

Pennsylvania State Educational Technology Policy Analysis
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May 4, 2003

Overview

This paper is an analysis of the state policies of Pennsylvania regarding educational technology. Using Chris Dede's Framework for state-level educational technology policy (<http://www.neirtec.org/statepolicy/>), I present the information in accordance with the structure of the framework. Dede's framework is divided into seven categories (A-G), each of which presents "essential questions" and "indicators" for potential or actual policy action. Within each category, with the exception of C, D, and G, I have elected to present policies in a format that addresses each indicator (or at times, related groups of indicators) rather than presenting the large group of policies related to the entire category. I have also devised a visual coding system for the indicators which is explained on the next page. At the end of each category, I present a brief summary of the policies relevant to each category and suggestions for potential policy action.

Interspersed throughout the paper are four "Policy-to-Practice" excerpts that relate to the policies and policy issues being presented. Data included in each of these excerpts were collected from teachers and one administrator currently employed in school districts throughout Pennsylvania. The purpose of these excerpts is to put a practical and realistic "face" on the process of policy implementation.

The paper concludes with my suggestions for further research and work to be done to improve this analysis.

All content presented in this paper is taken from the Pennsylvania State Department of Education (PSDE) website (<http://www.pde.state.pa.us/>), with a majority of the information coming from PSDE's Office of Educational Technology (OET) website, and a collection of websites responsible for supporting, implementing, and assessing Pennsylvania's integration of technology into its schools. The PSDE website is information-rich, well-organized and contains a useful search engine.

Coding System

Each category in Dede's framework includes "indicators" that I use for structuring the way policies are presented in the paper. For each indicator, I present a visual code to help the reader highlight areas of strength in Pennsylvania's educational technology policy and areas in need of further attention. However, the system used to assign these codes to an indicator is not meant to be presented as the least bit "scientific." Rather, it is an assignment based on my own limited research of the policies and can be ignored by readers who do not approve of its arbitrary and somewhat subjective nature.

Color Codes

I selected the very recognizable color scheme of green, yellow and red to code each indicator in an attempt to connect the reader's visual recognition of a traffic light to the purpose behind the coding system.

- **Policies are in motion**
Indicates that the state has made positive policy decisions in fulfilling the objectives represented by the indicator. It does not mean that policymakers can or should ignore this area. Also, it does not mean that the objectives represented by this indicator have been fulfilled in their entirety.
- **Some policies have begun to address these issues; not in full motion; slower pace**
Indicates that the state has addressed the issues represented by the indicator to some degree. It may also represent a situation where one part of the indicator has been addressed, but all parts of the indicator have not been addressed. In some situations, this code is assigned for lack of information and does not necessarily mean that policies are not in place.
- **Policies do not address these issues; Standstill**
Indicates that the state has not addressed the issues represented by the indicator at all (or at best, to a minimal degree). As in the yellow code description, the red code may also indicate that information could not be found for inclusion in the analysis.

Note: By conscious decision, if there was question as to the assignment of one code color versus another, I deferred to the color code that indicates less action (e.g., if it was between yellow and red, red was selected).

A. STATE TECHNOLOGY STANDARDS AND ASSESSMENTS FOR STUDENTS

- *State technology standards and assessments created for students at all grade levels*

The Pennsylvania Academic Standards (PAS) were developed by executive order of former Governor Ridge for the purpose of establishing “a rigorous set of standards, the achievement of which demonstrates the attainment of high levels of student competency in core academic subjects.” Parents, business and community leaders, teachers, higher education professors, school administrators and Department of Education staff members assisted in the development of the standards

(http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp?a=3&Q=76730&stateboard_edNav=|5496|&stateboard_edNav=|5467|).

Pennsylvania has academic standards in the following content areas: Arts & Humanities; Career Education and Work (in development); Civics and Government; Economics; Environment and Ecology; Family and Consumer Sciences; Geography; Health, Safety and Physical Education; History; Mathematics; Reading, Writing, Speaking and Listening; Science and Technology; and World Languages (in development). The standards for all content areas include specific skills and knowledge to be attained by students at certain grade levels. Depending on the content area, the grade levels to which the standards serve as a benchmark vary. For example, standards in Science and Technology address skills and knowledge to be attained by grades 4, 7, 10 and 12, whereas standards in Arts & Humanities use grades 3, 5, 8, and 12

(http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp?a=3&Q=76716&stateboard_edNav=|5467|&pde_internetNav=|&a_and_tNav=|).

The Pennsylvania System of School Assessment (PSSA), a standards based criterion-referenced assessment, is administered to every Pennsylvania student in 5th, 8th and 11th grade for reading and math. Students in 6th, 9th and 11th grade are assessed in writing. The individual assessment for Science and Technology in grades 4, 7, and 10 is to be implemented in 2003-2004.

(http://www.pde.state.pa.us/a_and_t/site/default.asp?g=0&a_and_tNav=|630|&k12Nav=|1141|).

- *State technology standards for students are validated against national models such as International Society for Technology in Education standards*

The development committees used national benchmarks, other states’ standards and international academic standards in developing the PAS. Following the development phase, the State Board of Education hired national experts on standards to evaluate preliminary drafts of the PAS

(http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp?a=3&Q=76730&stateboard_edNav=|5496|&stateboard_edNav=|5467|).

● *State technology standards for students include provisions for learners with special needs and varied linguistic, cultural, ethnic and socioeconomic backgrounds, including educational resources designed for universal usability*

The Pennsylvania Academic Standards in Science and Technology (ASST) reflect the increasing body of knowledge and skills students are expected to achieve as they progress to different benchmark grades (i.e., grades 4, 7, 10 and 12). ASST state: "Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level" (ASST p. 1). ASST do not include provisions for learners with special needs and varied backgrounds. In compliance with the Individuals with Disabilities Education Act (IDEA), Pennsylvania has developed an Alternate Assessment for use by students with disabilities

(http://www.pde.state.pa.us/a_and_t/site/default.asp?q=0&a_and_tNav=|630|&k12Nav=|1141|).

The Assistive Technology Act of 1998 (ATA) includes protections for funding of assistive technology. Included in the ATA is a policy mandating universal design in products and the built environment (<http://thomas.loc.gov/cgi-bin/query/z?c105:S.2432.ENR>). Pennsylvania also makes available an assistive technology lending library that loans free assistive technology devices to people with disabilities

(<http://www.temple.edu/instituteondisabilities/atlend/>). The State also supports purchase of assistive technology equipment through allocations to state Intermediate Units

(http://www.pde.state.pa.us/special_edu/cwp/view.asp?A=3&Q=67168).

● *State provides incentives to develop virtual high schools and similar distance learning opportunities for students who have difficulty obtaining access to classroom settings*

The Pennsylvania Department of Education developed Distance Learning Exchange, a clearinghouse of distance learning opportunities. The service is free to schools although no incentive is provided to use this service

(<http://dle.state.pa.us/>). Legislation, in accordance with Act 22 (1997),

allows for the development of cyber-charter schools in the State (http://www.pde.state.pa.us/charter_schools/lib/charter_schools/cyber_application9802final.pdf). Currently, there are seven such schools operating in the State

(http://www.pde.state.pa.us/charter_schools/lib/charter_schools/execsummprojappr.pdf).

Pennsylvania is a member of the Satellite Educational Resources Consortium (SERC). A variety of courses are offered to students, especially those in rural

areas, that are otherwise not available at the local school level (<http://www.serc.org/about/>).

● *State technology standards for students are integrated into state content standards for students*

Integration of technology into the PAS is explicitly addressed in the ASST while its inclusion is limited in other content area standards such as Math and Reading, Writing, Speaking and Listening. Although the ASST state that meeting all standards should be a collaborative effort among all curricular areas the message expressed by separating Science and Technology into the same category of standards is at the very least, misleading. Other PAS reflect this contradiction as the Academic Standards for Mathematics (ASM) contain minimal reference to technology integration. When use of technology is addressed in the ASM, it refers to students' use of basic technological devices such as graphing calculators and the use of spreadsheets. There is no mention of technology in the grade 3 category. The Academic Standards for Reading, Writing, Speaking and Listening (ASRWSL) incorporate technology to a greater degree than ASM, but the incorporation is still sporadic and somewhat isolated (such as using media for learning purposes and incorporating technology use for research) (<http://www.pde.state.pa.us/k12/lib/k12/Reading.pdf>).

The PAS define technology as "a body of knowledge separate from but related to the sciences, with specific content, curriculum and specific certification requirements" that is the "application of tools, materials, processes and systems by humans to solve problems and provide benefits to humankind" (<http://www.pde.state.pa.us/k12/lib/k12/scitech.pdf>). The knowledge of content, process and skills in technology should include these components:

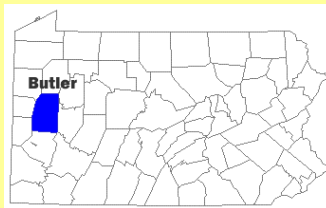
- methods of designing and developing solutions
- standards for selecting and using appropriate materials, tools and processes
- experimental and design specifications for testing and evaluating solutions
- criteria for judging the performance and impact of the solutions
- evaluating the impact of modifying a system to improve performance

(<http://www.pde.state.pa.us/k12/lib/k12/scitech.pdf>, p. 5)

ASST do emphasize the unifying themes between science and technology to provide the "big ideas" in which a teacher can integrate various concepts (<http://www.pde.state.pa.us/k12/lib/k12/scitech.pdf>, p. 2). However, the strength of the integration and connection between science and technology varies in degree. The category of Technology Education (3.6) is very specific in its descriptions although the practicality of achieving these goals is questionable. The language itself is intimidating and confusing. Category 3.7, Technological Devices, focuses on the specific tools and instruments

students should use and master by certain grade levels. Within this category, ASST state: "Computer literacy, including the use of hardware and software in standard statements C, D, and E should be integrated across all content areas" (<http://www.pde.state.pa.us/k12/lib/k12/scitech.pdf>, p. 26). Standard statements C, D, and E emphasize identification and application of basic computer operations, use and application of basic computer software, and identification and application of computer communications systems, respectively.

Policy to Practice
The Standards Connection



Dennis Walters teaches 6th grade Reading, 7th grade Word Processing, and 8th grade Computer Applications at Knoch Middle School in Butler County. He received his graduate degree in Education from Temple University and performed his student teaching at a public middle school in Philadelphia. The following is a brief description of a lesson he recently taught to his 6th grade gifted students that incorporated the use of technology.

Medieval Story-Telling Unit

"Students picked a character and developed a story as if they were living in Medieval times. Students were required to pick two facts about Medieval times and use Microsoft Word to present their facts in an interesting and appealing way that incorporated at least one graphic. Students were required to research food and prepare a dish, as authentic as possible. The objective of the unit was for students to accurately interpret life in Medieval times. The students used the internet and Microsoft Office, in a lab setting, to support their learning."

The following Pennsylvania Academic Standards for Science and Technology (PASST) may be applied to the unit described above:

- Demonstrate the effectiveness of image generating technique to communicate a story (3.6 Technology Education, B)
- Demonstrate age appropriate keyboarding skills and techniques (3.7 Technological Devices, C)
- Apply basic on-line research techniques to solve a specific problem (3.7 Technological Devices, E)

● *State assessments of students' progress in meeting technology standards are integrated into and aligned with state assessments of students' progress in meeting content standards*

● *State assessment strategies exemplify effective use of technology for assessment*

Currently, the PSSA tests students in math, reading and writing. The PSSA for Science, Technology, Environment and Ecology (STEE) will be

implemented in 2003-2004. Within the introduction to the already developed handbook for the STEE Assessment is the following: "In teaching to the Standards, many Pennsylvania educators follow the constructivist model of instruction. This attempt to provide a hands-on STEE program of instruction is to be commended"

(http://www.pde.state.pa.us/a_and_t/lib/a_and_t/STEEAssessHandbook.pdf).

However, the PSSA for STEE is by its own admission, not hands-on. In reviewing the sample items for this assessment, I found no specific questions that addressed computer technology.

● *State policies and procedures that provide tools and services used for improvement of student learning and assessment (added by author)*

As part of former Governor Ridge's Link-to-Learn educational technology initiative, programs such as Digital School Districts and Students Achieving Standards were designed to assist school districts in effectively using technology to improve student achievement

(<http://www.l2l.org/news/newsarticle.html?ID=124>).

In addition, Enhancing Education Through Technology (EETT) grants support schools in improving academic achievement through the use of technology

(http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=82197#OVERVIEW).

EETT funding has been divided into two grants: formula and competitive. The value of each grant is \$10.5 million.

In 2000, the Pennsylvania Department of Education selected the Microsoft Corporation to develop an all-access single entry point (i.e., portal) to all state government services. As a result of this endeavor termed PAMPowerPort, the Pennsylvania Department of Education, the Microsoft Corporation, eSchoolMall, LearningStation, and Lightspan.com partnered to develop the Connected Learning Communities Program (CLC). The CLC Program states as one of its major goals "the ability to enhance communication and collaboration between students, teachers and parents" (<http://www.iu13.k12.pa.us/tech/pport/>).

Cyber Start, administered by the PA Department of Community and Economic Development and the Department of Public Welfare, is a multi-year initiative aimed at providing technology programs for young children to ensure that they start school "computer-ready"

(<http://www.cyberstart.net/init.html>).

Pennsylvania's public libraries, school libraries and the State Library provide access to their resources (e.g., periodicals, reference materials) through Power Library (<http://www.powerlibrary.net/>). Another free resource for citizens of the State is Think.com. This tool, provided through a partnership between the Department of Education, the Tuscarora Intermediate Unit and Oracle Corporation, provides schools with a tool to build learning communities. These communities allow for teacher exchange of curriculum

and ideas as well as providing individual user spaces for students (<http://www.tiu.k12.pa.us/think/>).

The State actively participates in workforce development programs such as the Microsoft Office Specialist (MOS) certification program (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=87335), 3Com Net Prep (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50284), and the Oracle Internet Academies (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50298). The unifying theme behind these three programs is to provide students with practical knowledge and skills from companies in the Information Technology industry.

A: Overarching Question

How does the state ensure quality in student learning, assessment and usage of technology?

The State has developed Academic Standards and assessments (to be implemented in 2003-2004) for Technology. Measures to provide assistive technologies for learners with special needs are in place, and the state supports distance learning opportunities such as virtual schools. There are a wide variety of programs that target students' improvement in learning and provide tools and resources to support learning.

Suggestions

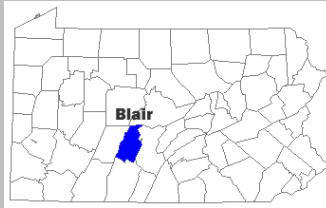
- Separate Academic Standards for Technology into its own content strand or fully integrate Technology Standards into other content strands or develop a method of cross-referencing Technology Standards as they apply to and can be integrated into other content areas
- The assessment for Science, Technology, Environment and Ecology, which will be in paper form, is a limited approach to assessing students' use and higher-order understanding of technology and technological tools. Incentives should be provided to districts to develop innovative assessment devices that actually "assess" students' use of technology. Local development of these assessments will allow for particular constraints faced by each district (e.g., hardware and personnel available).

B. STATE TECHNOLOGY STANDARDS, ASSESSMENTS, PROFESSIONAL DEVELOPMENT AND ASSISTANCE FOR TEACHERS, TEACHER EDUCATORS AND ADMINISTRATORS

- *State technology standards are set for all teachers and teacher educators*

- *State technology standards for teachers and teacher educators center on technology integration*
- *State technology standards for teachers and teacher educators are validated against national models such as ISTE standards for teachers and NCATE standards for teacher educators*
- *State technology standards for teachers are integrated into other state teacher standards and aligned with student technology and content standards*
- *State assessments of teachers' and teacher educators' progress in technology standards, based on integration into content areas, exemplify the effective use of technology for assessment*

Policy to Practice
Teacher Preparation



Jennifer DeHaven is a first-year teacher at Tyrone Elementary School in Blair County. She completed her bachelor's degree in education through Pennsylvania State University and currently teaches first grade.

During your pre-service coursework, were you required to take a course regarding technology and/or educational technology?

JD: I was not required to take a technology class.

In your other pedagogy/methodology courses, was the topic of using technology to approach teaching a variety of subjects part of the course(s)?

JD: Yes. In a science education class we created personal websites, as well as participating in computer-based communication in which we responded to journals. During our student teaching practicum we were *encouraged* to use technology.

Do you believe that your pre-service training (including student teaching) prepared you to integrate technology into your instructional practices?

JD: No, we were not required to take any technology courses and the little technology we used in the courses had no relevance to what I do now.

In what area (regarding educational technology) would you like additional support and/or training?

JD: I would like to learn more about the digital camera. I am required to teach "computers" for half of the school year, so I have training in areas such as Word and Print Artist. I could always use more ideas to integrate technology in my classroom, as well as being more familiar with children's software.

How often do you use technology in your classroom instruction?

JD: Once or twice a week.

For what subjects do you integrate technology into your teaching to greatest degree?

JD: Spelling, Writing, and Social Studies

No specific technology standards for teachers were found; however, the State Education Technology Plan (SETP) has identified strategic technology goals that include the dissemination of national technology standards to teachers and administrators

(http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=83373).

Currently, Pennsylvania's Code of Professional Practice and Conduct for Educators contains a brief statement in Section 3 about the need for teachers to keep current with research and technology

(<http://www.teaching.state.pa.us/teaching/cwp/view.asp?a=15&Q=76982&teachingNav=|1906|>).

In addition, the General Standards and Specific Program Guidelines for State Approval of Professional Educator Programs include technology in the Content and Performance sections. For example, Elementary Education certification candidates must demonstrate knowledge of content relating to the integration of technology into various subject areas such as Language Arts, Mathematics and Science. Performance requirements detail the specific knowledge candidates must gain through coursework, field experiences and student teaching. Section II C requires candidates to have experience with and content knowledge of "computer-mediated communications and emerging technologies including: audio-visual hardware and other presentation tools, productivity tools, internet searches and electronic mail"

(<http://www.teaching.state.pa.us/teaching/cwp/view.asp?a=6&Q=90674>).

The State has adopted the International Society for Technology in Education's (ISTE) National Educational Technology Standards for Teachers (NETS) for their administrators, but have yet to adopt NETS for teachers or students (http://cnets.iste.org/docs/States_using_NETS.pdf). Pennsylvania does have a partnership with the National Council for Accreditation of Teacher Education (NCATE) to conduct joint reviews of the State's colleges of education (http://www.ncate.org/partners/m_partners.htm). Of the 90 state-approved teacher education institutions, 21 are directly in the NCATE system.

Policy to Practice
Technology and Teaching: A vice-principal's perspective



Martha Perez is an assistant principal at Lewis Elkin Elementary School in the School District of Philadelphia. Elkin is a K-4 public school that serves approximately 1300 students. There are at least three computers and a printer in each classroom. The library, which serves as the computer lab, has approximately 30 computers. The school has internet access.

Does your school have a technology coordinator and/or other technology support personnel?

MP: We used to have one, our librarian, but we don't have the funding to continue paying our coordinator.

Does your school provide professional development opportunities for teachers regarding technology integration into instruction?

MP: In the past we had professional development for teachers, but because of our extended day program we haven't been able to schedule any PD during the week.

Do students use technology in the extended day program?

MP: Yes. They use the computers for homework help.

How often do you see technology incorporated into a teacher's lesson plans?

MP: I rarely see technology mentioned.

How are teachers assessed regarding their integration of technology into classroom instruction?

MP: Our teacher observation form (S-655) is used to assess teacher's performance in four areas: Personality, Preparation, Technique, and Pupil Reaction. Under the Technique section there is one line that addresses technology. The line reads, "Activity/Lesson incorporates the use of Technology, Equipment, and Materials in ways that engage all students and advance their development."

How many times a year do you assess your teachers using S-655?

MP: Tenured teachers get observed once (formally) and non-tenured teachers are observed twice.

What happens if a teacher is doing a lesson in which technology is not being used?

MP: It really depends on the administrator. Most administrators will give the teacher a 5 which means not-applicable. However, in our reading program students are using the computer for instruction every day in stations or small groups. If the curriculum required the use of technology and it was not being used, the teacher would probably receive a rating of 2 or 3 (1 = lowest rating and 4 = highest).

Do you consider this assessment system to be effective?

MP: I would like to see teachers observed more, at least 4 times per year.

Given the rating system for technology, do you think the assessment process, regardless of the number of times a teacher is observed, is fair?

MP: Not especially. I would like to see more teachers make better use of the computers in their rooms. However, the lack of training limits the use of what they're being given. Teachers need more training in how to use the computer and how to incorporate different software programs in their daily lesson planning. I would like to see more software programs that meet the needs of our ELL students.

On that note, pretend that your school just received a technology grant for \$100,000. How would you allocate the funds for your school?

MP: Professional Development.

All of it?

MP: We have a lot of resources. We have the technology. Our teachers are just not trained to use it effectively.

- *State assistance is provided for developing district and teacher education program professional development plans in technology usage, in students' safe and acceptable use of technology, and in copyright and intellectual property issues*

SETP has set objectives for providing professional development opportunities to be required in all grant programs. In addition, the State plans to identify partnerships through which high-quality professional development programs can be provided and also encourages local educational agencies to provide incentives for professional development/continuous learning (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf). Goals have also been established for evaluating and improving the technology components of teacher education programs.

Currently, the State has several initiatives to provide teachers with ongoing professional development opportunities regarding educational technology. Three GIS workshops were funded by the Office of Educational Technology (OET) in conjunction with the California University of Pennsylvania, Shippensburg University and Wilkes University (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=78984). The State offers teacher training in standards-based internet lessons through MarcoPolo (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50270). The Pennsylvania Educational Technology Expo and Conference, a joint effort between ConnectTech/PA Tech Ed Expo, the PA Educational Technology Conference, the PA Association for Educational Communication and Technology, the PA Department of Education, and the PA Intermediate Unit Instructional Materials Services Directors, is scheduled for 2004 (<http://www.petc.org/>).

The State provides access to the PA EdTech Mailing list, a listerv that provides news and announcements regarding educational technology in the State. The Technology Practices Exchange (TPE) was launched in January 2003 to provide educators with a "share-house" of educational technology practices and programs (<http://www.l2l.org/tpe/>).

Guidelines for creation and revision of Internet Safety Policies (ISP) are provided on the State website as well as extensive resources related to the Children's Internet Protection Act (CIPA). State incentives for development of ISP are connected to provisions of E-rate funding (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?a=169&q=87720).

The State has partnered with the Mid Atlantic Regional Technology in Education Consortium (MAR*TEC) to evaluate the effectiveness of teacher preparation programs regarding the integration of technology (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50340).

- *State financial incentives for professional development include administrators and state-level leaders*

Technology Leadership Academies have been developed for superintendents, principals, and school board directors and business leaders (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50921). Competitive grant components are to be provided for the creation of “effective technology leadership models” (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf). Grants are also to be provided to Institutes of Higher Education for the development and inclusion of technology components in their teacher and administrator preparation programs (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

- *State financial incentives for professional development emphasize technology integration and student assessment*

SETP includes set objectives for providing professional development opportunities to be required in all technology-related grant programs (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

- *State financial incentives for professional development emphasize districts with unusual challenges, such as urban and rural settings and impoverished communities*

No evidence found specific to professional development.

- *State support for professional development includes aid for exemplary technology usage in professional development (e.g., virtual communities-of-practice and distant mentoring) and increased time for educators’ planning*

As mentioned above, TPE provides teachers with a “share-house” of effective educational technology practices and programs (<http://www.l2l.org/tpe/>). In addition, teacher participants in relevant workshops regarding educational technology will be provided with ACT 48 credits (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

- *State supports technical training programs for school and district technology coordinators, teacher education program faculty, and instructors of content courses for teachers*

No specific evidence was found regarding technical training programs. However, according to SETP, 82% of districts have technology coordinators. Of the 2,684 school buildings in the state, technical expertise (by percent of schools) is available in the following categories: computer repair (71%),

telecommunications (47%), network wiring (59%), and network administration (65%)

(http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

● *State provided regional technology centers aid all educators (including instructors of content courses for teachers), including providing quality reviews and adoption guidelines for digital resources*

The State has 29 regional Intermediate Units (IU) to provide technology resources and services to schools

(<http://www.teaching.state.pa.us/teaching/cwp/view.asp?a=7&q=88112>).

B: Overarching Question

How does the state ensure quality in teaching and administration?

Technology standards for teachers have not been developed by the State and assessment for teachers' integration of technology into instruction is the responsibility of local districts. There are many resources and programs available for teachers' and administrators' professional development and an evaluation of teacher preparation programs has been conducted. Regional technology centers are in place throughout the State.

Suggestions

- Develop state technology standards for teachers based on national models.
- Provide guidelines for local districts to create their own assessments and evaluations of teachers regarding technology integration into instruction.
- Target funds to support technical training for technology coordinators and/or "de facto" technology coordinators (e.g., math teacher serving as a school's technology lead).

C. STATEWIDE SUBSIDIZED ELECTRONIC NETWORK LINKING DISTRICTS AND OTHER STAKEHOLDERS FOR INFORMATION EXCHANGE, COLLABORATION AND DISTANCE EDUCATION

● *Network Capabilities (heading created by author)*

● *Statewide School Access (heading created by author)*

A consortium of 16 companies (PA Team), led by Adelphia Business solutions, was selected to develop a statewide network. The Commonwealth Telecommunications Services (CTS) Project, undertaken by PA Team, provides services that include: centralized network security, support systems, network management, service agreements and multiple high speed

internet connections

(<http://www.keycomm.state.pa.us/keycomm/cwp/3904>). All public schools and school districts receive discounted pricing (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?a=3&q=63297) which can be offset through the use of E-rate funds. Since 1998 Pennsylvania's schools and libraries have received more than \$300 million in discounts through the E-rate program (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf). The Department of Education provides extensive online resources and offers workshops for school districts seeking to maximize E-rate funding (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?a=3&Q=65705&ed_techNav=|3363|&ed_techNav=|4217|835|). Currently, 88% of schools in PA have internet access and 72% of schools have internet access at a speed of T1 or greater (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

The Link-to-Learn (L2L) initiative provided funding for development of the Pennsylvania Education Network (PEN), a unified collection of community-based networks (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf). Additional communication between the Department of Education, the educational community and the public is fostered through various methods which include: listserves, forums, conferences, teleconferences, and media releases, among others (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

C. Overarching Question

Has the state developed a capacity for information exchange, resource sharing and collaborative action among multiple stakeholders at all levels?

The State has developed a consortium of companies from throughout the State to develop a sophisticated telecommunications network. Access to the network for schools throughout the State is not at 100%, but additional funding methods for districts not currently connected are available.

Suggestions

- Access to the statewide network for every school should be, or remain, a high funding priority for the State, beyond reliance on federal funding.
- Emphasis on access, which most likely translates to economically disadvantaged schools in urban and rural settings, should be supplemented with positively disproportionate funding for training and technical support.

D. STATEWIDE PROGRAM PROVIDING DATA OR ADMINISTRATIVE SYSTEMS TO DISTRICTS (E.G., FISCAL DATABASES, STUDENT ASSESSMENT RESULTS)

● *Assessment Results (heading created by author)*

The State provides access through the Pennsylvania Department of Education (PDE) website to School Profiles that provide data regarding state, district and school demographics and performance (<http://www.paprofiles.org/>). Visitors to the site have the option of printing custom reports by selecting indicators, schools and districts. Disaggregated data are also shown based on Title 1, gender, race/ethnicity, IEP, Limited English Proficient Students, Migrant Students and Economically Disadvantaged Students.

● *Fiscal Systems*

PDE, in partnership with volunteer schools from across the state, developed “Your Schools, Your Money” (YSYM) to disseminate school data to the public (<http://www.yourschoolsyourmoney.ed.state.pa.us/PublicOverview.asp>). The strategy of YSYM focuses on three key areas: 1) presenting non-financial information about each category of costs, 2) showing graphic displays of data and 3) collecting direct input from the districts providing data. Data are collected from PDE sources such as, but not limited to: the Annual Financial Report, School Profile Data Collection Forms, the Public School Enrollment Report, and the Public School Support Staff Report (<http://www.yourschoolsyourmoney.ed.state.pa.us/DataSources.asp>).

D: Overarching Question

Does the state provide districts with aggregated, synthesized information on which to base educational policies and decisions?

The State provides PSSA data through its website and provides districts with flexibility in customizing data for their own purposes. PDE also provides fiscal summaries and data in formal and informal ways through its partnership with schools across the State.

Suggestions

- In line with the “Your Schools, Your Money” initiative, the State should expand the current resources provided (e.g., PDE site has information targeted at parents regarding what PSSA scores mean) for understanding and interpreting PSSA results. This might include, but not be limited to, workshops for teachers and parents on data interpretation.

E. STATE GUIDELINES FOR TECHNOLOGY-RELATED FACILITIES DESIGN, EQUIPMENT, SOFTWARE, CONNECTIVITY AND INFRASTRUCTURE; STATEWIDE CONSORTIUM PURCHASING PROGRAMS (DISCOUNTS FOR LARGE-SCALE ORDERS) AND FUNDING SUPPORT FOR TECHNOLOGY ACQUISITION

- *State has established a program for hardware, software and online services purchasing, with discounts for large-scale orders*
- *State technology purchasing guidelines stress evolutionary, strategic approaches in developing infrastructures for new and existing facilities and for installations of equipment, software and connectivity*
- *Based on advances in technology, technology purchasing guidelines and infrastructure standards for facilities, equipment, software and connectivity are regularly updated*

The State utilizes the services of PEPPM, powered by Epylon Corporation, to provide a bid and buy site for schools to purchase technology products. The awarding institution for PEPPM is the Central Susquehanna Intermediate Unit (<http://www.peppm.org/pa/default.htm>). The Lancaster-Lebanon Intermediate Unit (IU 13) has established a statewide software discount program for schools. Software may be purchased at the district or school level at reduced prices by visiting IU 13's website (http://www.iu13.k12.pa.us/tech_software_main.shtml).

Technology management and support for all government agencies is the responsibility of the Office of Information Technology (OIT). OIT has established guidelines for desktop software and hardware to maintain continual and fiscally responsible upgrades to computer systems within government agencies. It is not clear how directly or indirectly OIT works with the Office of Educational Technology (OET). OIT's website was not easily navigable and many dead links were encountered. The Commonwealth's Telecommunications Services Project (CTS) includes telecommunications installations and upgrades for government agencies, including schools. One of the major projects in the State's ongoing network development and support process is the Keystone Communications Project (<http://www.keycomm.state.pa.us/keycomm/cwp/view.asp?A=3&Q=70815>). Unfortunately, detailed information about KCP was unavailable due to problems experienced with the OIT website.

- *State technology infrastructure standards are integrated with districts' and teacher education programs' educational plans*

Link-to-Learn (L2L) funds were provided for six higher education initiatives that included Infrastructure Investment, Integrating Technology into Teacher Preparation and Improving Technology at Colleges and Universities (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50179).

- *Extensive state financial support is offered for hardware, software and online services purchasing*

Many of the competitive grant programs previously mentioned target hardware, software and online services purchasing. However, the State's emphasis on acquisition of technology has shifted to awarding funds for programs that support students' attainment of academic standards (http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf).

- *State financial incentives for technology and infrastructure development emphasize districts with unusual challenges, such as urban and rural settings and impoverished communities*

Under the School Renovation, IDEA, and Technology Grant, \$44 million was awarded to local education agencies (LEAs) to help rural and economically disadvantaged schools meet renovation-related technology expenses (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50186). In order to bring technology and high-speed internet access to low-income residents, the State issued more than \$3.38 million in Digital Divide Grants (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=87258). These grants were distributed to organizations, including LEAs, that provide technology training to low-income populations.

As part of Pennsylvania's Space Grant program (funded through NASA), the Pennsylvania Space Grant Consortium developed a computer recycling program: SCROUNGE. SCROUNGE collects equipment from donors and places the technology in schools, non-profit organizations, community groups and individual homes throughout the State (<http://www.psu.edu/spacegrant/scrounge.html>).

E. Overarching Question

Does the state aid districts in designing and purchasing their technology infrastructure?

The State provides resources and services to schools for purchasing software and hardware at discounted rates. There is limited support and guidance for strategic infrastructure development beyond purchasing equipment. Financial incentives for purchasing technology infrastructure are included in many state grants and can be supplemented by federal funds.

Suggestions

- Publicize and provide incentives for local school leaders to utilize resources like e-Tech planner for creating technology plans which stress infrastructure development.

- Provide models for districts and local schools to follow.

F. STATE-SPONSORED RESEARCH AND EVALUATION OF EDUCATIONAL TECHNOLOGY INITIATIVES; DEVELOPMENT OF EDUCATIONAL TECHNOLOGY DEVICES, APPLICATIONS AND APPROACHES; DISSEMINATION AND ADAPTATION OF EDUCATIONAL TECHNOLOGY

- *Systematic state-sponsored research is based on analyses from statewide database; policy decisions are based on research syntheses*
- *State systematically evaluates technology initiatives, including collection of evaluations from other sources and usage of analyses from statewide database; outcomes inform policy decisions*

Data specific to the implementation and integration of technology into schools is collected from school districts through the Pennsylvania Technology Inventory (PATI). Schools and local education agencies (LEAs) can enter data directly into the database. These data are posted on the state website to provide an analysis of technology at the local, regional and state levels

(http://www.pde.state.pa.us/ed_tech/cwp/view.asp?Q=50396&A=169) and (<http://pa.ontargetus.com/>).

In addition to PATI, the Office of Educational Technology (OET) conducts research studies – related to teaching and learning as well as analyses of grant programs – and presents the data to the public through its website (http://www.pde.state.pa.us/ed_tech/cwp/browse.asp?a=169&bc=0&c=26855&ed_techNav=|3779|&ed_techNav=|4217|). Several evaluations currently provided by OET include: Students Achieving Standards, Technology Integration in Preservice Teacher Programs at Pennsylvania Colleges and Universities, and the Educational Technology Impact Analysis (1999).

- *State provides incentives for districts to apply as designated testbeds for innovation, evaluation*

In 1997, under the Link-to-Learn (L2L) initiative, over \$4 million in funds went to Technology Testbeds Projects (<http://l2l.org/L2L/>). The State continued its funding of innovative technology programs in 2000 by selecting three school districts to become “Digital School Districts.” The goals of this initiative are to:

- develop a new educational paradigm enabled by technology and systematic reform
- increase student achievement related to Academic Standards
- increase the appropriate and effective use of technology in teaching, learning, and managing schools

- bridge the digital divide within communities
- develop partnerships with world-class companies and education institutions
- serve as a model to other schools for the innovative use of technology

http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50172

● *State provides vendors with guidelines on desired services, applications and assistive technologies*

● *State offers vendors incentives for developing desired services and applications as well as for involving local teachers in adapting standards-based software*

The Assistive Technology Act of 1998 includes a policy mandating universal design in products and the built environment (<http://thomas.loc.gov/cgi-bin/query/z?c105:S.2432.ENR:>).

● *State sponsors educational technology development, including distance education, as well as participation in consortia for this purpose*

Pennsylvania is a member of the Satellite Educational Resources Consortium (SERC) (<http://www.serc.org/about/>).

● *State systematically disseminates information on transfer and adaptation of innovations via technology service centers and state electronic network*

In addition to the State's Intermediate Units and dissemination of information across the PDE website (which have already been mentioned), PA has created the Technology Practices Exchange (TPE). TPE is an online forum for educators to "share effective and innovative strategies for integrating technology" (http://www.pde.state.pa.us/ed_tech/cwp/view.asp?Q=87391&A=169). TPE was launched in January 2003, but has yet to reach a wide audience.

Policy to Practice
Technology Practices Exchange: A test case

The Technology Practices Exchange (TPE) was launched by the Pennsylvania Department of Education's Office of Educational Technology (OET) on January 15, 2003. TPE is an online forum developed to provide a central venue for Pennsylvania educators to share "effective and innovative" strategies for technology integration in teaching and learning.

Visitors of the site have the option to search for technology practices or to submit their own technology practices. Submission of a practice involves completing a form whereby the teacher provides contact information, categorizes the entry, and then writes a summary of the idea within a set character limit.

As I was doing research for this paper, I came across TPE and decided to submit a practice of my own for two reasons: 1) I am a Pennsylvania school teacher and 2) OET was offering free software to the first 50 people who submitted an approved strategy. Even though TPE was nearly two months old at the time I visited, only eight submissions were posted. I submitted a lesson regarding the use of PowerPoint as a creative writing tool, a lesson I used for several years with sixth graders in Philadelphia. The lesson is not revolutionary and perhaps not extremely innovative, but I always found it to be effective.

I waited for a week and checked TPE again to see if my lesson was approved and posted. It was not and the original eight entries were the only ones posted. A month went by and I checked again. Same result. I began to think that my submission was not worthy of posting, but the fact that only the original eight submissions were posted provided me with a modicum of comfort.

It is now more than two months since I submitted my lesson and TPE still only contains the original eight entries.

So what is the point of this brief excursion from policy? Well, it is not to complain. TPE is an excellent "idea." It is a well-publicized "idea" on the OET website. However, the idea and the reality are two different things. Here are my suggestions:

- 1) Make TPE more user-friendly by allowing educators to submit attachments of lesson plans and strategies rather than making them type a very limited summary.
- 2) Stress communication. Providing one's email address is not enough to motivate most teachers to contact each other. Perhaps an asynchronous discussion board would entice teachers to participate more fully.
- 3) Gather a sample of educators to pre-populate the site with 100 or more entries.
- 4) Publicize the site locally as well as on the OET site.
- 5) Maintain the site in order to prevent PA educators from including a negative review of TPE in a research paper.

● *State research, development and dissemination initiatives emphasize technological innovations that could improve equal educational opportunity*

No specific evidence was found regarding research and dissemination initiatives; although many funding initiatives mentioned above include provisions for awards to districts of high need.

F: Overarching Question

How does the state provide support for the effective usage and evolution of educational technology resources?

The State conducts evaluations of its technology initiatives and collects data from its schools regarding technology integration. Innovative methods for technology integration are supported and sponsored by the State. The State,

based on research limited to the scope of this paper, does not leverage its position with vendors in requesting desired services in exchange for incentives.

Suggestions

- Approved technology vendors should be utilized as partners in supporting and developing innovative resources for testbed sites and for targeting areas of need such as urban and rural settings.
- Statewide funding should be allocated for the creation of technology committees in every school where one responsibility of each committee would be to keep abreast of state resources and funding opportunities for purposes of dissemination throughout the schools.

G. STATE STRATEGIC PLAN FOR EDUCATIONAL IMPROVEMENT, INCLUDING TECHNOLOGY; STATE FUNDING FOR EDUCATIONAL TECHNOLOGY PLANS AND INITIATIVES

● *State Strategic Plan and Local Strategic Plans (heading created by author)*

In his "Plan for a New Pennsylvania," (PNP) Governor Rendell addresses the "startlingly low student performance" and the need to prepare the state's students for prosperity in the 21st century (<http://www.state.pa.us/budget/cwp/view.asp?a=3&q=433002&budgetNav=1>). Rendell's PNP includes a section dedicated to education strategies entitled "Choosing Success for our Children"

(<http://www.state.pa.us/budget/cwp/view.asp?a=1100&q=432988&budgetNav=1>). The education plan, in line with No Child Left Behind, establishes three guiding principles for the State's role in education: 1) funding of proven academic programs, 2) holding schools accountable for results, and 3) providing assistance for troubled schools and districts. Basic Education Funding under the new plan is proposed at \$5.7 billion.

Funding is targeted at three separate initiatives. To ensure that children start their schooling right and are reading at level by grade 4, \$687 million is dedicated to The Early Childhood Education Investment Fund. The second major funding initiative, The Student Achievement Fund, targets \$455.5 million to assist schools in helping their students achieve the State standards. The third initiative aims to make sure schools are achieving results by providing incentives through the Rewarding Results Fund. \$71.4 million will be provided to create a performance-driven culture within the State's schools

(<http://www.state.pa.us/budget/cwp/view.asp?a=1100&q=432988&budgetNav=1>).

PNP does not explicitly mention the use of technology in improving students' learning or its role in preparing students for the 21st century workplace.

The State requires that each school district, area vocational-technical school and charter school prepare and submit a six-year strategic plan. The strategic plan must clearly define how the district or school will incorporate standards into the curriculum. Guidelines for creation and submission of the strategic plans are provided by the State

(<http://www.teaching.state.pa.us/teaching/lib/teaching/StrategicPlanningGuidelines3-03.pdf>).

● *State Education Technology Plan (heading added by author)*

The current State Education Technology Plan (SETP), effective over the period of July 2002 to June 2005, identifies the State's mission and vision as follows:

Mission

- To ensure the effective utilization of technology throughout the educational environment
- To foster high-quality professional development programs for technology applications in education
- To graduate students capable of thriving as productive citizens in a high-tech society

Vision

- For the successful integration of technology into all aspects of the educational process – administratively, pedagogically, and scholastically
- For the mastery of Academic Standards via enhanced education through technology applications
- For the universal adoption of technology into the culture of the educational community

(http://www.pde.state.pa.us/ed_tech/lib/ed_tech/PASateTechnologyPlan2002.pdf)

Each school district in the State is provided with and required to use an on-line planning tool to develop technology plans. The tool, eTechPlanner, provides support for drafting a technology plan and budgeting for technology expenses

(http://www.pde.state.pa.us/ed_tech/cwp/view.asp?A=169&Q=50389).

SETP was developed by a nine-member advisory committee in conjunction with the Office of Educational Technology (OET) staff. The State's eTechPlanner provided a model for SETP. SETP identifies seven goals with specific objectives and action steps connected to each goal. The seven goals of SETP relate to the following: Leadership, Teaching, Learning, Infrastructure, Resources/Content, Accountability, and Support. The plan will be evaluated throughout its three-year implementation to ensure that the goals continued to be addressed and achieved.

G: Overarching Question

Does the state make strategic investments in improving education through technology?

The current priorities described in Governor Rendell's strategic plan for education in Pennsylvania do not explicitly mention technology; however, the state education technology plan is very clear in stating the mission and objectives for the State. Based on past and ongoing efforts, the State appears to place high priority and emphasis on technology integration in education.

Suggestions

- Give priority to applicants of grants whose proposals include the teaching of various content areas through innovative and effective uses of technology.

POTENTIAL IMPROVEMENTS TO THE ANALYSIS/WORK TO BE DONE

The analysis was done through the course of one semester using only resources available online. Although there are many components of the analysis that are beneficial to a state-level policy-maker, much of the analysis' creativity is experimental. I suggest the following items to continue and improve the analysis:

- creation of a more scientific rubric for assignment of coding scheme
- collaboration with state officials to provide additional information not readily available through the state website
- expansion of the vignettes to focus on items/indicators within each category and to include interviews with state-level directors, directors of the State's intermediate units, and local technology coordinators/teachers
- analysis extended to include summaries of the current interrelationships between policies within and across categories

