and parental involvement and increase communication with parents, including a description of how parents will be informed about the technology and its proper use.

The **Technology Advisory Committee** is comprised of the business community members, parents, teachers, students, school administrators, and central office technical staff (*see appendix 1*).

**Portland Adult Education** serves approximately 6,000 adults each year in several learning sites throughout the city. Programming ranges from basic reading, English as a Second Language, high school completion, college preparation, vocational, certificate programs, and general interest. Collaboration with various agencies is an integral part of programming. Technology plays a large role in Portland Adult Education. Computer application classes are offered in sequence, and academic students supplement their learning through the use of the computer lab. Registration is online and linked from the PPS district web site

**The Public Access Cable TV Channel** (TV3) is based at Portland Arts and Technology High School, and is a primary vehicle for sharing school events with the public, including sports, visual and performing arts, and civic event coverage (school committee meetings, etc.)

Below are objectives in this plan related to these groups:

2010 - 2012:

- Revise Portland Schools web site to provide enhanced access to school resources for parents and community members
- Revise Portland Schools web site to include user friendly methods for PPS staff to publish and maintain content
- Expand web-based survey to include responses from parents and students
- Institute a parent awareness program for Internet Safety
- Improve web-based opportunities for parents and community members to share in decision-making
- Improve email-based communications (lists, registration, announcements, etc) for parents and community members

## 2. Vision for Learning Technology in the Portland Public Schools

*Technology is a dynamic, constantly evolving and essential tool for learning within the Portland Public Schools educational community. All members use it to support, enhance, and contribute to the shared enterprise of lifelong learning and to improve the quality and productivity of life and work.*

### **Technology Serves Education by Contributing to:**

- Authentic and challenging student learning experiences that use a variety of communication and electronic tools;
- Student assessment that is based on products, progress and effort;
- New roles for students and teachers as partners in the learning process;
- Increased proficiency of teachers, administrators and support staff utilizing new communication and management tools;
- Evolution of a culture that connects learning beyond the school walls to community and global resources;
- Preparation of learners for a world immersed in technology.

### 3. A. Goals for Student Learning

In the Portland Public Schools, students will:

1. Use technology to create original works and activities.
2. Use technology to work collaboratively, including at a distance, to support their learning and to help others learn.
3. Use digital tools to find, evaluate, and use new information.
4. Use critical thinking and technical knowledge to discern the usefulness, accuracy, and intent of material they find on-line.
5. Practice legal and ethical behavior, and demonstrate ways to keep safe while using the Internet and new media.
6. Understand that technology is a tool that can be used in society for both great good and great evil (and everything in between), depending on its user's skills, care, and intentions.
7. Recognize appropriate boundaries and etiquette... and avoid over-dependence on technology, especially at the expense of human interactions and relationships.

### 3. B. Objectives and strategies for reaching these goals:

<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Provide equitable access and support to all schools for creative work, communication, collaboration and research using new media, electronic telecommunications and learning networks</li> <li>2. Provide equitable access and support in the use of teacher Web Pages (classroom websites) to facilitate and document learning projects</li> <li>3. Provide equitable access and support for learners to find, contact, and collaborate with others outside the district, state, and/or country in individual and/or group learning projects</li> <li>4. Ensure that library/media specialists have the capacity (time, training, facilities and resources) to provide concentrated instruction in media literacy (evaluation of source material, plagiarism, changes in copyright, re-use conventions, etc.)</li> <li>5. Implement a comprehensive Internet Safety curriculum at all grade levels</li> </ol> <p><b>Evaluation:</b></p> <p>Staff and student surveys, curriculum &amp; course guides, training schedules, Student handbook (establish baseline for 2010, trend thru 2012.)</p>	<p><b>Primary implementation strategies:</b></p> <p>Offer <i>one-one computing</i> for all students in grades 6-12, including hardware, software, networks for Internet access, training for teachers, in-school staff to assist with instruction and technical support, evaluation, and ongoing budget support.</p> <p>Create and offer an on-line course system (powered by Moodle CMS) in addition to the teacher web page/blog server (powered by WordPress)</p> <p>Offer a <i>basic, up to date computing environment</i> to support learning in the K-5 schools, including shared computers for student use both individually and in groups, proper computers for teachers to use in classroom instruction, shared equipment for projection, training for teachers, part time staff to assist with instruction and technical support, evaluation, and ongoing budget support</p> <p>Promote interactive <i>global connections</i> through specific initiatives (videoconferencing) and awareness building via on-line and face-to-face training</p> <p>Develop a comprehensive <i>Internet Safety curriculum</i> and create an on-line resource (for distance learning or f2f) where the new curriculum can be archived and supporting materials and training made available</p> <p>Develop a pilot program for <i>distance learning</i> (make at least some courses available on-line.)</p>
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## 4. Identify Necessary Technology

*This section* includes an assessment of technologies currently in use (equipment and telecommunication services) that are needed to meet district goals and objectives.

### **Goal: Offer *one-one computing* for all students in grades 6-12:**

*What technology is needed to meet this goal?*

- One-one wireless computing devices for every student and teaching staff person in grade 6 (locally purchased)
- Wireless networks to cover all middle schools (6<sup>th</sup> grade wings.)
- Properly supported implementation of the Maine Learning Technology Initiative (state one-one laptop program) in Grades 7-8 (State supplied equipment and wireless networks.)
- Wireless computing devices for all of approximately 2300 students in grades 9-12
- Properly supported implementation of the MLTI program for teachers in grades 9-12 (state supplied equipment for teachers and state installed wireless networks.)
- Proper audio-visual equipment, including projectors (approximately 330 classrooms.)
- Reliable high-speed network backbone, LAN cabling, Internet services, software applications and shared printing for all buildings, provided centrally in a reliable manner, with sufficient bandwidth for 7000 students and 1200 staff to use technology for learning and to support the learning environment.)

### **Goal: Offer a *basic, up to date computing environment* to support learning in the K-5 schools:**

*What technology is needed to meet this goal?*

- Wired and wireless networks to cover all elementary schools (approximately 200 classrooms.)
- Shared computing devices for all students in grades K-5, for use both individually and in groups (approximately 1600 units adequate for instruction.)
- Proper computers for teachers to use in classroom instruction, including research, communications, materials creation and presentation (included in above)
- Shared equipment for projection, Audio-Visual presentation, including document cameras (approximately 180 units)
- Reliable high-speed network backbone, LAN cabling, Internet services, software applications for all buildings, provided centrally in a reliable manner, with sufficient connections and bandwidth for 7000 students and 1200 staff to use technology for learning and to support the learning environment.

(Also sufficient additional equipment for administrative and support functions, including: 300 desktop computers, 300 printers, and 80 photocopiers/scanners system-wide.)

### **Briefly, how is the technology currently in place meeting these needs?**

#### **In place, meeting the needs:**

Backbone networks, Internet, software applications, one - one computing devices at grades 7-8, networks in EECS, PATHs, West, Reiche, and printing

#### **Less than adequate or missing, not meeting the needs:**

One –one computing devices at grades 9-12 and 6, elementary computing devices, AV/projection, networks in 12 out of 16 buildings

# 5. Collaboration with Adult Literacy Service Providers

*This section* describes describes how the program will be developed, where applicable, in collaboration with adult literacy service providers

## ***Background Information***

### **Portland Adult Education Program:**

This program is funded and supported by Portland Public Schools.

Like business and industry, the use of technology has changed the way Portland Adult Education (PAE) does business. During a February 2000 meeting with several area businesses to discuss their issues, concerns and needs, it was made clear that they need employees with a solid understanding of computers.

PAE opened its first computer lab of twelve machines purchased through a Carl Perkins grant in 1991. Presently, PAE has over eighty computers in six classrooms. Technology class offerings range from basic word processing and using the Internet to programming languages and webpage design and creation. Additionally, the computer is used as an instructional tool in the delivery of curriculum in areas such as mathematics, accounting, medical terminology, and basic literacy.

In direct response to the changing marketplace, PAE developed a 216-hour web design certificate program. Students take classes in HTML and web page development programs to learn current technology to give them employable skills in this emerging field.

Students make use of the computers in classes that are held for 10 months of the year, Monday through Thursday from 9 a.m. to 9 p.m. Supervised labs are available on Friday and Saturday mornings for students to work on assignments. Not only are the computers used for delivery of instruction, but students who don't have computers at home can use PAE computers located in the student lounge or during supervised labs on Fridays.

In addition to computer use in the classroom, technology has enhanced our operations through the use of fax machines, email and computerized accounting and student registration systems. We are working on getting all instructors and students on the PPS GroupWise system to facilitate communication. PAE will also pilot using technology to deliver instruction to students who are unable to attend classes at our sites.

PAE will continue to look for ways to integrate technology into the learning process, meet the training needs of staff and instructors in the use of emerging technologies, and secure financial support to purchase up-to-date hardware and software.

**Objective: Expand offerings of Portland Adult Education program**

- Research and plan to offer Native Language classes to serve and assist populations new to Portland
- Research and plan to offer Distance Learning opportunities

Evaluation: PAE directors will report annually to the TAC.

***Primary Implementation Strategies:***

- Survey parents/community to determine the area(s) of needs to be addressed
- Choose language(s) on which to build classes
- Build syllabi
- Determine feasible scheduling for classes
- Institute pilot platform for on-line learning
- Introduce video conferencing in at least two locations
- Institute pilot program for asynchronous (web-based) courses over distance at high school level.

## 6. Strategies for Improving Academic Achievement and Teacher Effectiveness

*This section* describes Strategies for Improving Academic Achievement and Teacher Effectiveness -how funds, specifically Ed Tech funds where applicable, will be used to improve academic achievement, including the technology literacy of all students attending schools served by the SAU; and how funds expended will improve the capacity of all teachers in schools served by the SAU to integrate technology effectively into curricula and instruction.

**Objective:** *Integrate technology with the curriculum to increase student learning*

- Increase the number of classrooms using electronic communication to support learning.
- Increase the use of inquiry-based, collaborative projects using technology to support learning.
- Increase the use of electronic collaboration (including at a distance) for learning.
- Increase the involvement of students in media-rich learning activities that integrate the use of technology.
- Increase student production of projects, artifacts and evidence in a variety of electronic media.
- Increase the embedding of technology into educational planning and the creation of learning materials.

Evaluation: Annual teacher survey, system logs, student portfolios (establish baseline for 2010, trend thru 2012.) CTS will report annually to the Portland School Committee

**Primary implementation strategies:**

- Provide access, training and support in the use of technology applications and resources for learning
- Provide access and support in the use of Teacher Web Pages (classroom Websites) and online tools to manage and assist learning.
- Create an archive of resources for teachers in embedding technology into the learning process.
- Establish specific programs (ePals, Global Nomads, etc) to increase access to online collaboration for learning.
- Support media specialists and classroom teachers to provide concentrated instruction in media literacy, including research skills, source evaluation, copyright, ethics, etc.
- Embed 21st Century Skills into educational planning and training, especially for the one-one program at grades 6-12.
- Develop a strong leadership team for technology integration, to include building representatives, district technology leaders, and a variety of stakeholders.

## 7. Integration of Technology with Curricula, Instruction and Assessment

*This section* describes how technology (including software and electronically delivered learning materials) will be integrated into curricula, instruction, and assessment and includes a timeline for this integration.

<p><b>Objectives:</b></p> <p><b>1. Teachers will use technology to support their curriculum and instruction. By 2012:</b></p> <ul style="list-style-type: none"> <li>• 100% teachers in grades K-5 will have a basic comfort level with learning technology, including appropriate online resources, sample integration scenarios, and ways to improve their professional learning and practice.</li> <li>• 60% of teachers in grades K-5 will have experienced a <i>live connection</i> with a remote school, institution, provider or individual.</li> <li>•</li> <li>• 50% of teachers in grades 6-12 will establish use of the online classroom system with their students.</li> <li>• 70% of teachers in grades 6-12 will develop an online presence for their regular classes using more than one resource (WordPress, Online classrooms, etc.) to facilitate student learning.</li> <li>• 100% of all teachers will have a basic understanding of <i>Internet Safety</i> as it applies to their grade span.</li> <li>• 60% of teachers in grades 9-12 will be able to demonstrate an understanding of <i>media literacy</i>, especially source evaluation, copyright, re-use, etc.</li> </ul>	<p><b>Primary Implementation Strategies</b></p> <ul style="list-style-type: none"> <li>• Continue the <i>Building Technology Coordinators</i>, as technology integration mentors at each building</li> <li>• Provide district-level ongoing professional development activities with contact hours toward '<b>lane changes</b>' (as described in teacher contract)</li> <li>• Technology components will be embedded into scheduled release time activities for teachers. (For instance, the online classroom will be used to support professional development activities relating to RTI, Literacy, standards, and other major initiatives)</li> <li>• Technology leaders will provide scheduled district-wide professional development programs to address major technology integration initiatives such as online classrooms, one-one learning, global connections, etc.</li> <li>• Electronic portfolios will continue to be piloted, with increased capacity through expansion of one-one learning, increased scanning capability, improved portfolio server, etc.</li> <li>• Support teachers in their efforts to learn more about using the available data systems to inform instructional practices</li> </ul>
<p><b>2. Teachers will use technology to assess student performance.</b></p> <ul style="list-style-type: none"> <li>• Participating teachers will use the NWEA, NECAP, and PSAT assessments to institutionalize a cycle of assessment, analysis, and adjustment in instruction (100% of affected teachers participating by 2012)</li> <li>• Increase the embedding of technology into the creation and assessment of student work (portfolio capability, archiving system fully implemented by SY 2011)</li> </ul>	<p><b>Primary Implementation strategies</b></p> <ul style="list-style-type: none"> <li>• Support the implementation of NWEA assessments, including servers, access for students, staff to facilitate and train proctors and teachers, and training for data analysis to improve instruction through a continuum of diagnostics and adjustments.</li> <li>• Support the creation and archiving of student work in new media, including storage, instructional tools, networks, and access.</li> <li>• Create/implement an improved <i>data warehouse</i> by SY 2011</li> </ul>

## 8. Technology Type and Costs, and Coordination with Funding Resources

*This section* develops a step-by-step action plan, with timeline, that includes goals, activities, required hardware and software, costs, and funding sources. It describes the type and costs of technology to be acquired and how it fits within the current structure, using the list developed in the technology assessment in Section 4, above. Sources of funding, specifically Ed Tech IId funds, E-Rate funds, and funds from other Federal programs, and state and local sources that support technology acquisition and integration are identified and designated.

GOALS	ACTIVITIES	HARDWARE	SOFTWARE	COSTS	FUNDING	TIMELINE
<b>1. Ensure that there is capable hardware and software for all to use including those with exceptional needs</b>						
<b>Provide portable computer devices for all students in grades 6-12</b>	Participate in MLTI for grades 7-8	(State provided) MacBook	MLTI suite (State Provided)	\$242 per student	(State)	2010-13
	Provide used laptops (prior MLTI) for grade 6 one-one program (+ 1 per classroom in grades K-5.)	1,100 G-4 Ibooks	PPS Image (Mac suite)	\$175 per student Two payments: \$135 FY10 \$40 FY11	Federal ARRA, Stimulus, CIP bond Local	2010-12
	Provide Netbooks for all students in grades 9-12.	2,300 Dell Netbooks	PPS Open Source package	\$480 per student (one time fee for three years)	ARRA, Title IID Stimulus, CIP bond Local	2010-12
	Provide software support for 2300 netbooks.		Off-site filter, Virus protection, XPPro license	\$14 per student	Local	Annual
<b>2. Provide and maintain Enterprise-level network (INET)</b> <i>See appendix 4</i>						
	Provide District-wide Internet Access	contract Time Warner for central fiber connectivity		\$30,000	E-Rate, Local	annual
	software contract content filtering		SurfControl Barracuda	\$12,348	local	annual
	accommodations for new servers in data center	server rack and UPS		\$2,800		2009-10
	Upgrade UPS (emergency power to the data center)	Managed UPS array		\$12,000	Local	2009-10

	Install virtualized server capacity with storage area network, (SAN) co-location/redundancy, etc.	SAN array (2)	Virtualization package	\$24,000	Local	2009-10
<b>3. Provide digital phone service to high Schools and Elementary Schools as part of a comprehensive long-range upgrade plan</b>	Digital upgrade	Digital phone switches and equipment	Voicemail software	\$300,000	E-Rate, CIP, local	2009-13
<b>4. Continue to provide and support analog phone service</b>	Ongoing contract (monthly)	Centrex contract		\$10,000-\$12,000 monthly	Erate/Local	
<b>5. Provide and maintain adequate computers and related equipment</b>	Budget for maintenance of network hardware and replacement of obsolete and non-supported equipment	Computers, printers, network equipment		\$600,000	CIP (Bond) Local Budget	<b>2009-13</b>
	Establish an allocation for student-computer use	(contained within above)				
	Support <u>distance learning</u> with a pilot program		Course management system (VHS/ K12inc, etc.) relationship)	\$32000 \$7000	Local/E-Rate/grant	<b>2010-12</b>
	Establish videoconferencing	H323 videoconferencing equipment		\$12000	CIP/Local/E-rate/Grant	<b>2010</b>
	Replace Intercom systems	New VOIP-integrated		\$200,000	CIP/Local	<b>2010-13</b>
<b>6. Ensure that wired and wireless network is current, robust, and available in all classrooms and locations</b>						
	Complete a facilities plan to include network infrastructure (cable and wireless) for all buildings within 3-5 years (at least three bldgs. in FY'10: EECS, Rieche, West, and PHS)	New cable WiFi switches Radius security		\$360,000	E-Rate, Local Stimulus/CIP Bond Title Grants	

# Facilities needs to support learning 2009-2013 with Funding Source

Year	Priority	Building	Explanation and funding source	Cost (*\$1000)
		CBHS	(See PATHS)	0
2009	1	Cliff Is ES	Install VPN Router, wireless (Local)	0.7
2010	1	Deering HS	Complete data cabling (Approved CIP FY '10)	47
		East End CS	(To be completed FY 2009 (E-Rate))	0
2011		Hall ES	Replace data cable, Install wireless (CIP/Local)	30
2011		King MS	Replace Cabling (E-rate funding pending @ 80%) (Lab 2009, Local)	28
2012		Lincoln MS	Replace Cabling (CIP/Local)	27
2011		Longfellow ES	Replace data cabling, install wireless (CIP/Local)	36
2011		Lyseth ES	Replace cable and install wireless (CIP/Local)	34
2012		Moore MS	Replace Cabling (CIP/Local)	26
		<b>Nathan Clifford</b>	<b>Closes upon opening of new school @ 150 Ocean Avenue</b>	0
2010	1	Portland HS	Complete data cabling (Approved CIP FY '10)	50
2012		PATHS	Replace non-standard cable and split ports (Local)	20
2011		Peaks Island	Replace data cable, install wireless (CIP/Local)	7
2010		Presumpscott	Replace cable, Install Wireless (E-rate, Title 1 pending)	32
		Reiche ES	(Completed FY 2009 (E-Rate))	0
2010		Riverton ES	Replace older data cable, Install wireless (E-Rate, Title 1 pending)	21
		West	(Completed FY 2009 (E-Rate))	0

Total (includes structured cabling, Wireless Access points, and basic switching.  
Does not address VOIP phone installations)

\$358,700.00

All buildings should be completed prior to school year 2012-13.

# 9. Supporting Resources

*This section* describes the supporting resources such as services, software, other electronically delivered learning materials, and print resources that will be acquired to ensure successful and effective uses of technology.

***Goal: Administrators and Teaching Staff will use technology effectively in their work environment.***

Objectives	Primary Implementation Strategies .	Hardware	Software	Personnel	Cost	Funding	Timeline
<b>Administrators and staff will utilize a variety of user-friendly custom applications for data input &amp; retrieval.</b>	<i>Continue the development of applications that will address:</i>						
<b>target date:</b>							
2009-13	Online Databases		InfoTrac Searchasaurus Grolier WorldBook Maine InfoNet		\$7,900.00 \$4,679.00 \$3,300.00	Local	Annual
2009-13	District-wide Library Catalog with home access via Web	PPS Library Catalog Server	Spectrum Catalog		\$8910	Local	Annual
2009-13	Web-based Student Information System		PowerSchool		\$259,000 initial/\$31,000 yearly	Local	Annual
2009-13	Online Teacher GradeBook		PowerSchool			Local	2009-13
2009-13	Parent Access via Web/Elementary, DHS		PowerSchool			Local	2009-13
2009-13	Parent Access via Web/Secondary		PowerSchool			Local	2009-13
2009-13	Employee information lookup-Web		Pentamation e-Finance/HR		\$23,400	Local	Annual
2009-13	Expand document Imaging districtwide		Laserfiche		\$12,000	Local	Annual
2009-13	Phone/Email notification system for parent attendance & other	Server w/analog at City, managed by CTS	Synrevoice		\$4,170	Local	Annual
<b>PPS will provide adequate technical support for the INET and all PPS applications</b>	<b>Computer Tech Services (CTS)</b> team will be staffed at the minimum level to maintain and provide technology for 9000 users.			10 FTE (See staffing)	\$500,703	Local	Annual

	Internet service will be provided by Time Warner				\$30,000		Annual
<b>Web site</b>	Web site will be redesigned and redeveloped to provide online resources for learning, and for staff & the public, programmer and editor designated	Internal server	ImageX Media Drupal/Apache		\$28000	Title IID, Local	2010
<b>CTS staff will have the knowledge and capacity to lead and support technology use for learning</b>	Staff development activities for CTS and lead technology staff				\$7000		Annual
<b>Instructional leaders and One-one instructional staff will have necessary availability (5-10 days) during the summer months</b>					\$18000		Annual

# 10. Steps to Increase Accessibility

**This section describes the steps being taken to ensure that all students and teachers have increased access to technology. The description must include how Ed Tech funds, if applicable, will be used to help students in high-poverty and high-needs schools, or in schools identified for improvement or corrective action under Section 1116 of Title I; and how the steps taken will ensure that teachers are prepared to integrate technology effectively into curricula and instruction.**

<p><b>1. Providing capable hardware and software, distributed equitably to all schools.</b></p>	<p><i>Primary Implementation Strategies</i></p> <ul style="list-style-type: none"> <li>• Define a minimum standard for computer capability; continue to revise the standard each year.<sup>1</sup></li> <li>• Ensure the equitable purchase and distribution of technology through Title funds, CIP bonds, Grants and the Local budget</li> </ul>
<p><b>2. Providing consistent, reliable technical support to all classrooms, including those with Title 1, Special needs, and ELL populations</b></p>	<p><i>Primary implementation Strategies</i></p> <ul style="list-style-type: none"> <li>• Formalize the use of a ticket system for help desk dispatching and management, and tracking of reports and work orders.</li> <li>• Use survey and incident reports to assess support levels annually, including building level data</li> <li>• Support the BTC positions for equitable support for learning, including enhancements at the building level to these positions.</li> </ul>
<p><b>3. Providing teacher and administrative training/staff development support to all schools, including CIP/Title 1A schools, and those with Special Needs &amp; ELL populations</b></p>	<p><i>Primary Implementation Strategies</i></p> <ul style="list-style-type: none"> <li>• Support technology threads and integration with Professional Learning Communities, formal training, contract-related PD activities and plans, Certification process, etc, with Title funds, Grants and the local budget.</li> </ul>

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<sup>1</sup> See Appendix Technology Standards

# 11. Promotion of Various Curricula and Teaching Strategies that Integrate Technology

*This section* describes how various curricula and teaching strategies that integrate technology effectively into the general curriculum and instruction will be identified based on a review of relevant research, and lead to improvements in student academic achievement.

**Philosophy: Integrate 21<sup>st</sup> Century Skills into teaching and learning in the content**



**areas.**

## Research Summary:

The following is from an [article](#) on the “[21st century Literacies](#)” by Donald Leu, and members of the [New Research Lab](#), at the University of Connecticut:

[Literacies](#)

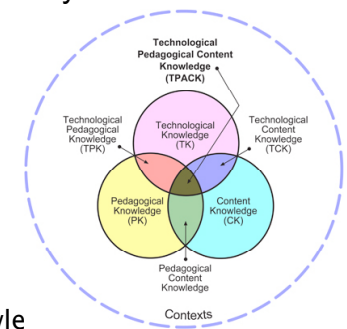
*“Many groups from the private sector and national content organizations have tried to identify 21st Century skills. Some commonalities emerge when you view the following reports: [Partnership for 21st Century Skills Framework \(2007\)](#); ...[ISTE NET-S Standards \(2007\)](#); [AASL Standards for the 21st Century Learner \(2007\)](#); the NCTE policy statement [Towards a Definition of 21st Century Literacies \(2008\)](#); [Are They Really Ready to Work? \(Casner-Lotto & Barrington, 2006\)](#). We often refer to these as navigating the “C’s of change.” Across all the new standards and reports, students must now build their creativity, critical thinking, communication, collaboration, self-control, and comprehension skills.”*

## Design of Curriculum and Instruction:

The research informs us that we should not teach the new skills and knowledge in isolation, but to embed them into regular teaching and learning. For instance, instead of teaching “how to collaborate in an on-line forum,” we will use the online forum to discuss Macbeth, while introducing and reinforcing the new skills throughout the class. This is a qualitative change that applies across the curriculum. Specific new skills are needed and occasionally taught directly, but the technology is not emphasized over required learning in the content areas. *Staff development toward changes in specific lessons and units of instruction* is informed by two research-based models:

[TPACK](#), (Mishra and Koehler<sup>2</sup>) which attempts to show the interplay of Technological, Pedagogical and Content Knowledge required by teachers to design learning experiences for integration, and [SAMR](#), which attempts to qualify different levels of integration (toward changes more likely to bring about increases in learning: Substitution, Augmentation, Modification, and Redefinition) based on

Redefinition	Tech allows for the creation of new tasks, previously inconceivable	Integrated with workgroup and content management software
Modification	Tech allows for significant task redesign	Integrated with email, spreadsheets, graphing packages
Augmentation	Tech acts as direct tool substitute, with functional improvement	Basic functions (e.g., cut and paste, spellchecking) used
Substitution	Tech acts as direct tool substitute, with no functional change	Word processor used like a typewriter



<sup>2</sup> Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Journal of Instructional Development*, 108 (6), 1017-1054.

the research of Ruben R. Puentedura<sup>3</sup>, who works with the *Maine Learning Technology Initiative*.

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<sup>3</sup> <http://hippasus.com/resources/tte/>

# Action Steps

**The following specific actions will be taken in the schools to implement these changes...**

CTS and district administration will create and conduct learning opportunities for teachers. Building administration will practice supervision, mentorship, coordination (for instance, organizing teachers into learning communities, organizing student volunteers, etc.) Teachers will attend training both in person and online, and will use their improvement process to try new integration strategies with students. Students will use their equipment to practice research, collaboration, communication, content creation, etc. CTS technical staff will provide software and network support, to help make sure everything works. In grades 9-12, building ed. techs. will operate a new one-one program, assisting teachers and students with hardware and software issues, repairs, replacements, etc. All of these activities are driven by the learning process, which is evaluated as it is now, in the content areas, reduced absenteeism, course and school completion, etc.

(New content will be formally taught and assessed in some areas. Internet safety, digital citizenship, and media literacy curricula are being developed (K-12) in committee this year. These are required in new legislation.)

## Resources

*The following resources are in place for teachers:*

Necessary technology as identified in section 4 above.

Training and ongoing support for the integration of technology into teaching and learning (as defined throughout this document, including Section 12, below.)

## 12. Professional Development

*This section* describes how ongoing, sustained professional development for teachers, principals, administrators, and school library media personnel will be provided to further the effective use of technology in the classroom and library media center.

**All teaching staff will pursue ongoing learning about technology as a classroom teaching tool for achieving the Maine Learning Results Objective:**  
*Integrate technology with the curriculum to increase student learning*

- Increase the number of classrooms using electronic communication to support learning.
- Increase the use of inquiry-based, collaborative projects using technology to support learning.
- Increase the use of electronic collaboration (including at a distance) for learning.
- Increase the involvement of students in media-rich learning activities that integrate the use of technology.
- Increase student production of projects, artifacts and evidence in a variety of electronic media.
- Increase the embedding of technology into educational planning and the creation of learning materials.

Evaluation: Annual teacher survey, system logs, student portfolios (establish baseline for 2010, trend thru 2012.)  
Technology Director will report annually to the Portland School Committee

Title IID goal: Staff responses on the annual survey will indicate a high "comfort level" with on-line tools for instruction, data analysis, and communication.

(Target= 80% will indicate "agree or strongly agree" on items which indicate a high comfort level with on-line tools.)

*Primary implementation strategies*

- Provide access, training and support in the use of technology applications and resources for learning
- Provide access and support in the use of Teacher Web Pages (classroom Websites) and online tools to manage and assist learning.
- Create an archive of resources for teachers in embedding technology into the learning process.
- Establish specific programs (ePals, Global Nomads, etc) to increase access to online collaboration for learning.
- Support media specialists and classroom teachers to provide concentrated instruction in media literacy, including research skills, source evaluation, copyright, ethics, etc.
- Embed 21st Century Skills into educational planning and training, especially for the one-one program at grades 6-12.
- Develop a strong leadership team for technology integration, to include building representatives, district technology leaders, and a variety of stakeholders.
- Sustain support levels, especially the building technology coordinators, teacher leader/s positions

## 13. Innovative Delivery Strategies

*This section describes how the development and use of innovative strategies for the delivery of specialized or rigorous courses and curricula through the use of technology, including distance-learning technologies, will be encouraged, particularly in areas that would not otherwise have access to such courses or curricula due to geographical distances or insufficient resources.*

**\*Objective for 2009-12:** Increase the number of students using online learning opportunities (baseline is 0.)

### **Implementation Strategies:**

- Investigate the availability of Advanced Placement/Early College Courses currently not offered in Portland Schools.
- Develop a plan for offering Distance-Learning Courses
- Make available at least some Web-based Distance-Learning Courses (VHS, etc.)
- Offer a platform for online course delivery as a pilot program
- Offer H323 Videoconferencing opportunities in at least two locations

### **Assessment Methods : \***

Observation, Course catalogue, On-line course logs, Videoconferencing report

## 14. Accountability Measures

*This section describes the process and accountability measures which will be used to evaluate the extent to which the plan activities are effective in integrating technology into curriculum and instruction, increasing the ability of teachers to teach, and enabling students to reach Maine's Learning Results.*

### **14.1. Evaluation Process**

The Technology Plan will be monitored at both the district and building levels, by the following groups (**\*see appendices 1, 2 and 3**):

- The Building Technology Coordinators (*BTC Teams,*) facilitated by the Director of Technology, is comprised of all building technology coordinators, instructional technology leader/s (and CTS operations staff members as needed.) Secondary and elementary teams meet monthly to guide the district policy and provide input for the district leadership. The BTC also functions as a support group for its members, which builds capacity in the group. Each school is expected to have a building-based technology planning process, facilitated by the BTC and involving stakeholders at the school level. Site-based technology needs are incorporated into the district plan.
- **Each BTC will provide a yearly report to the District Technology Coordinator using data to assess the progress of classroom integration of technology.**

- The *Technology Advisory Committee* will be re-established to include members of the school and larger Portland communities. The TAC will meet twice each year — October and May. Tasks for members will be determined in October to define the work of educating the Portland Community about technology and the implementation of the District Technology Plan. The diverse membership of this group provides opportunity to reach school improvement teams, parent-teacher organizations, local businesses and partners, the local colleges and universities, community organizations and the School Committee. **In June of each year, the Technology Advisory Committee will complete its evaluation of the learning/integration goals<sup>4</sup> at its regular meeting.**
- The technology director will report annually to the school committee. The annual report will be published electronically and summarized in district publications and for the press.

#### **14.2. Summary of objectives for the PPS Learning Technology Plan for 20010-12:**

- Revise Portland Schools web site to provide enhanced access to school resources for parents and community members
- Revise Portland Schools web site to include user friendly methods for PPS staff to publish and maintain content
- Expand web-based survey to include responses from parents and students
- Institute a parent awareness program for Internet Safety
- Improve web-based opportunities for parents and community members to share in decision-making
- Improve email-based communications (lists, registration, announcements, etc) for parents and community members
- 
- Provide equitable access and support to all schools for creative work, communication, collaboration and research using new media, electronic telecommunications and learning networks
- Provide equitable access and support in the use of teacher Web Pages (classroom websites) to facilitate and document learning projects
- Provide equitable access and support for learners to find, contact, and collaborate with others outside the district, state, and/or country in individual and/or group learning projects
- Ensure that library/media specialists have the capacity (time, training, facilities and resources) to provide concentrated instruction in media literacy (evaluation of source material, plagiarism, changes in copyright, re-use conventions, etc.)
- Implement a comprehensive Internet Safety curriculum at all grade levels
- 
- Implement a plan to offer Native Language classes to serve and assist populations new to Portland
- Implement a plan to offer Distance Learning opportunities

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<sup>4</sup> See section 3 above, **Goals for Student Learning**, section 6, **Strategies for Improving Academic Achievement and Teacher Effectiveness** and section 12 **Staff Development**

- Increase the number of classrooms using electronic communication to support learning.
- Increase the use of inquiry-based, collaborative projects using technology to support learning.
- Increase the use of electronic collaboration (including at a distance) for learning.
- Increase the involvement of students in media-rich learning activities that integrate the use of technology.
- Increase student production of projects, artifacts and evidence in a variety of electronic media.
- Increase the embedding of technology into educational planning and the creation of learning materials.
- 
- 100% teachers in grades K-5 will have a basic comfort level with learning technology, including appropriate online resources, sample integration scenarios, and ways to improve their professional learning and practice.
- 60% of teachers in grades K-5 will have experienced a *live connection* with a remote school, institution, provider or individual.
- 
- 50% of teachers in grades 6-12 will establish use of the online classroom system with their students.
- 70% of teachers in grades 6-12 will develop an online presence for their regular classes using more than one resource (WordPress, Online classrooms, etc.) to facilitate student learning.
- 100% of all teachers will have a basic understanding of *Internet Safety* as it applies to their grade span.
- 60% of teachers in grades 9-12 will be able to demonstrate an understanding of *media literacy*, especially source evaluation, copyright, re-use, etc.
- Use the NWEA, NECAP, and PSAT assessments to institutionalize a cycle of assessment, analysis, and adjustment in instruction (100% of affected teachers participating by 2012)
- Increase the embedding of technology into the creation and assessment of student work (portfolio capability, archiving system fully implemented by SY 2011)

## Appendices

### Appendix 1 Technology Advisory Committee

#### Membership:

Joe Makley	District Technology Coordinator
Susan Steele	Title IV Coordinator, Community and Business Partnerships
Robin Walden	Teacher, Building Technology Coordinator
John Cobleigh	Teacher, Building Technology Coordinator
Michael Lamoureux	Instructional Technology Leader
Bill Wilson	Parent, Community member
Ken Kunin	Deering High School Principal
Sheila Jepson	Deering High School assistant principal
(Varies)	Rotating student member/s
David Smith	Teacher
David Grant	Teacher
Shoshana Hoose	TV3 (Public Access cable TV station)

The TAC has liaison relationships with the following individuals and groups:

Superintendent

Elementary Principals

Secondary Principals

Computer/Technology Services Team

Student Technology Leaders

School/Community members' listserv



Computer  
Technology  
Services

**Portland Public Schools**  
Portland, Maine

## **Technology Standards for Portland Schools and Classrooms**

January 2009

*Note: The Technology Standards for the Portland Elementary Schools were developed in consideration of the Portland Public School technology policies, national standards and best practices for instructional technology. It will be reviewed and adjusted annually by the PPS technology committee, and an inclusive instructional technology team at the building level. These standards apply to secondary schools, with the addition of the capacity for one-one ratio of computing devices (Per MLTI and local one-one initiatives.)*

### **I. Portland Public Schools Vision for Learning Technologies:**

Technology is a dynamic, constantly evolving and essential tool for learning within the Portland Public Schools educational community. All members use it to support, enhance, and contribute to the shared enterprise of lifelong learning and to improve the quality and productivity of life and work.

Technology serves education by contributing to:

- Authentic and challenging student learning experiences that use a variety of communication and electronic tools.
- Student assessment that is based on products, progress and effort.
- New roles for students and teachers as partners in the learning process.
- Increased proficiency of teachers, administrators and support staff utilizing new communication and management tools.
- Evolution of a culture that connects learning beyond the school walls to community and global resources.
- Preparation of learners for a world immersed in technology.

## **II. Learning Goals:**

1. Students will use technology in a creative way to make new things and practice new ways of working.
2. Students will use technology to work collaboratively, including at a distance, to support their learning and to help others learn.
3. Students will use digital tools to find, evaluate, and use new information.
4. Students will use critical thinking *and technical knowledge* to discern the usefulness, accuracy, and intent of material they find on the Internet.
5. Students will practice legal and ethical behavior, and demonstrate ways to keep safe while using the Internet

## **I. Identification of Necessary Technology:**

### **I. Student and staff computer access:**

It is expected that students and teachers will use technology in a flexible way to support the learning goals above. Configurations will need to change as equipment evolves. At the time of opening, computer devices for student use will include desktop, portable, wireless, and shared devices, in flexible combinations. Each classroom will have at least one cluster (3 units) of desktop computers. The instructional program for grades 4 & 5 will begin with one class set (20-30 units) of portable computing devices per grade level, located on a charging cart that can be moved between classrooms. In order to incorporate this technology into instruction, each classroom will be provided with a movable desktop computer station, document camera speakers, electronic white board, and ceiling mount projector. Video conferencing will be available over shared, portable equipment.

[A note about instructional video: Each classroom's projection system will accommodate DVD and digital media through the computer and Internet, without the need of coaxial cable or a separate internal video distribution system.]

## II. Telecommunications:

The building will be connected to the Portland Public Schools/City of Portland I-Net, which will provide high-speed connections for Internet and phones. (Cable television will be made available to the cafeteria, stage area, and library.) Software, voice and data services will be provided over the I-Net backbone. Each occupied space will have data ports and wireless coverage.

## II. Summary of network infrastructure requirements

- I. Secure, lockable, air conditioned wiring closet [space for two 84"X19"X24" data racks, with proper standing room on at least three sides.] AC and filtration must meet data center standards for air quality.
- II. Data Cabling [specifications as indicated on drawings, on file]
  1. Cat 6 Wiring in every classroom and office space (minimum 6 drops (jacks) each classroom and office space, color coded for VOIP or data)
  2. Cat 6 wiring near the ceiling for wireless access points (designated classrooms, gym, and administration area.)
  3. Cat 6 wiring to the media center (computer lab adjacent to the library.)
- III. Data switches, Enterasys Power Over Ethernet 10/100/1000 [specifications on file.]
- IV. VOIP (Voice over IP) system:
  1. Phone in each room
  2. Cisco equipment [specifications on file.]



## III. Staff Development

- I. All staff will receive rigorous initial training on how to integrate classroom technology into the instructional program, including specific strategies based on the ISTE and local standards.
- II. All classrooms will receive on-going assistance in the use of learning technology.
- III. Each Elementary School is expected to designate at least at least one staff person to support of learning technologies.

#### **IV. Accountability Measures**

- I. The Portland Public Schools Technology coordinator, instructional leader/s and the building principal will monitor and review the progress of activities and their effectiveness in integrating technology into curriculum and instruction.
- II. Evaluation will be based on sections I and II above, the ISTE Staff & Student technology standards (Appendices A, B,) and locally established goals.

## Appendix II: Itemized equipment list for all Portland Schools (subject to revision)

### Ethernet Switches:

Enterasys Matrix C3 48 Port 10/100/1000 POE Switch	C3G124-48P
Enterasys Matrix C3 24 Port 10/100/1000 POE Switch	C3G124-24P

### Wireless:

Enterasys Wireless Access Point	RBT-1002
Radius Server	SBR-WINSS-LIC
Wireless LAN Controller & Access Points	
Enterasys Wireless LAN Controller	RBT-8500
Enterasys Wireless LAN Controller 1 YEAR SUPPORTNET	ES-SN-S06
Enterasys Wireless LAN Management RASM- 200 APS	RBT-NMS-200
D2 Policy License	D2POL-LIC-D2
Enterasys Wireless LAN Management RASM- 200 APS 1 YR	
SUPPORTNET SOFTWARE SUB	ES-SAS-S04
Enterasys Wireless Access Points	RBT-1002
Enterasys Wireless Access Points 1 YR SUPPORTNET	ES-SN-S00
Radius Server	SBR-WINSS-LIC

### VOIP Telephony:

Router/Gateway	
2821 VSEC Bundle w/PVDM2-32,FL-CCME-48,Adv IP	
Serv,64F/256D	C2821-VSEC-CCME/K9
4 port FXS or DID VIC	VIC-4FXS/DID
Four-port Voice Interface Card - FXO (Universal)	VIC2-4FXO
1-Port 2nd Gen Multiflex Trunk Voice/WAN Int. Card - T1/E1	VWIC2-1MFT-T1/E1
Power Cord,110V	CAB-AC
Cisco 2800 ADVANCED IP SERVICES	S28NAISK9-12403
Feat Lic Survivable Remote Site Telephony up to 48 phones	FL-SRST-MEDIUM
Cisco 2821/51 AC power supply	PWR-2821-51-AC
Device manager for routers	ROUTER-SDM
32-Channel Packet Voice/Fax DSP Module	PVDM2-32
256MB DDR DRAM Memory factory default for the Cisco 2800	MEM2800-256D-INC

64MB CF default for Cisco 2800 Series  
SNT 24X7X4 + SAU 2821 Voice Bundle

MEM2800-64CF-INC  
CON-SNTP-2821CCME

**Videoconferencing unit:**

Tandberg Edge 95 MXP  
On-site customer core  
Customer core (annual)

115590  
115594NPP  
115590V01D

**Ceiling Mount Projectors: (TBA)**

**Desktop computers, Portable computers, charging cart: (TBA)**

## **Appendix III: ISTE Standards for students:<sup>5</sup>**

### **1. Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

- a. apply existing knowledge to generate new ideas, products, or processes.
- b. create original works as a means of personal or group expression.
- c. use models and simulations to explore complex systems and issues.
- d. identify trends and forecast possibilities.

### **2. Communication and Collaboration**

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

- a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
- b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- c. develop cultural understanding and global awareness by engaging with learners of other cultures.
- d. contribute to project teams to produce original works or solve problems.

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<sup>5</sup> [http://www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/NETS\\_for\\_Students\\_2007.htm](http://www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/NETS_for_Students_2007.htm)

### **3. Research and Information Fluency**

Students apply digital tools to gather, evaluate, and use information. Students:

- a. plan strategies to guide inquiry.
- b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- d. process data and report results.

### **4. Critical Thinking, Problem Solving, and Decision Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:

- a. identify and define authentic problems and significant questions for investigation.
- b. plan and manage activities to develop a solution or complete a project.
- c. collect and analyze data to identify solutions and/or make informed decisions.
- d. use multiple processes and diverse perspectives to explore alternative solutions.

### **5. Digital Citizenship**

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

- a. advocate and practice safe, legal, and responsible use of information and technology.
- b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
- c. demonstrate personal responsibility for lifelong learning.
- d. exhibit leadership for digital citizenship.

## **6. Technology Operations and Concepts**

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

- a. understand and use technology systems.
- b. select and use applications effectively and productively.
- c. troubleshoot systems and applications.
- d. transfer current knowledge to learning of new technologies.

## **Appendix IV: ISTE technology standards for teachers:<sup>6</sup>**

### **1. Facilitate and Inspire Student Learning and Creativity**

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments. Teachers:

- a. promote, support, and model creative and innovative thinking and inventiveness.
- b. engage students in exploring real-world issues and solving authentic problems using digital tools and resources.
- c. promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes.
- d. model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments.

### **2. Design and Develop Digital-Age Learning Experiences and Assessments**

Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS•S. Teachers:

- a. design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.
- b. develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress.
- c. customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources.
- d. provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.

### **3. Model Digital-Age Work and Learning**

Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society. Teachers:

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<sup>6</sup> [http://www.iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS\\_for\\_Teachers\\_2008.htm](http://www.iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS_for_Teachers_2008.htm)

- a. demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.
- b. collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation.
- c. communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital-age media and formats.
- d. model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning.

#### **4. Promote and Model Digital Citizenship and Responsibility**

Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.  
Teachers:

- a. advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.
- b. address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources.
- c. promote and model digital etiquette and responsible social interactions related to the use of technology and information.
- d. develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital-age communication and collaboration tools.

#### **5. Engage in Professional Growth and Leadership**

Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources. Teachers:

- a. participate in local and global learning communities to explore creative applications of technology to improve student learning.
- b. exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others.
- c. evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning.
- d. contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community.

