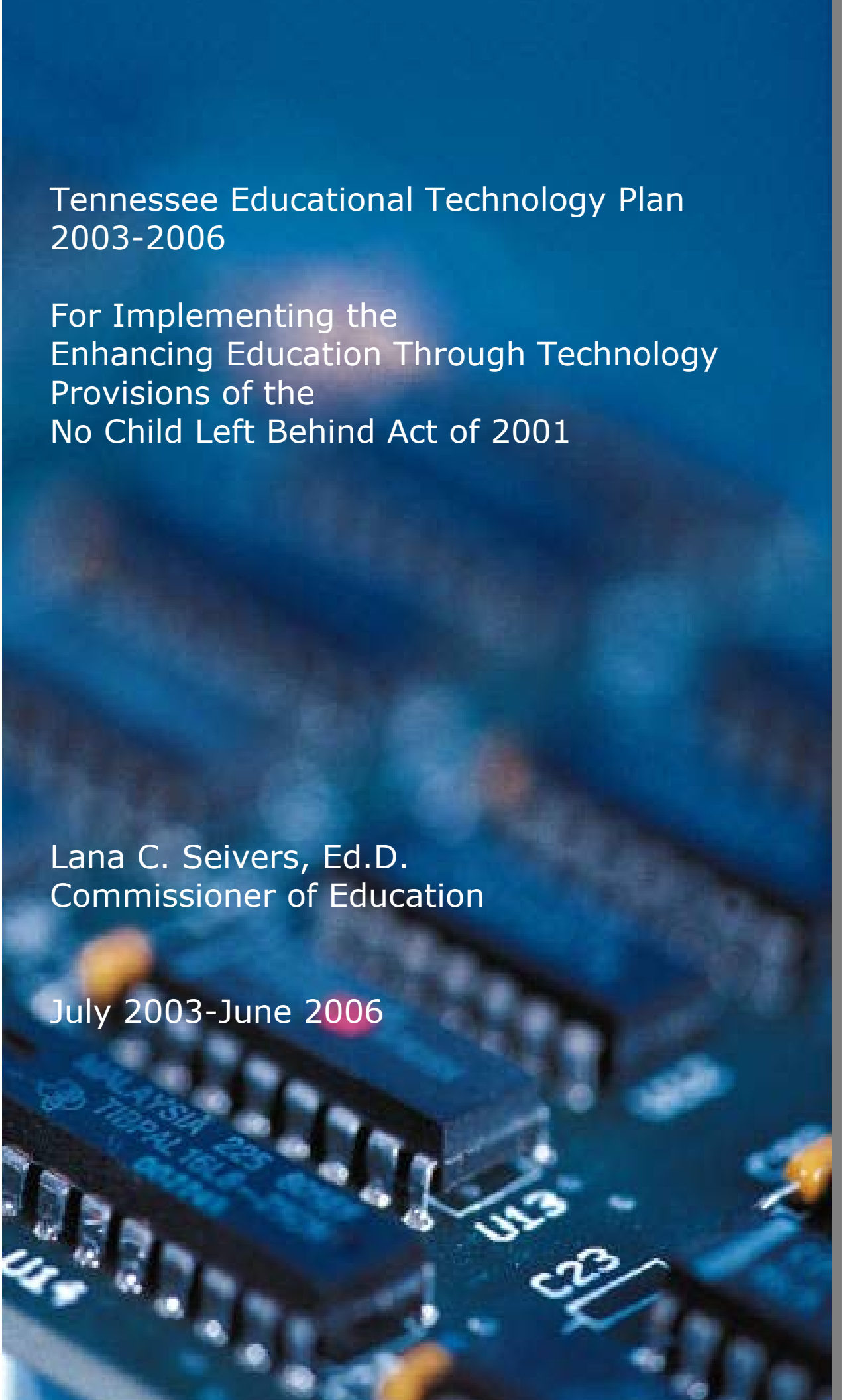
Tennessee Educational Technology Plan 2003-2006

For Implementing the
Enhancing Education Through Technology
Provisions of the
No Child Left Behind Act of 2001

Lana C. Seivers, Ed.D.
Commissioner of Education

July 2003-June 2006



This document was presented as an Action Item (First Reading) to the Tennessee State Board of Education at the April 23, 2004 meeting. The Board passed a motion to accept it without question or further discussion. The Plan will be presented for Second Reading and approval by the Board at the scheduled August 27, 2004 meeting.

Submitted by
Department of Education Technology Plan Committee
Tennessee Department of Education
710 James Robertson Parkway
6th Floor Andrew Johnson Tower
Nashville, Tennessee 37243

Chair: Jerry Bates, Director of Applied School Technology
Co-Chair: Brenda Staggs, Coordinator Special Programs
With help from Lisa Cothron and Morgan Branch

Critical Friends:
Debbie Browne (SDE Federal Programs Consultant), Tom d'Apolito (SDE Vocational Education), Helen Gooch (Montgomery County Schools), Jim Idol (Knox County Schools), Deborah Lowther (University of Memphis), Belinda Moss (Williamson County Schools), Linda Poteat (Bristol City Schools), Kay Sapp (SDE Comprehensive School Reform), Lynn Tucker (Gibson County Schools), Jubal Yennie (Education Consultant)

Table of Contents

Appendices

Executive Summary

This Strategic Educational Technology Plan for the State of Tennessee responds directly to the U. S. Department of Education's (USDoE) rule that state applications for Title II Part D funding under the No Child Left Behind Act must have statewide long-range strategic technology plans for K-12 education. Guidance from the USDoE Office of Technology requires the technology plan to address fifteen specific elements. These elements structure the outline for Tennessee's current plan. (NCLB Title II Part D, § 2413)

To prepare the plan, the Tennessee Department of Education comprehensively reviewed the status of educational technology in Tennessee. The Tennessee State Board of Education's goals for technology generally align with those in Title II Part D, Enhancing Education through Technology (EdTech). Universal access to the Internet is a reality in Tennessee schools. A new annual statewide school technology survey collects key information useful for baseline information and strategic planning.

To meet the ambitious federal goal that technology be fully integrated into the curricula and instruction of all schools by December 31, 2006, the most significant challenge is to provide ongoing, sustained high quality professional development that results in teachers adopting uses of technology that improve student learning. All school districts receive formula-based funding for technology from EdTech. The law earmarks one-fourth of the formula money for professional development. The state builds local capacity for professional development by funding technology coaches in schools that receive competitive grants from EdTech's discretionary funds. A cooperative agreement with the USDoE makes it possible to conduct state-of-the-art research on the effectiveness of the state EdTech program. The long-term strategy includes a pilot program in 2005 to Orchestrate Regional Bases Integrating Technology (ORBIT). The ORBIT centers will provide a region's districts with professional development that focuses on integrating technology into teaching practice to improve student learning.

Current state law requires a technology course for high school graduation. Federal law expects eighth graders to be technology literate. In line with the 2003 State Board Master Plan, this educational technology plan also adopts the eighth grade technology literacy expectation. All district technology plans must address the issue. At this time, the state plan does not recommend adding technology literacy to the current comprehensive student assessment program. Instead, the plan develops models for authentic assessment of student technology literacy and uses technology performance tasks in its project evaluation strategy. The state uses an annual technology survey to collect student technology literacy information.

The plan recommends that technology literacy be required for renewal of teacher licensure. To ensure that technology is being used to enhance student learning, the state's key approaches are embedded professional development, increased access, technology literacy for students and educators, and state-of-the-art research.

Foreword

This Strategic Educational Technology Plan for the State of Tennessee is prepared in direct response to the U. S. Department of Education's stipulation that a state's application for Title II Part D funding under the No Child Left Behind act must be accompanied by a statewide long-range strategic educational technology plan. Guidance from the USDoE Office of Technology requires the technology plan to address fifteen specific elements. These elements comprise the structure for Tennessee's current plan. (NCLB Title II Part D, § 2413)

In preparing this plan, the state Department of Education undertook a comprehensive review of the state of educational technology. Beginning with the State Board of Education's Master Plan, the authors conducted a fact-finding analysis of current conditions both within the department's organization as well as those in the school districts in Tennessee.

Using Chris Dede's *State Policy Framework for Assessing Educational Technology Implementation* (co-sponsored by the National Science Foundation, the Benton Foundation, the Council of Chief State School Officers, and NEIR*TEC)[1], a department-wide survey was devised and all divisions within the department were surveyed in early 2002. From the survey, it was clear that a patchwork of technology initiatives existed within the department. It was further clear that most divisions responded to the survey with perceptions that technology was primarily an administrative tool, as properly befitting their respective responsibilities.

Thus, a more comprehensive, school-based statewide survey was undertaken with the 2002 debut of Tennessee's first online technology survey, EdTech Online Technology Evaluation (E-TOTE). E-TOTE was devised from work pioneered at the Maryland Department of Education and adapted by the Mississippi Department of Education, both of whom generously permitted Tennessee to use whatever survey components were desired.

Since the state previously used the School Technology and Readiness (STaR) chart rubric as part of the needs assessment for its competitive technology grants under the Technology Literacy Challenge Fund (TLCF) program, these items were added to E-TOTE. The STaR Chart is a tool for planning and assessing school technology readiness. Originally designed by the CEO Forum, the STaR Chart that Tennessee adopted was customized by the Texas Department of Education who also generously shared their work with Tennessee. (The STaR Chart adopted in Tennessee contains twenty-one items that describe the school's teaching and learning, educator preparation and development, the administration and support services, and the infrastructure for technology. Each item has four implementation levels: early tech, developing tech, advanced tech, and target tech. Schools use the STaR Chart to report their level of technology readiness. The entire STaR Chart is available in Appendix B.)

As with other states, Tennessee eagerly anticipated the release of the U. S. Department of Education's National Technology Plan mandated under the No Child Left Behind act, in order to ensure that the state plan be aligned with the national plan. As of this writing,

[1] http://www.neirtec.org/statepolicy/documents/chart0112.pdf

the national plan is still a work in progress. Rather than delay the state plan, work was undertaken in earnest to generate a new strategic educational technology plan for Tennessee.

The authors are grateful to all the parties within the department who have replied to incessant questions and have clarified partial understandings. No less important to the final form of the document is the constructive criticism provided to the authors by a committee of "critical friends" who were convened in a day long work session to provide their perspective.

The Department recognizes that the release of this strategic plan is the beginning of what must be a more extensive, incisive, and ongoing dialog with stakeholders. A comprehensive survey of the ways in which technology is actually used in the classrooms across the state is still needed. The state also needs to identify best practices and the most promising uses of technology in Tennessee's K-12 schools. The state is mindful that the most popular uses of technology are not necessarily the most successful in terms of raising the levels of student learning.

One set of tools for evaluating the impact of technology is expected to come from the scientific research study that Tennessee has undertaken. Another possible set of tools will come from the data collection instrumentation work of the national organization of state educational technology directors. When appropriate tools are available, the state will incorporate their use into the accountability requirements for the use of the Title II Part D formula funds at the district level.

Policy makers and taxpayers alike are justified in expecting that their investment in educational technology benefit the ways students learn in Tennessee schools. The informal action research represented by publications such as the ATEC response to Larry Cuban's *Undersold and Overused* are helpful in starting the dialog. Tennessee was honored that three[2] of the nine authors *How to Ensure EdTech Is Not Oversold and Underused*, edited by Arthur Sheekey, are Tennessee public school teachers hard at work helping fellow teachers learn to integrate technology into their practice. After studying the essays in this book, Larry Cuban wrote in his Foreword:

> The notion that the computer is a learning tool is firmly planted in the language used to describe new technologies; yet integrating the tool into the daily repertoire of teachers remains the ultimate challenge. … In the minds of both practitioners and policy makers, the individual teacher remains the dominant and sole reason why new technologies fail to be used frequently and imaginatively for classroom instruction. Organizational and political structures within and without the school continue to be ignored as substantial factors that help shape daily teaching. (pp ix-x)

These words issue a challenge to policy makers and education leaders: how do we use organizational and political structures both within and without the school to help shape daily teaching? The goal of the Tennessee Department of Education is to craft strategies to tackle that challenge as it undertakes to prepare the next version of this Strategic Educational Technology Plan.

[2] The three technology coaches are Diane Bennett (Mt. Juliet High School), Mary Haney (Ida B. Wells Academy, Memphis, TN) and Elaine B. Wilkins (Ida B. Wells Academy, Memphis, TN)

Legislative mandate for state educational technology plan

Section 2413 of the No Child Left Behind act lists what must be included in the state educational technology plan. The legislative language is presented here in its entirety as a framing reference. [3]

SEC. 2413. STATE APPLICATIONS.

(a) IN GENERAL- To be eligible to receive a grant under this subpart, a State educational agency shall submit to the Secretary, at such time and in such manner as the Secretary may specify, an application containing a new or updated statewide long-range strategic educational technology plan (which shall address the educational technology needs of local educational agencies) and such other information as the Secretary may reasonably require.

(b) CONTENTS- Each State application submitted under subsection (a) shall include each of the following:

(1) An outline of the State educational agency's long-term strategies for improving student academic achievement, including technology literacy, through the effective use of technology in classrooms throughout the State, including through improving the capacity of teachers to integrate technology effectively into curricula and instruction.

(2) A description of the State educational agency's goals for using advanced technology to improve student academic achievement, and how those goals are aligned with challenging State academic content and student academic achievement standards.

(3) A description of how the State educational agency will take steps to ensure that all students and teachers in the State, particularly students and teachers in districts served by high-need local educational agencies, have increased access to technology.

(4) A description of the process and accountability measures that the State educational agency will use to evaluate the extent to which activities funded under this subpart are effective in integrating technology into curricula and instruction.

(5) A description of how the State educational agency will encourage the development and utilization of innovative strategies for the delivery of specialized or rigorous academic courses and curricula through the use of technology, including distance learning technologies, particularly for those areas of the State that would not otherwise have access to such courses and curricula due to geographical isolation or insufficient resources.

(6) An assurance that financial assistance provided under this subpart will supplement, and not supplant, State and local funds.

(7) A description of how the plan incorporates teacher education, professional development, and curriculum development, and how the State educational agency will work to ensure that teachers and principals in a State receiving funds under this part are technologically literate.

(8) A description of—

(A) how the State educational agency will provide technical assistance to applicants under section 2414, especially to those applicants serving the highest numbers or percentages of children in poverty or with the greatest need for technical assistance; and

(B) the capacity of the State educational agency to provide such assistance.

(9) A description of technology resources and systems that the State will provide for the purpose of establishing best practices that can be widely replicated by State educational agencies and local educational agencies in the State and in other States.

(10) A description of the State's long-term strategies for financing technology to ensure that all students, teachers, and classrooms have access to technology.

(11) A description of the State's strategies for using technology to increase parental involvement.

(12) A description of how the State educational agency will ensure that each subgrant awarded under section 2412(a)(2)(B) is of sufficient size and duration, and that the program funded by the subgrant is of sufficient scope and quality, to carry out the purposes of this part effectively.

(13) A description of how the State educational agency will ensure ongoing integration of technology into school curricula and instructional strategies in all schools in the State, so that technology will be fully integrated into the curricula and instruction of the schools by December 31, 2006.

(14) A description of how the local educational agencies in the State will provide incentives to teachers who are technologically literate and teaching in rural or urban areas, to encourage such teachers to remain in those areas.

(15) A description of how public and private entities will participate in the implementation and support of the plan.

[3] http://www.ed.gov/policy/elsec/leg/esea02/pg35.html

Title II Part D, Section 2413(b)

1. Strategic Outline

In the 2003 Master Plan for Tennessee Schools, the Tennessee State Board of Education presents the following vision:

> Our vision is that all children enter school ready to learn and become fluent readers, learn challenging subject matter, access information, and solve problems. Teachers are highly qualified, hold high expectations for all students and use multiple teaching strategies and technologies to ensure that all students learn. Teachers and school leaders have opportunities for continuing professional growth, enabling them to meet the needs of diverse learners. Schools, students, families and communities form partnerships to improve continuously the learning experiences of all students. A variety of assessments and measures are used to monitor and improve student learning. Funding is appropriate to ensure that students have the resources to accomplish high levels of learning and are prepared for postsecondary education, work and citizenship.[4]

"An outline of the State educational agency's long-term strategies for improving student academic achievement, including technology literacy, through the effective use of technology in classrooms throughout the State, including through improving the capacity of teachers to integrate technology effectively into curricula and instruction."
NCLB §2413(b)(1)

Technology Strategies, in Brief:

Through the effective use of technology in classrooms across the State and improving the capacity of teachers to integrate technology effectively into curricula and instruction, Tennessee will improve student academic achievement and technology literacy. The state's long-term strategies for accomplishing this goal are the following six originally presented by the State Board plus six supplemental strategies:

Tennessee Technology Strategies	
1.	Implement and improve information systems. *(Information Systems)*
2.	Focus technology resources to improve student learning.
3.	Provide all students with access to technology resources in the classroom and the opportunity to use them to improve learning in all subjects.
4.	Advance student technology literacy to ensure all students are prepared for high skilled, high wage jobs and to support lifelong learning.
5.	Support opportunities for teachers and administrators to develop competence in using technology to meet instructional goals. Ensure that all teachers use technology for instruction, consistent with Board standards and federal requirements.
6.	Obtain or develop online instruction to meet individual student and teacher learning needs and course requirements. Use technology to provide ongoing professional growth opportunities.
7.	Monitor the implementation of local district applications for federal EdTech funds.
8.	Conduct an annual statewide school-level technology survey (E-TOTE).
9.	Use the competitive grant program for high need schools to develop the capacity and institutionalization of effective technology integration.
10.	Create classroom-tested portfolio assessment modules for student technology literacy.
11.	Develop online professional development capacity.
12.	Conduct rigorous scientific research on the effectiveness of the competitive EdTech program in Tennessee.

[4] http://www.tennessee.gov/sbe/mpo3internet.pdf

The State Board's Master Plan presents nine Key Result Areas (KRAs), with goals and strategies for each. The plan also identifies priority areas for focused attention in the upcoming year. For 2003, the priorities are early childhood education, reading, meeting the needs of diverse learners, teacher quality enhancement, and school leadership.

The Master Plan's Key Result Areas are: early childhood education, primary and middle grades education, high school education, technology, teacher education and professional growth, accountability and assessment, school leadership, school health and safety, and funding. KRA 4, Technology, contains the Board's outline of the State's strategies for improving student achievement through the effective use of technology in classrooms throughout the state. KRA 5, Teacher Education and Professional Growth, refers specifically to providing professional development that includes the introduction to new knowledge and skills. For those teachers who have not yet developed the capacity to integrate technology effectively into instruction, the board's strategy can be applied to encompass technology integration.

2003 State Board Master Plan for Tennessee Schools
Key Result Area 4: Technology

The State Board's goal for Key Result Area 4 is that technology be used to improve student learning and analyze data. In the State Board Master Plan, the Board delineates the current status and then outlines the strategies it embraces to reach the goal.

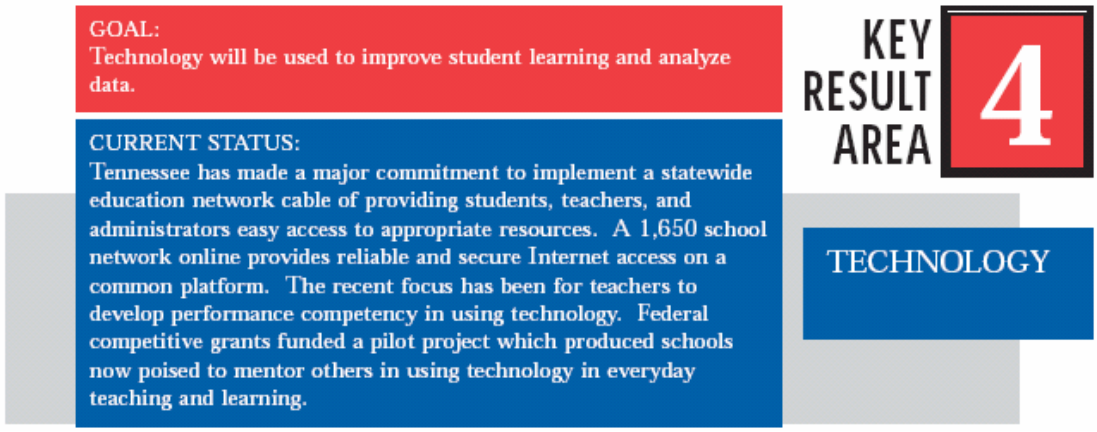


Figure 1: State Board KRA 4: Technology

Technology Strategies

The Board outlines six strategies for reaching its goal for KRA 4. The first is clearly an information system strategy and thus only indirectly related to the effective use of technology to improve student academic achievement. (The State Board lists the strategies in order by the amount of new implementation cost associated with each.)

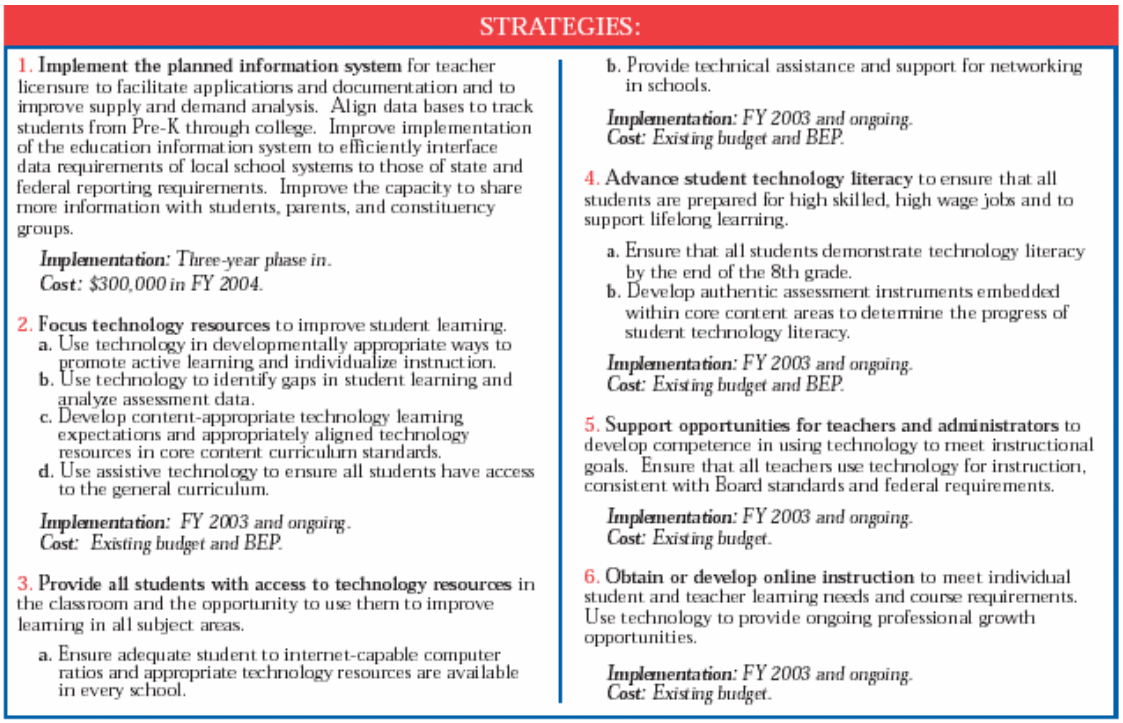


Figure 2: State Board Strategies

The Board also presents five measures for use in accounting for strategic progress toward the goal in KRA 4. Two measures are information systems' measures, with the remaining three addressing the classroom impact of technology.

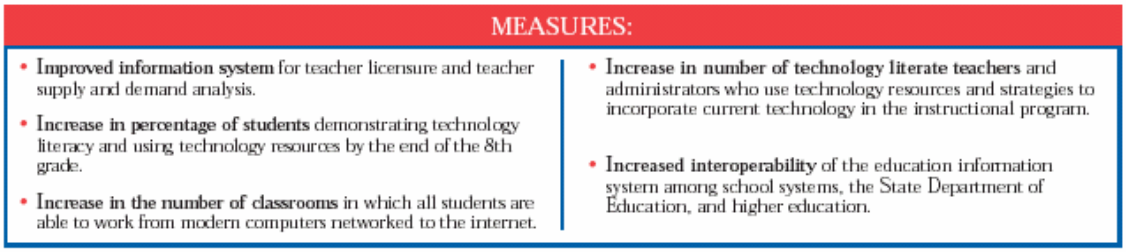


Figure 3: State Board Measures

The State Board's Master Plan thus provides the context for the state's long range strategic educational technology plan. In 2003, the only official "department" of technology existing within the Department of Education is the Office of Information Infrastructure and Systems Support. The presentation of this Strategic Educational Technology Plan for the Department of Education is the work of individuals whose primary focus has been on technology integration, who communicate with the Office of Information Infrastructure but whose work is not directed by it. (For a history of technology integration efforts in the state, see Appendix A.)

The State Board's vision identifies technology as a tool which teachers employ while they ensure that all students learn. However, it is no less a tool for the students

themselves as they are actively engaged in their own learning, accessing information, and solving problems.

If technology is used as a tool to ensure that all students learn, it follows that the tool must be utilized as part of the teaching process by all those who teach. Teachers, who are in fact highly qualified, can and do appropriately use technology as part of their everyday multiple teaching strategies.[5]

While not stated specifically within the Master Plan, technology also constitutes a specific subject of study within the state high school curriculum. At least one technology course or an equivalent must be on record as part of a student's school completion file.

The current national climate for technology in education is captured by Eisenberg and Johnson's (2002) observation:

> Education technologists are clearly describing what students should know and be able to do with technology. They are advocating integrating computer skills into the content areas, proclaiming that computer skills should not be taught in isolation and that separate "computer classes" do not really help students learn to apply computer skills in meaningful ways. There is increasing recognition that the end result of computer literacy is not knowing how to operate computers, but to use technology as a tool for organization, communication, research, and problem solving.

This means that the ideal role for educational technology is for it to be embedded within the core content areas where it serves as a vehicle for processing, refining, and demonstrating student content mastery. This shift in emphasis characterizes the revised vision for technology in Tennessee schools which this strategic plan embraces.

Technology literacy itself is admittedly more difficult to quantify when its accomplishment is dispersed throughout the content areas.[6] Nevertheless, the state believes that it is all the more powerful in effect, especially in an age of high stakes accountability, when it is embedded with the instruction process to improve student academic achievement in core content areas.

While the primary purpose of technology in Tennessee schools is to serve as a tool used in the teaching and learning process by teachers and students to ensure that all students learn and that all students are actively engaged in their own learning, another purpose exists and sometimes competes for resources. This secondary purpose for technology is to serve in supporting roles for school management and planning, similar to the role it plays in the larger business community.

The passage of the federal No Child Left Behind act (H.R. 1) in 2001 established three explicit goals for technology in its Title II Part D section known as Enhancing Education

[5] The state's definition of "highly qualified" teachers, as required by Title II Part A of No Child Left Behind, does not explicitly include technology literacy on the part of the teacher or the practice of integrating technology into everyday teaching and learning.

[6] The U. S. Department of Education's request for grant applications to develop scientifically based replicable procedures and instruments for Evaluating State Education Technology Programs (ESETP) gives silent testimony to its recognition of the reality that education technology's accountability instruments for effective implementation are not well developed.

Through Technology ("EdTech"). Appropriations for this legislation provide funding to Tennessee which has enabled the state to adopt additional strategies that complement those presented by the Board. These additional strategies are gears that will help ensure the state makes appropriate strides toward achieving the legislation's goals.

The following table demonstrates how the State Board strategies are aligned with the federal goals and illustrates how Tennessee will improve student academic achievement (including technology literacy) through the effective use of technology in classrooms throughout the State, and through improving the capacity of teachers to integrate technology effectively into curricula and instruction. Italic print is used for the additional complementary strategies established to meet federal requirements.

State Board Strategies, Aligned with Federal Goals

	Federal Goals		
	To improve student academic achievement through the use of technology in elementary schools and secondary schools ALL STUDENTS will be educated in learning environments that have access to educational technology used in support of academic achievement.	To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability. ALL STUDENTS will demonstrate technology literacy by the end of eighth grade.	To encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies. ALL STUDENTS will be taught by teachers qualified to use technology for instruction.
STATE BOARD Strategies	**STATE Goal**: Technology will be used to Improve Student Learning and Analyze Data		
1. Implement the planned information system for teacher licensure:	• Align databases to track students • Improve implementation of the education information system • Improve capacity to share more information with constituents		
2. Focus technology resources to improve student learning:	• Promote active learning and individualize instruction • Identify gaps in student learning and analyze assessment data • Develop content-appropriate learning expectations and aligned technology resources in core standards • Use assistive technology to ensure all have access to general curriculum • *Monitor implementation of local district applications for formula EdTech funds*		• *Conduct rigorous scientific research on the effectiveness of the competitive EdTech program in Tennessee*
3. Provide all students with access to technology resources in the classroom and the opportunity to use them to improve learning in all subject areas:	• Adequate student to internet-capable computer rations and appropriate resources in every school • Technical assistance and support for networking in schools	• *Conduct annual statewide school-level technology survey.*	• *Conduct annual statewide school-level technology survey.*

	Federal Goals		
STATE BOARD Strategies	To improve student academic achievement through the use of technology in elementary schools and secondary schools ALL STUDENTS will be educated in learning environments that have access to educational technology used in support of academic achievement.	To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability. ALL STUDENTS will demonstrate technology literacy by the end of eighth grade.	To encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies. ALL STUDENTS will be taught by teachers qualified to use technology for instruction.
	STATE Goal: Technology will be used to Improve Student Learning and Analyze Data		
4. Advance student technology literacy to ensure that all students are prepared for high skilled, high wage jobs and to support lifelong learning:		• All students demonstrate technology literacy by end of 8th grade • Develop authentic assessment instruments embedded within core content areas to determine literacy progress • *Conduct annual statewide school-level technology survey* • *Create classroom-tested portfolio assessment modules for student technology literacy*	
5. Support opportunities for teachers and administrators to develop competence in using technology to meet instructional goals. Ensure that all teachers use technology for instruction, consistent with Board standards and federal requirements:			• *Conduct annual statewide school-level technology survey* • *Develop the capacity for institutionalizing effective technology integration (Structure and support a competitive grant program that develops faculty-wide capacity for technology integration; develop cadre of building-level technology coaches with expertise in promoting student-centered practice with a broad range of technology use; expand statewide network of model mentor schools that exemplify best practice in effective technology integration; establish series of regional professional development collaborative that engender technology mentorship cooperatives)*
6. Obtain or develop online instruction to meet individual student [and teacher] learning needs and course requirements. Use technology to provide ongoing professional growth opportunities:			• *Develop online professional development capacity (Cadre of online course facilitators at the local level; access to professionally developed research-based online professional development workshops)*

2. Goals for Using Technology **to improve academic achievement** aligned with academic content and achievement standards.

2

"A description of the State educational agency's goals for using advanced technology to improve student academic achievement, and how those goals are aligned with challenging State academic content and student academic achievement standards."

NCLB §2413(b)(2)

Tennessee uses technology in education to improve student learning. This purpose is based upon the premise that technology is a tool rather than an end in itself. In his best-selling management analysis book that outlines findings on what makes the difference between a company being merely "good" and rising to the level of "great," Jim Collins reports that

> "Technology and technology-driven change has virtually nothing to do with igniting a transformation from good to great. Technology can *accelerate* a transformation, but technology cannot *cause* a transformation."[7]

As a tool in education, technology is an accelerator for improving student learning, but it is not the prime mover in a transformation.

In its 2002 Consolidated Application for federal funds, Tennessee presented its Title II Part D goals for technology. These goals align with the goals of the legislation, as shown below.

Tennessee Technology Goals

1. All students will be educated in learning environments that have access to educational technology used in support of academic achievement.
   ["to improve student academic achievement through the use of technology in elementary and secondary schools." H. R. 1 §2402(b)(1)]

2. All students will demonstrate technology literacy by the end of the eighth grade.
   ["to assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability." H. R. 1 §2402(b)(2)(A)]

3. All students will be taught by teachers qualified to use technology for instruction.
   ["to encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies." H. R. 1 §2402(b)(2)(B)]

[7] Jim Collins (2001) Good to Great, p. 11.

Goal 1: All students will be educated in learning environments that have access to educational technology used in support of academic achievement.

In order for technology to be used to improve student academic achievement, there must be adequate access to technology. From the formal inception of the Connect Tennessee Students (ConnecTEN) program in 1995, Tennessee has supported the belief that universal access to the Internet is essential in all Tennessee schools. The state continues to value Internet access in all schools, and continues to financially support a statewide network which is offered to all districts in the state despite geographic and socio-economic challenges.

The ConnecTEN program works directly with over 27 local telephone companies to secure the most appropriate connection type and bandwidth for the Internet usage levels demonstrated by the schools. The value of this investment is clear from the fact that all but five of the state's 136 school districts, according to a recent survey, participate in the ConnecTEN program.

The quality of Internet service is defined by contract with vendor providing the ConnecTEN infrastructure. Available bandwidth is determined based on statewide student-to-computer ratio. The current contract specified a 4:1 ratio, increasing to a 2:1 ratio by 2006. Over 85% of the schools have a T1 line or greater. The bandwidth utilization at all sites is monitored on a regular basis to ensure that the delivered bandwidth is adequate to meet the need. In addressing the access goal, the Department must remain committed to ensuring that bandwidth keeps pace with the needs as schools increase their use of technology.

Three factors are at work in the equation for equitable access to technology. The first is sufficient quantity of technology in schools. The second is sufficient infrastructure support. The third is sufficient quality of use of technology.

1. **Sufficient Quantity.** The first factor in the access equation is the student-to-computer ratio in schools which affords students the use of technology in the pursuit of learning goals. Tennessee's 2003 technology survey reveals the statewide ratio of all computers is 3.9 students per computer which easily meets the national average. Nevertheless, a digital divide exists. When considering only the high/mid capacity computers, there are: 4.55 students per computer in the most affluent schools, compared to 5.45 students in schools with free/reduced meals of 70% or more. The gap is smaller when all computers are considered (3.71 vs. 4.11).

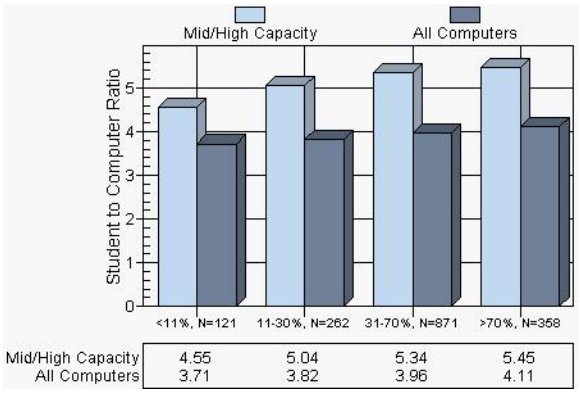


Figure 4: 2003 Student to Computer Ratio

The overall good news masks disparities that exist when the data are analyzed on a school-by-school basis. Since the purchase of hardware is a locally funded situation and therefore a matter of local option, the state's role in this part of access is necessarily

limited to making information available to stakeholders and expecting them to find ways to equalize the distribution.

The relatively encouraging picture regarding access in the state is a result of praiseworthy local efforts as well as earlier state-led technology endeavors that focused on universal access. Nevertheless, pockets of inequity remain, and it is a goal of this technology plan to ensure that school districts continue to have the necessary information to direct appropriate purchasing efforts.

2. **Sufficient Infrastructure Support.** The second factor in the access equation is the support for the physical infrastructure. The physical infrastructure represented by a statewide network and end-user work stations is held together by the human infrastructure of technology coordinators and technicians. The state ensures that the statewide network is maintained through its service contract. Local school districts are responsible for maintaining local infrastructure with appropriate technical support. Field reports acknowledge that absence of timely and adequate technical support can waylay the best-designed instructional intentions for technology. The State Board recognizes this by naming technical support as the second factor in its strategy equation for access. Statewide, the average technician to computer is 1 to 633[8]. Considering aging equipment with escalating service needs and the fact that school buildings are located across an entire county, technical service can be a significant issue, particularly once educators seriously use technology as part of everyday teaching and learning.

3. **Sufficient Quality of Use.** The third factor in the access equation is quality of technology use. Mere physical access to technology, while it is an essential condition for the effective use of technology in support of academic achievement, is not enough. The broader issues for access are bound up with issues of professional development and teacher practice. For true equity of opportunity for students, all teachers in Tennessee must use technology in ways that enhance the teaching and learning process. This is such a critical factor that the Title II Part D of No Child Left Behind requires local districts to dedicate a full 25% of the flow-through funds to "ongoing, sustained, and intensive, high-quality professional development." [H.R. 1 § 2416 (a) (1)].

[8] According to data collected in E-TOTE 2002-03.
http://tn.ontargetus.com/TNReports/dtTechSup_State.asp

Goal 2: All students will demonstrate technology literacy by the end of the eighth grade.

What is technology literacy? A national task force developed a consensus definition for student technology literacy during the 2002 National Leadership Institute sponsored by the U. S. Department of Education for all state directors of technology. According to this definition,

> Technology literacy is the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century.[9]

The recently released work of the Partnership for 21st Century Skills entitled *Learning for the 21st Century* provides a definition for information and communication technologies (ICT) literacy which was derived from the work of the Programme for International Student Assessment (PISA):

> ICT literacy [is] the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communication with others in order to participate effectively in society.[10]

In an education context, the common core of these two definitions is that technology literacy is the ability to appropriately use the tools of technology in pursuit of an information and learning objective. This core definition is consistent with the state technology standards for students.

Technology Standards. Tennessee's Department of Education has separate student technology standards, complete with learning expectations, performance indicators, and sample performance tasks.[11] The standards grew out of the Computer Skills Next program and developed with the National Education Technology Standards (NETS) project. Pre-publication NETS material was utilized in the state standards.

A review of the standards shows the technology learning expectations could be embedded in and aligned with virtually every core content area. The key is for teachers to integrate technology into their everyday teaching and learning. Such an effective and aligned use of technology strengthens the teaching and learning of all core curriculum content. This education technology plan **recommends** that a **future goal** be that all curriculum standards incorporate appropriate technology instructional and assessment strategies. This will ensure that all students are technologically literate in age-appropriate ways.

As with the NETS standards, Tennessee's technology standards are stated at grade clusters: K-2, 3-5, 6-8, and 9-12. As with other state standards, these standards are reviewed on a rotating basis every five years. The technology standards are being reviewed during the 2003-04 academic year.

---

[9] National Leadership Institute Toolkit, 2003.
[10] The PISA Framework for Assessing ICT Literacy: Draft Report to Network A, 2003, p. 11, quoted in Learning for the 21sth Century, 2003, p. 4.
[11] These are available online from http://www.tennessee.gov/education/ci/cicurframwkmain1.htm. See also Appendix I.

Assessment. Student technology performance is not included in the state testing program. Rather, every Director of Schools is required to attest to a graduate's completion of at least one technology course. With the 2002 advent of the annual technology online survey (E-TOTE), the state collects self-reported data at the school level regarding eighth grade student technology literacy. Local methods for the collections vary, from simple estimation to formalized portfolio assessment protocols. The majority of schools utilized a student self-reported skills checklist in 2003.

The 2004 E-TOTE survey includes student technology literacy at all four grade cluster levels reflected in the state technology standards. To improve the quality of data, the department collects sample assessment instruments from the districts which it posts for shared access. Starting in 2004-05, the department will provide sample authentic assessment constructs for student technology portfolios, developed by recipients of the competitive EdTech grants.

Assessing student technology literacy can be accomplished in a variety of ways. An example of a four-level continuum[12], developed by the State Educational Technology Directors' Association (SETDA)'s task force on technology literacy assessment, is shown here. In developing assessments for technology literacy, the state recommends that districts work toward project-based assessments.

1. KNOWLEDGE BASED ASSESSMENT→	2. PERFORMANCE BASED ASSESSMENT→	3. PORTFOLIO BASED ASSESSMENT→	4. PROJECT BASED ASSESSMENT
Use as a base, PLUS	**Evidence of integration**	**A continuous process over time**	**A culminating activity**
Standardized Test	Observation	Student production logs	Interviews of team members as a group or individually
Item analysis	Product summary	Student reflection	Analysis of project elements
Rubric for content	Checklist	Collection of artifacts	Rubric for relevance of project outcome
	Artifact	Rubric for portfolio elements	
	Rubric for content & process		

Table 1: SETDA National Leadership Institute Toolkit: Continuum of Assessments

Current Status. Review of the 2003 E-TOTE survey shows that significant work is needed before all eighth grade students will be technology literate. In the survey, principals were asked what percentage of their current eighth grade population meets each of ten performance indicators that are tied to the NETS student technology standards and aligned with the state technology standards. The statewide averages shown in the following table demonstrate the need for significant effort on the part of local school districts in order to meet the federal requirements. The stated federal goal is that ALL students will be technology literate by the time they leave the eighth grade.

[12] National Leadership Institute Toolkit, 2003. Available online www.setda.org

Eighth Grade Student Technology Literacy
What percent of all of the current eighth grade students in your school have demonstrated competence in each of the competencies?

ETOTE 2003 ITEMS 5.2.1-5.2.10	Statewide average %
1. Applying strategies for identifying and solving routine hardware and software problems that occur during everyday use. (TN Standard 4)	35.26
2. Demonstrating knowledge of current changes in information technologies and the effect those changes have on the workplace and society (TN Standard 1)	37.19
3. Exhibiting legal and ethical behaviors when using information and technology, and discussing consequences of misuse (TN Standard 2)	61.24
4. Using content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research (TN Standard 6)	47.36
5. Applying productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum (TN Standard 5, 6)	43.19
6. Designing, developing, publishing, and presenting products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom (TN Standard 7)	31.47
7. Collaborating with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom (TN Standard 3)	28.85
8. Selecting and using appropriate tools and technology resources to accomplish a variety of tasks and solve problems (TN Standard 5)	48.35
9. Demonstrating an understanding of concepts underlying hardware, software, and connectivity, and of practical applications to learning and problem solving (TN Standard 4)	34.06
10. Researching and evaluating the accuracy, relevancy, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems (TN Standard 2)	35.17

Table 2: Tennessee Eighth Grade Technology Literacy in 2003

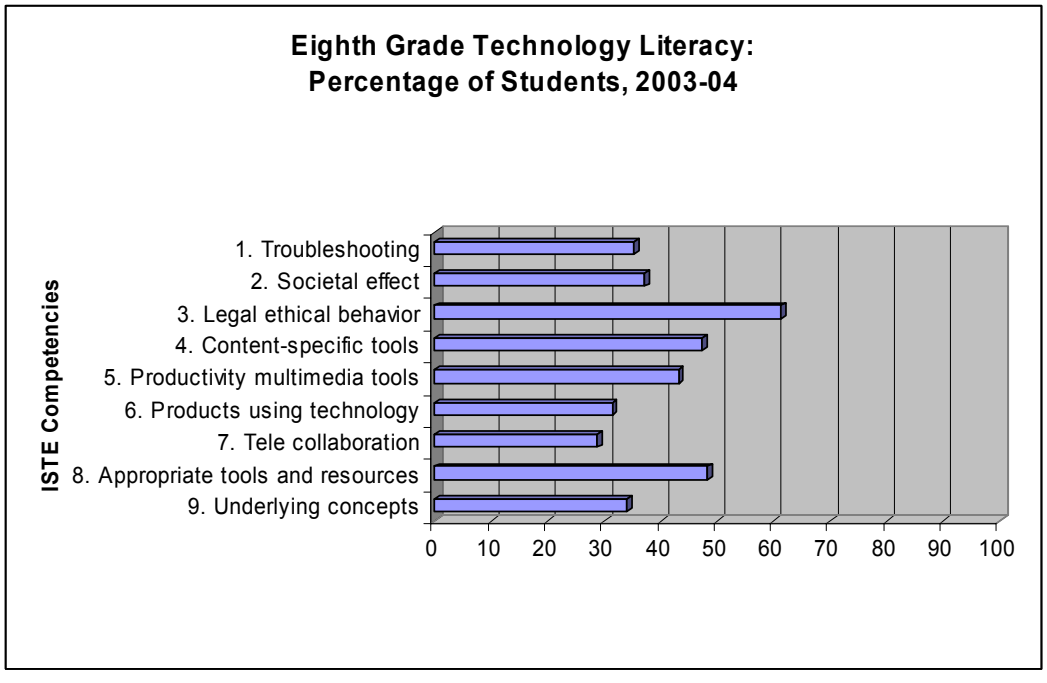


Figure 5: Eighth Grade Student Technology Literacy in 2004

Goal 3: All students will be taught by teachers qualified to use technology for instruction.

In Tennessee, the goal is for teachers to use technology to modify classroom environments so that teaching practices

- are student-centered
- actively engage students in higher-order learning, and
- employ generative learning strategies and problem-based learning.

In order for this to happen, Tennessee teachers must be technology literate. While some might think this expectation "just goes without saying," it is clear from building level reports that it not only needs to be said, but needs to be more systemically addressed. While the State Board's strategy embraces the expectation that all teachers will use technology for instruction, the reality is that much needs to be done. This is demonstrated by E-TOTE survey results in 2003. When the survey asked principals to consider the faculty as a whole and respond whether 10%, 40%, 60%, or 100% of the faculty met the NETS-ISTE standards and implemented them in the classroom, the results showed that in 734 of the schools, principals thought that only 10% of their teachers met the standards and implemented them in the classroom.

% of schools	# Schools	H. Capabilities of Educators (Select the best description)
44%	734	10% meet ISTE technology proficiencies and implement in the classroom
35%	586	40% meet ISTE technology proficiencies and implement in the classroom
19%	307	60% meet ISTE technology proficiencies and implement in the classroom
2%	30	100% meet ISTE technology proficiencies and implement in the classroom

Table 3: 2003 Tennessee Teacher Technology Literacy

The taxpayers' investment in educational technology infrastructure will reap the rewards for which it was purchased only once the educators in our schools not only learn how to effectively integrate technology, but also actually do it.

To meet the challenge, the state has, with the assistance of the Appalachian Technology Education Consortium (ATEC), developed a "Technology Coach Handbook" to assist school districts in their efforts in helping teachers learn to integrate technology into core content instructional practice. This Handbook was first made publicly available to Tennessee districts at the 2003 state technology conference, TETC.

Underlining the value of Tennessee's approach to using technology in ways that support core content mastery, the Coach Handbook (2003) cites the International Society for Technology in Education (ISTE):

> An 'essential condition' for successful use of technology is to implement a student-centered approach to learning. The underlying reasoning is that today's workforce requires employees to actively participate in a collaborative environment that utilizes multiple resources and technology tools to solve a variety of problems. To prepare our youth for this world, our classrooms must incorporate new, research-based components into traditional approaches that are proven to be successful. … [I]n order to achieve the new, student-centered environments, ISTE suggests that it is important to engage students in learning experiences that require them to:

- Communicate using a variety of media and formats
- Access and exchange information in a variety of ways
- Compile, organize, analyze, and synthesize information
- Draw conclusions and make generalizations based on information gathered
- Know content and be able to locate additional information as needed
- Become self-directed learners
- Collaborate and cooperate in team efforts
- Interact with others in ethical and appropriate ways

As elusive as some of these achievements may be for standardized assessment methods to quantify, they are nonetheless critical attributes in today's society. Effective teaching in all content areas is characterized by students who demonstrate these higher order performances. Experts recognize technology's role as a cognitive tool that supports these higher aims. For example, Gavriel Solomon's "On the Nature of Pedagogic Computer Tools"[13] discusses technology as a cognitive tool that promotes and cultivates thinking. David Jonassen uses the term "mindtools" instead of cognitive tools. Mindtools are "computer applications that, when used by learners to represent what they know, necessarily engage them in critical thinking about the content they are studying." Mindtools include concept organizers such as databases and idea mapping tools and modeling instruments such as spreadsheets. [14]

The simple answer to the question about how the state will use technology to improve student academic achievement is found embodied in this vision. The efforts supported by the discretionary portions of the Enhancing Education Through Technology Act are directly aligned with this vision.

A recent review of district strategic technology plans and prior Title IID formula projects revealed that there are many instructional uses of technology embraced by districts and not all align entirely with this holistic vision of technology integration. They do align nonetheless with the State Board's second strategy of focusing technology resources to improve student learning through using technology to identify gaps in student learning and analyze assessment data.

Federal funds for Title I schools and Targeted Assistance schools have been heavily invested in a variety of integrated learning management systems, reading motivation programs, motor developmental approaches implemented with technology and diagnostic systems. The self-contained nature of these products lend themselves to packaged adoptions, and the "research-based" claims of their providers make the decision process for the local federal project directors fairly easy.

While there is a real market for the skill reinforcement applications of technology, it is questionable whether any significant meaningful change in teaching practice results when these applications are in the forefront of a school's improvement planning. Observing this situation, Jonassen remarks:

---

[13] Appearing in *Computers as Cognitive Tools* (S. P. LaJoie & S. J. Derry (eds.) 1993) and quoted in Paula Vincini's article "The spectrum of cognitive tools," available in the online publication *Innovations in Learning*, http://at.tccs.tufts.edu/pdf/newsletter_apr_2003.pdf December 29, 2003.
[14] Quoted in Paula Vincini, "The spectrum of cognitive tools"

> The thousands of drill-and-practice programs made available to educators were easy for publishers to produce, and they satisfied the demand that teachers be innovative and use computers. The irony of their existence and use was that they replicated one of the oldest and most meaningless forms of learning, rote drill and practice. While drill programs did help some remedial learners who needed practice, they were not the most effective way to use powerful computer technologies.[15]

One analysis of the differences between the ways technology is used in low socio-economic status (SES) and high SES classrooms reveals an interesting piece of data with even more interesting consequences. According to Henry Becker's (2002) report on technology access in *The Future of Children*,

> All schools provide about the same access to computers, but higher-SES schools—and in particular, the higher-achieving classes in those schools—generally use computers in more intellectually powerful ways. The main advantage [emphasis added] for students in higher-SES schools is their access to a teaching approach that enables them to master computer skills in the context of solving real problems and gaining deeper understanding of an area of student, compared with an approach more common in lower-SES schools that emphasizes skills reinforcement and remediation.[16]

Finding an automated way to teach the same way we have taught in the past is not a solution when those ways we have taught in the past have been found wanting. Individualizing an instructional path for a student through electronic analysis of performance and prescription for automated worksheets can only go so far in helping students "communicate using a variety of media and formats; access and exchange information in a variety of ways; compile, organize, analyze, and synthesize information; draw conclusions and make generalizations based on information gathered; know content and be able to locate additional information as needed; become self-directed learners; collaborate and cooperate in team efforts; and, interact with others in ethical and appropriate ways". (ISTE)

Without the larger vision of how technology can contribute to a transformation of the teaching and learning process, we risk consigning the investment in networking our schools to being something of a Connecticut Yankee in King Arthur's Court[17]: a modern man settling back into the classroom of a century ago where technology can only be used for learning strategies that characterized the industrial age model of skill reinforcement and remediation.

This is better stated in the words of Rod Paige, U.S. Secretary of Education, in his September 2002 letter of introduction to *Visions 2020: Transforming Education and Training through Advanced Technologies*

> Everywhere one looks, the Internet and information technology are transforming every aspect of life in the United States. We are living, shopping, working, governing, and communicating in new ways that are enabled by technology.

---

[15] Jonassen (1996), p. 5

[16] Henry Jay Becker (2000). "Who's wired and who's not: children's access to and use of computer technology" in The Future of Children 10(2): Children and Computer Technology. Available http://www.futureofchildren.org

[17] Mark Twain (1889). A Connecticut Yankee in King Arthur's Court.

> Organizations are learning how technologies streamline processes, enable real-time information transactions, expand markets beyond geographic areas, and customize service offerings to the needs of customers. These new capabilities have done more than simply make organizations more efficient—they have forced leaders to rethink markets and reengineer business structures and processes that led to dramatic improvement in quality.
>
> But to a large extent, schools have been an exception to this information revolution. Indeed, education is the only business still debating the usefulness of technology. Schools remain unchanged for the most part despite numerous reforms and increased investments in computers and networks. The way we organize schools and provide instruction is essentially the same as it was when our Founding Fathers went to school. Put another way, we still educate our students based on an agricultural timetable, in an industrial setting, yet tell the students they live in a digital age.
>
> The problem is not that we have expected too much from technology in education—it is that we have settled for too little. Many schools have simply applied technology on top of traditional teaching practices rather than reinventing themselves around the possibilities technology allows. The result is marginal—if any—improvement.

At the core of this Tennessee strategic educational technology plan is a lofty ambition: that the educators in Tennessee will realize how, in Paige's words, "technology can actually transform what we think of as education." When this happens, technology's use will improve the lasting quality of student academic achievement. And just as in the business realm, technology's greatest effect is in accelerating change, so too will technology in Tennessee schools accelerate the transformation from *Good to Great*.[18]

[18] Jim Collins (2001) Good to Great.

3. Strategies and Action Plan

The state's action plan to ensure that all students and teachers, particularly those served by high-need LEAs, have increased access to technology is composed of the following strategies. For each goal, the state will:

3

"A description of how the State educational agency will take steps to ensure that all students and teachers in the State, particularly students and teachers in districts served by high-need local educational agencies, have increased access to technology."

NCLB §2413(b)(3)

Goal 1	All students will be educated in learning environments that have access to educational technology used in support of academic achievement	
	Strategies	**Reference**
1.1.0	Implement and improve information systems.	SBE 1
1.1.1	Conduct an annual statewide school-level technology survey (E-TOTE)	Supp 8
	a. Inform school leaders of the findings of the surveys so they can embed technology into their school plans.	
	b. Inform the public of district and school level survey findings.	
	c. Annually review the survey instrument to ensure indicators are accurate and suitable.	
	d. Monitor annual results for appropriate progress toward reaching the goal of 100% effective integration by December 2006.	
1.2.0	Focus technology resources to improve student learning.	SBE 2
1.2.1	Expect educators to use technology in developmentally appropriate ways to promote active learning and individualize instruction.	SBE 2.a
	a. Expect school leaders to embed technology within their individual Tennessee School Improvement Plans (TSIPs), reflecting the findings of their TAGLIT (Taking a Good Look at Instructional Technology) and E-TOTE surveys.	
1.2.2	Develop content-appropriate technology learning expectations and appropriately aligned technology resources in core content curriculum standards.	SBE 2.c
1.2.3	Expect schools to use assistive technology to ensure all students have access to the general curriculum.	SBE 2.d
1.2.4	Conduct rigorous scientific research on the effectiveness of the competitive EdTech program in Tennessee.	Supp 12
	a. Implement the Tennessee EdTech Accountability Model (TEAM) and publish research findings.	
1.3.0	Provide all students with access to technology resources in the classroom and the opportunity to use them to improve learning in all subject areas.	SBE 3
1.3.1	Ensure adequate student to internet-capable computer ratios and appropriate technology resources are available in every school.	SBE 3.a
	a. Fund local capacity for technology through the Basic Education Plan (BEP) funding formula: $22.30 technology dollars per student based on total average daily membership (ADM).	

1.3.2	Provide technical assistance and support for networking in schools a. Fund local capacity for technology through the Basic Education Plan (BEP) funding formula: (a) Technology Coordinator, a non-instructional position, at the rate of one per 6,400 students with a minimum of one per system. b. Underwrite the funding of a statewide Internet network for all schools (ConnecTEN) where escalation of service is based upon level of use, irrespective of geography or socio-economic status. Pursue increased access in remote areas to facilitate online delivery of professional development otherwise difficult to obtain. c. Review district technology plans and require that they include steps for increasing access for all students and teachers, including how EdTech funds will be used to help students in target groups. d. Participate in national educational technology conferences to acquire current information on trends, effective practice, and emerging technologies.	SBE 3.b
1.3.3	Monitor the implementation of local district applications for formula EdTech funds. a. Review, in concert with E-rate schedule, district technology plans, requiring them to include steps for increasing technology access for all students and teachers, including how EdTech funds will be used to help students in target groups. b. Distribute Title II Part D formula funds to local school districts following the Title I Part A distribution formula and reallocate unclaimed funds to districts receiving the smallest formula allocations. c. Monitor the implementation of local district applications for formula EdTech funds to ensure use of funds increases accessibility to technology for all students, focusing on those in high poverty, high need, and/or high priority schools. d. Require local districts receiving Title II Part D competitive funds to coordinate the use of Title II Part D formula funds with the competitive funds.	Supp 7
1.4.0	Obtain or develop online instruction to meet individual student learning needs and course requirements.	SBE 6

Goal 2	All students will demonstrate technology literacy by the end of the eighth grade.	
	Strategies	
2.1.0	Advance student technology literacy to ensure that all students are prepared for high skilled, high wage jobs and to support lifelong learning.	SBE 4
2.1.1	Expect that all students demonstrate technology literacy by the end of the 8th grade. a. Collect and report school survey data on student technology literacy at grades 3, 5, 8, and 12.	SBE 4.a
2.1.2	Develop content-appropriate technology learning expectations and appropriately aligned technology resources in core content curriculum	SBE 2.c

	standards. a. Revise student education technology curriculum standards based on the current national student technology standards.	
2.1.3	Develop authentic assessment instruments embedded within core content areas to determine the progress of student technology literacy. a. Create classroom-tested portfolio assessment modules for student technology literacy. b. Expect an increased use of student technology portfolios as a routine assessment tool for technology literacy.	SBE 4.b; Supp 10
Goal 3	**All students will be taught by teachers qualified to use technology for instruction.**	
	Strategies	
3.1.0	Support opportunities for teachers and administrators to develop competence in using technology to meet instructional goals. Ensure that all teachers use technology for instruction, consistent with Board standards and federal requirements. a. Provide all public K-12 educators with free e-mail accounts. b. Recommend increased use of teacher technology portfolios and technology integration components in daily lesson plans as part of teacher assessment. c. Recommend technology literacy be part of the matrix of requirements for "highly qualified" teachers and paraprofessionals; recommend Teacher Licensure add specific demonstration of technology literacy as delineated by the National Education Technology Standards for Teachers as a requirement for teacher certification renewal. d. Expect districts to provide ongoing, sustained high-quality professional development in effective technology integration for all certified personnel and to provide similar professional development for all those who work directly with children in classroom environments. e. Develop a mentor technology integration school network capable of providing high quality job-embedded professional development to other schools. f. Provide administrator technology academies and the annual statewide technology conference (TETC) as opportunities for continued professional growth in meeting the needs of diverse learners by using technology as part of the learning process.	SBE 5
3.2.0	Obtain or develop online instruction to meet teacher learning needs. Use technology to provide ongoing professional growth opportunities. a. Provide all public K-12 educators with free e-mail accounts. b. Support the online professional development efforts of certified course facilitators, recommending districts provide staff development credits for educators successfully completing online professional development. Recommend districts in challenging geographic areas engage certified online course facilitators for online	SBE 6 Supp 11

Goal 3	All students will be taught by teachers qualified to use technology for instruction.	
	technology workshops for their educators. c. Request state education universities provide graduate credit to educators who complete rigorous online professional development in technology integration. d. Collaborate with regional technology cooperatives (such as those from Southern Regional Education Board and The Appalachian Technology Education Consortium) in accessing professional development, student distance learning, and expert panels. Strengthen the state's ability to provide information to districts about current trends and to provide strong state level feedback to the U. S. Department of Education by taking an active role in the State Education Technology Directors' Association (SETDA).	
3.3.0	Use the competitive grant program for high need schools to develop the capacity for and institutionalization of effective technology integration. a. Increase the dissemination of the best practices of the competitive grant recipients to all schools. b. Establish and maintain informational web page for technology integration resources: places to go, people to visit, and best practices to use. c. Structure a regional professional development model-school mentoring program that will "Orchestrate Regional Bases for Integrating Technology" to begin ORBIT centers in the third funding year of the Title II Part D competitive grant program. d. Recommend local applicants for competitive grants, particularly in year three, incorporate local and regional business support for their competitive federally funded initiatives.	Supp 9

4. Accountability Process and Measures

To evaluate the extent to which the activities funded under Title II Part D are effective in integrating technology into curricula and instruction, the state has established a process with accountability measures based on data collected in the annual E-TOTE survey.

The state's initial consolidated application for federal funds under No Child Left Behind (2001) presented accountability benchmarks for Title II Part D.[19] The data sources draw from the new SY2003 EdTech Tennessee Online Technology Evaluation survey (E-TOTE), which adopted the Tennessee STaR Chart as a rubric for evaluating a school's technology and readiness. The original benchmarks in the consolidated application which state the expectations are as follows:

> 4
> "A description of the process and accountability measures that the State educational agency will use to evaluate the extent to which activities funded under this subpart are effective in integrating technology into curricula and instruction."
>
> *NCLB §2413(b)(4)*

Consolidated Application Accountability Benchmarks: Title II Part D

GOAL	Performance Indicator	Performance Objectives	Data Source(s)
Goal 1: All students will be educated in learning environments that have access to educational technology used in support of academic achievement.	The number of schools in which all students are able to work from networked computers	The student to computer ratio in all schools, and especially poverty schools, will be at least less than 10 students per computer with a refresh cycle established for every 5 years by 2005.	Annual on-line School Technology and Readiness report submitted by each school: Focus item R, Level of Progress: Developing Tech
Goal 2: All students will demonstrate technology literacy by the end of eighth grade.	The number of schools in which all students are able to work from networked computers	The student to computer ratio in all schools, and especially poverty schools, will be at least less than 10 students per computer with a refresh cycle established for every 5 years by 2005.	Annual on-line School Technology and Readiness report submitted by each school: Focus item R, Level of Progress: Developing Tech
	The percentage of schools with advanced patterns of student technology use	The percentage of schools demonstrating advanced patterns of technology student use will grow by 12% each year.	Annual on-line School Technology and Readiness report submitted by each school: Focus item F, Level of Progress: Advanced Tech
Goal 3: All students will be taught by teachers qualified to use technology for instruction.	The percentage of schools in which teachers are using technology for instruction	In all schools, 100% of the educators will meet ISTE technology proficiencies and implement in the classroom by 2006.	Annual on-line School Technology and Readiness report submitted by each school. Focus item H, Level of Progress: Target Tech
		The percentage of schools whose patterns of teacher use of technology is Advanced will grow by 12% each year.	Annual on-line School Technology and Readiness report submitted by each school. Focus item B, Level of Progress: Advanced Tech
		The percentage schools in which classroom technology use is integrated into subject area will grow by 12% each year.	Annual on-line School Technology and Readiness report submitted by each school. Focus item D, Level of Progress: Advanced Tech

[19] The final consolidated application is available online at http://www.tennessee.gov/education/accttnconsolidatedapplication.pdf. (p.50)

The online state technology survey, E-TOTE, collects data statewide and provides annual accountability from each school in districts receiving Title II Part D funds. The survey uses self-reported data. It is clear that the Department's accountability process calls for better-informed self reporting in order to improve the quality of the data. This became obvious in the course of the first year of the survey when some districts addressed the issue locally by providing supporting instruments to their members to help clarify the data collection requested in the E-TOTE survey. In order to better inform the self-reporting process from all districts in subsequent years, the Department of Education will invite all districts to contribute their supporting instruments which will be reviewed, cataloged, and made available online with recommendations for their use. Full credit will be given to the authors.

The Department recognizes that self-reported data should not be the sole source for an accountability system. But many districts who receive the EdTech formula funds are not yet equipped to provide any other type of effect data related specifically to technology use. To redress this issue, the Department has embedded capacity-building within its design for the EdTech competitive grants. Through this model, trained classroom observers will become available to assist districts in their assessment process. This plan is incorporated in the descriptions that follow.

E-TOTE Survey[20]

E-TOTE (EdTech Online Technology Evaluation system) was created specifically for the accountability needs in Title II Part D and is funded through the project portion of the state's Title II Part D administrative funds. Data are collected at both the system and school level, with most of the data elements coming from the schools. Hierarchical password security is used for the data collection process and, at this point, for the school-level reports. District and statewide reports are public documents available online. The state will seek to present public reporting of at least some of the data items from school level surveys in 2004-05.

The annual E-TOTE data collection occurs during a limited time frame each fall. (The first year of the survey, the collection was completed in late February, but the schedule was changed to late fall, to address the requests of school administrators.) The late fall data collection period will be maintained to provide more comparable longitudinal data from year to year.

Copies of the original survey and the revised 2003-04 survey are available online. See http://www.tennessee.gov/education/acctetote.htm. The school year 2003 E-TOTE Executive Summary is included in the Appendix C. Data already collected in the 2003 survey has been invaluable formative assessment information for this technology plan.

[20] Links to the annual E-TOTE survey items as well as individual district and statewide reports from the annual survey are available online at www.tennessee.gov/education/acctetote.htm In addition to other measures, the survey incorporates twenty-one measures of technology impact originally adopted from the Texas School Technology and Readiness (STaR) Chart. A copy of Tennessee's STaR Chart is available in the Appendix and is also available for download online (http://www.tennessee.gov/education/acctstar-campus-portrait.doc). See also the E-TOTE 2003 Executive Summary "Where do we stand in 2003?" Available www.tennessee.gov/education/acctetotesumm.pdf

Formula Awards

In Tennessee, all 136 school districts were eligible for the 2003-04 Title II Part D formula funds. District sizes vary (from 1-184 schools), as do the district allocation amounts, as the following table shows:

Formula Allocations	Low	High
2002-03	$ 1,062	$ 811,692
2003-04	1,368	1,048,560

Table 4: Title II Part D Formula Allocations

The state requires each district receiving Title II Part D funds to submit an E-TOTE survey from each of its schools. Although this requirement was established so the state could supply data for federal performance reports, the survey has generated a statewide data system useful for strategic planning not only at the state level, but also at the district and school level. E-TOTE data are used as part of the determination of need for competitive technology grants.

A school's response to E-TOTE cannot isolate the effect of the activities funded under Title II Part D, but the aggregate results within a school system can be indicative of overall progress toward the goal. A major thrust of the federal legislation is to encourage integration of its programs rather than operating in isolation. Therefore, this aggregate report is consistent with federal direction.

As part of the regular consolidated application process for federal funds, beginning with the second year of NCLB funding, districts are further required to specify the method they will use to (a) document that the proposed activities did occur; and (b) evaluate the project success. State consultants charged with monitoring federal programs in districts will utilize the accountability measures outlined by the district in its local consolidated application to evaluate their Title II Part D projects.[21]

Assessing the effectiveness of the formula-funded program depends upon local measures monitored as part of the comprehensive monitoring process by state consultants. For a more reliable methodology in evaluating how effective the formula funds are in integrating technology into curricula and instruction, the state will recommend adopting site-based observation techniques. These techniques and the necessary tools are being developed in conjunction with the competitive grant programs and funded through the ESETP grant which concludes in 2006. Trained observers are required for this approach. The state proposes to train the federal consultants who monitor federal program in the use of the tools so they can incorporate this into their technical assistance and monitoring responsibilities.

Assessing effectiveness in the use of the formula funds is particularly difficult given the range in award size. Regardless of how small the least-funded district is, there is only so

[21] Given the timing delay of federal funds in the first year of the consolidated application process, explicit accountability measures for Title II Part D were not specified in the district application for SY2003, other than documenting that 25% of the funds were used for professional development.

much that can be accomplished with less than fifteen hundred dollars.[22] State policy typically requires accountability measures be used consistently across the state. Therefore, the same accountability standard applies to all, regardless of funding level.

Competitive Awards

The accountability process used for the competitive grant recipients depends upon the nature of the grant award.

- EdTech LAUNCH [2003-2004, 2004-2005] (Leading All Users to New Challenging Heights) grants constitute the major award type during rounds one and two. For this program, a three-year external evaluation process is employed using a matched-control quasi-scientific research design based on data collected from a school-level Formative Evaluation Process for School Improvement (FEPSI) and student-level achievement and performance analysis. The external evaluation is funded by the grantee's award, state administrative/project funds, and by the Appalachian Technology Education Consortium (ATEC)[23] and is conducted by the Center for Research in Education Policy, located at the University of Memphis.

- EdTech GEAR [2003-2004] (Generating Equal Access for Remote areas) is a small competitive grant funded with residual funds from the first round of EdTech LAUNCH. As such, it is a one-time opportunity. There are two tiers of immediate impact: (1) the actual development of a cadre of online course facilitators through participation in an online training course and practicum; and (2) the subsequent participation by district educators in the workshops offered by the new course facilitators. Accountability for these tiers is initially a simple matter of completion rates and participant evaluations. The facilitators are further required to establish a viable work-based accountability measure for workshop participants. The third tier of impact is teacher classroom implementation. The accountability measure for this tier is designed by the facilitators as they plan their implementation programs.[24]

- EdTech ORBIT [2005-2006] (Orchestrating Regional Bases for Integrating Technology) is projected to be the third round of the EdTech funding process. ORBIT will provide a distribution model for a professional development program derived from the LAUNCH model. Part of the accountability model for this program (still in draft mode) will incorporate some of the same on-site classroom observations by trained observers to determine the impact of professional development on the classroom teaching style of participating teachers. Educators will be assisted in analyzing their student performance data in conjunction with their participation as ORBIT clients.[25]

---

[22] According to E-TOTE 2002-03, the district receiving the least funding has 418 students compared to the most highly funded district's 120,068.
[23] EdTech LAUNCH web site: http://www.tennessee.gov/education/acctedtech3.htm
[24] EdTech GEAR web site (including downloadable Request for Application, program description): http://www.tennessee.gov/education/acct-gear.htm
[25] A conceptual presentation of the ORBIT program is contained in the EdTech LAUNCH Request for Applications document.

Evaluating State Education Technology Programs

To further quantify the impact of the EdTech LAUNCH and EdTech ORBIT efforts using a true scientific research model, the state applied for and received one of ten federal discretionary grants that fund efforts to Evaluate State Education Technology Programs (ESETP) over a three-year period.[26] Working under a cooperative agreement with the U. S. Department of Education, Tennessee's EdTech Accountability Model (TEAM) will build on the quasi-scientific study that has already been scheduled as part of the external evaluation process for EdTech LAUNCH. Funding from the new discretionary grant will produce a scientific research study and will generate evaluation protocols that will be incorporated throughout the federally funded technology-related initiatives in the state.

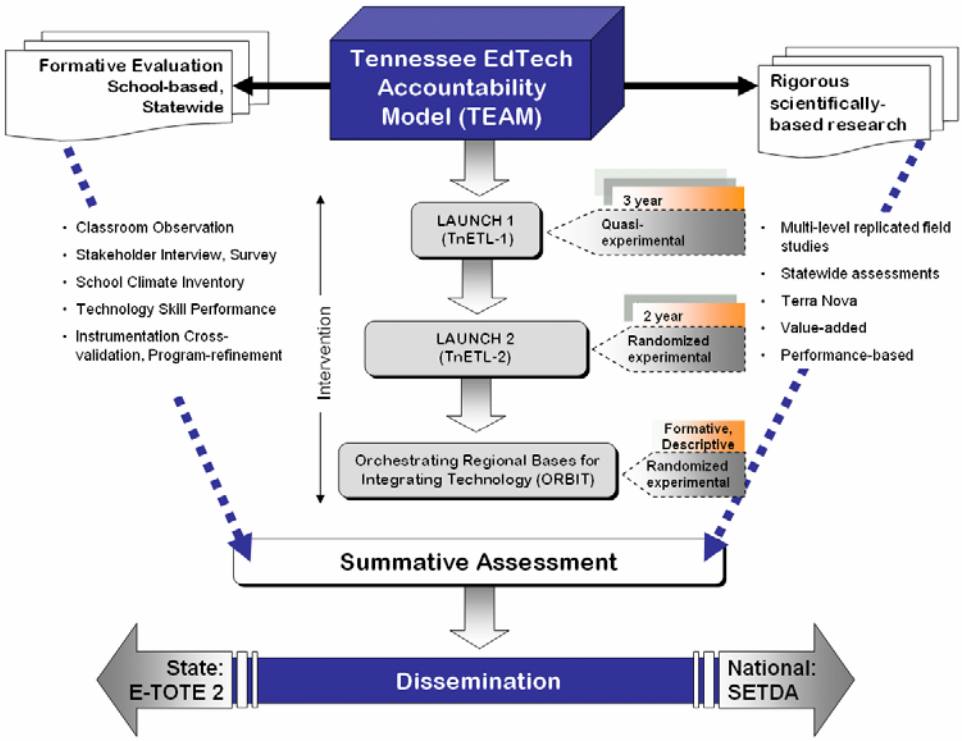


Figure 6: Tennessee EdTech Accountability Model [TEAM]

[26] The purpose of the Evaluating State Education Technology Program grant is "to increase the capacity of States to design, conduct, and procure high-quality evaluations of educational technology". To do so, this competition supports grants to States to: (1) Build their capacity to conduct scientifically based evaluations of educational technology interventions, by planning and conducting an experimental or quasi- experimental evaluation of a State-selected educational technology initiative; and (2) widely disseminate pertinent information, based on what is learned about the evaluation methods, practices, analyses, and instruments used, that will help other States enhance their ability to conduct similar empirical evaluations." (Federal Register June 11, 2003, 68:112)

Additional Technology Accountability Procedures

Technology Plan Reviews. The Department of Education reviews district technology plans to ensure they meet the requirements of section 2414 of Title II Part D as well as the requirements for E-rate applications. A Technology Plan Criteria sheet (TPC) was developed and first used for the 2003 review cycle.[27] The TPC combined for the first time the E-rate and federal technology plan requirements to encourage school districts to produce a unified long-range strategic technology plan. (The TPC was derived, with permission, from the work of the Oregon Department of Education's Office of Technology.)

The lengthy district technology plan review and revision process experienced in 2003 will be significantly reduced in the future once districts better understand the requirements for the technology plan, due in part to the department offering technical assistance sessions for developing a technology plan.

Funding Internet Access. The Request for Proposal for the statewide network includes provisions for levels of service expected to keep pace with the local demand. The Department's Office of Technology Infrastructure is responsible for ensuring that the contractor performs according to the scope of service specified in the multi-year contract and for performing any service interval reviews. The ConnecTEN network is funded with state appropriated funds and federal E-rate funds. The State Department of Education files for E-rate funds as a consortium on behalf of all participating Local Education Agencies. The current funding proportion for the ConnecTEN network is 30% in state funds and 70% in E-rate funding.

Distance Learning. While the state provides grants for online Advanced Placement courses for students in schools that cannot offer the courses, there is no official process in place to determine the relative value of the online courses compared to face to face courses. However, the accountability measure is a simple one: the completion rate of the students who are enrolled in the program and the fact that the program makes access to these Advanced Placement courses available where there had been no access.

[27] The TPC can be downloaded from http://www.tennessee.gov/education/acct-tpc2.doc. A copy is included in Appendix D.

5. Innovative Delivery for Underserved Areas

In order to meet stringent standards and increase student achievement, specialized rigorous academic courses and curriculum must be available to all Tennessee students. Therefore, the state will seek and support the effective use of innovative strategies to ensure that students in schools that have insufficient resources or that are geographically isolated are served. State-sponsored efforts in using distance learning technologies are in the beginning stage and rely heavily on the Internet access provided to all schools. While some current distance learning opportunities are directly student-focused, most are for professional development.

As the state's competitive EdTech program moves into the ORBIT program stage, the regional professional development model centers will be encouraged to incorporate distance learning for their clients.

The innovative delivery strategies include:

1. On-line courses for students and virtual schools
2. On-line formative student assessment
3. On-line professional development
4. Tennessee Electronic Library
5. Video conferencing
6. Assistive technology
7. Internet2 (under study)

5

"A description of how the State educational agency will encourage the development and utilization of innovative strategies for the delivery of specialized or rigorous academic courses and curricula through the use of technology, including H. R. 1—252 distance learning technologies, particularly for those areas of the State that would not otherwise have access to such courses and curricula due to geographical isolation or insufficient resources."

NCLB §2413(b)(5)

On-line Courses for Students and Virtual Schools. The state will continue its participation in the AP Nexus federal grant project as long as federal funds are available. Sponsored by a Southern Regional Education Board (SREB) Apex Learning project, this program makes online Advanced Placement courses available to students in geographically isolated areas or in districts with insufficient resources. Legislative action to continue this effort with state funds has been proposed but was not funded in the 2003 legislative session.

The state is actively investigating the potential of starting a state virtual high school and is considering the use of virtual schools as one form of alternative governance under No Child Left Behind.

On-line Formative Student Assessment. The state plans to develop on-line formative assessment tools that align with the discrete objective performance indicators addressed in the annual standardized Tennessee Comprehensive Assessment Program (TCAP). Teachers will be able to utilize the results from these online assessments to better target instructional strategies to content areas where students do not show mastery. The initiative will also support a more focused individualization of instruction.

On-line Professional Development

a. **Institute for School Leaders (ISL).** In conjunction with the Peabody College of Education at Vanderbilt University, the Bill & Melinda Gates Foundation, and Little Planet Learning, Inc., the department's Office of Professional Development developed a unique series of leadership development academies based on the Interstate School Leaders Licensure Consortium (ISLLC) standards.

(http://www.schoolleader.net/). After participating in a four-day on-site academy with a cohort of 30 administrators, participants continue to have access to the same professional materials, streaming video vignettes, and research-based readings they utilized in the academy. These materials are delivered on-line to enable the administrators to bring the research-based methods into faculty meetings and other school improvement endeavors. This innovative program is based on the challenge-based "learning cycle" developed by cognitive learning scientist John Bransford[28]. According to the program's prospectus, every principal in the state will participate in this Institute for School Leaders.

With the success of the ISL program for administrators, the office of Professional Development is providing the opportunity at the teacher level, with some script modifications.

b. **GEAR (SREB ETLO)**. The state encourages the development and use of innovative delivery strategies for academic courses and curricula through the use of technology by its support of the online professional development initiative established with the competitive GEAR grants. The educators serving as the GEAR on-line course facilitators hosted presentations for the state's educators at the 2003 state technology conference. These presentations introduced the online workshops they planned to teach and shared reflections about the impact of online learning. GEAR grant recipients have been encouraged to include educators from other school districts in the additional workshops they offer after the completion of the grant. Through this network, access will be more available to those school districts that do not have ready access to high-quality, ongoing, sustained professional development.

Part of the rationale for developing online course facilitators and exposing teachers to a controlled online learning environment is to encourage educators to imagine how to optimize the benefits of online learning to complement the face-to-face learning environments they create for their students. The rationale thus includes capacity-building: if teachers themselves have strong positive experience with distance learning, it is believed they will be more inclined to support similar applications for student learning. In other words, they will be more able to extrapolate the hallmarks of successful distance learning initiatives.

The GEAR initiative is the result of the Multi-state Online Professional Development initiative of the Southern Regional Education Board (SREB). The SREB program was funded by a grant from AT&T and utilizes the services of the Education Development Center (EDC)'s EdTech Leaders Online (ETLO) [29] program. ETLO's monograph on Successful Online Professional Development[30] carefully lays out appropriate uses of this type of distance learning project.

c. **The Comprehensive Literacy Classroom**. In collaboration with the Appalachian Education Laboratory (AEL) and a grant from the Appalachian Regional Commission (ARC), the department is creating The Comprehensive Literacy Classroom, an online professional development program. The program is designed to

[28] See John D. Bransford, Ann L. Brown, and Rodney R. Cocking, eds. (2000). How people learn: brain, mind, experience, and school. National Academy Press
[29] For information on the ETLO program, visit http://www.edtechleaders.org/
[30] http://www.edtechleaders.org/Resources/articles/SuccessfulOPD.pdf

improve the assessment of literacy and the teaching of reading in the Reading First schools. The first module, Assessment and Intervention in a Comprehensive Literacy Classroom, was on schedule to begin in January 2004. The approach is designed to encourage a professional learning community model that joins educators from various regions across the state. The ARC funds increased bandwidth access in twenty-five counties located in East Tennessee Appalachian areas as well as rural west Tennessee to accommodate the streaming video components of the program. For systems with limited resources that choose to use the program in the future, the video portions will also be available in CD format.[31]

Tennessee Electronic Library (TEL). Through the Tennessee State Library and Archives, a division of the Tennessee Department of State, all school libraries in Tennessee have free access to nineteen selected electronic databases provided by the Gale Group. TEL is supported by federal funds under the Library Services and Technology Act.[32]

Video Conferencing

The Department's Office of Special Education broadcasts regular video conferences fed from the U. S. Department of Education and other major content providers. These conferences are primarily informational in focus. Broadcast locations throughout the state make use of video conferencing capacity in other state agencies in addition to the facilities in local education agencies.

The state is interested in further exploring the use of video conferencing to deliver specialized courses to students and to share master teacher experiences with educators.

The Appalachian Education Laboratory (AEL) donated several ISDN video conferencing units to the state who provided them to three recipients of the EdTech competitive grants with distant mentor schools. AEL had received the equipment as a donation from the Diversified Information and Assistance Network (Project D.I.A.N.E.) headquartered at the Tennessee State University.[33]

Assistive Technology

While Assistive Technology is not a distance learning initiative, use of assistive technology is definitely an innovative delivery strategy. Assistive Technology is the particular concern of the Office of Special Education[34]. Approximately fifteen percent (15%) of Tennessee students are identified as needing special education intervention. These children have assistive technology considered with their Individualized Education Program (IEP). About fifteen percent (15%) of children needing special education intervention require significant assistive technology assistance.

---

[31] Phone calls with Carol Thigpen (Regional Representative for AEL) on 10/16/03 and 10/27/03

[32] Tennessee Electronic Library (TEL): http://www.tennessee.gov/sos/statelib/tel/ and http://infotrac.galegroup.com/itweb/tel_main. For a list of the electronic resources, visit http://infotrac.galegroup.com/menu

[33] Established in 1992, Project D.I.A.N.E. is a Diversified Information and Assistance NEtwork with collaborative focus on health, education, community, and economic development. See www.diane.tnstate.edu

[34] Http://www.tennessee.gov/education/speced

School systems must implement the technology specified in the IEP within forty days of its identification. Off-the-shelf or locally fabricated equipment can be used and can be procured through the federally-funded Office of Special Education, local funds and community support.

Schools in the Tennessee Early Intervention system work with the Engineering Department at Tennessee Technological University to create equipment required by children they serve. This collaboration gives engineering students the opportunity to utilize their engineering expertise to solve a "real-life" challenge and create assistive devices to suit the individual needs of specific students. The engineering departments of East Tennessee State University, Jackson State Community College and the University of Memphis are also being encouraged to engage in this collaborative effort.

The Department oversees twelve service centers which offer training to special education educators and service providers and consultative services on purchase options. The department administers three special projects with services ranging from 1) training pre-service teachers, 2) offering specific software/hardware vendor options to 3) scheduling sessions where a non-IEP child is paired with a child receiving special ed services to increase awareness, acceptance and friendship, as well as providing peer tutoring to these at-risk students. [35]

Internet2

The Department of Education has conducted an initial investigation into the feasibility of participating in Internet2, the high-performance Internet backbone (Abilene) serving the higher education and research community. The Internet2 regular member universities who have approached the Department with interest in sponsoring the K-12 community are Vanderbilt University, the University of Tennessee (Knoxville), and the University of Memphis. Initial fact-finding about applications for Sponsored Education Group Participant (SEGP) status was begun. The universal application which Internet2 could make available to K-12 schools is interactive video conferencing that is technically superior, does not depend on dedicated ISDN lines, and does not incur additional telecommunication expenses. Internet2 videoconferencing would be available in any school room having an active Internet connection. Internet2 could provide students with realtime access to remote instruments such as electron microscopes. The project is in the investigative stage at this point.

[35] Phone call with Lewis Butler, Assistive Technology Coordinator, Tennessee Department of Education Office of Special Education on 10/21/03

6. Funding

Current funding for the various strategies discussed in this document comes from both state and federal sources. Federal funding from Title II Part D of NCLB supplements state funding.

> 6
>
> "An assurance that financial assistance provided under this subpart will supplement, and not supplant, State and local funds."
>
> *NCLB §2413(b)(6)*

In outlining his priorities for education, Governor Phil Bredesen lists "making better use of technology in the classroom" his fifth priority. In line with this promise to Tennesseans, in his January 2004 State of the State address, Governor Bredesen listed a $2 million initiative for new classroom technology as part of his budget priorities for education.[36] Bredesen stated "I am asking for a modest investment to allow us to begin developing real state-of-the-art computer technology in the classroom. No Child Left Behind has underlined for us that we have schools and classrooms with difficult challenges. Over the past decade, modern business has used technology to transform how it performs. We should do no less for our children."[37]

The Governor's communication office later released the following statement:

> **Making Better Use of Technology**: New computers and software are powerful tools that can help teachers and administrators in their daily routines. With that in mind, Governor Bredesen is setting aside $2 million in technology grants for school systems to purchase new software to help improve results. Moving forward, the Governor is committed to making better use of technology in our schools.[38]

State Funds

State Network (ConnecTEN). ConnecTEN, the statewide K-12 Internet network, is available to all public school districts in the state. State funds pay for the non-discounted portion of the network, while E-rate funds are used to pay for the discounted portion. In 2003-2004, the state budget figure for ConnecTEN nears six million dollars, a portion of which comes from the BEP. This expense is considered a "classroom component" as far as the BEP funding formula is concerned, with the local district portions adjusted out of their BEP allotments.

Information Systems. A Request for Proposals (RFP) for a common student information system that will feed data needed for state and federal reporting was recently issued by the state and a contract awarded. The Office of Information Infrastructure and the Deputy Commissioner of Education oversee the system design and implementation. The program will be funded through existing state funds and will be available at no cost to LEAs.

The State Board's 2003 Master Plan identified $300,000 for the first of a three year expenditure to modernize the teacher licensure database system. This represents the only new money requested for technology in the State Board's 2003 Master Plan.

[36] http://www.sitemason.com/files/cHcGze/news%20release%20as%20PDF2.pdf
[37] http://www.sitemason.com/files/fRsN2M/020204%20SOS%20Release.pdf
[38] http://www.sitemason.com/files/eyfIe4/Education%20Priorities.pdf

BEP Formula. The Tennessee Basic Education Program (BEP) funds technology at the local level. The following State Board of Education statement explains the concept behind the BEP "formula":

> The BEP components serve as the basis for calculating the level of funding for each school system. These components represent the level of support necessary for our schools to succeed. The components serve as the basis for calculating the level of BEP funding for each school system; the BEP does not prescribe specific levels of expenditures for individual components. Actual costs of the essential components are monitored and updated from year to year. Total costs are calculated by applying cost specifications to schools' census data.
>
> Equity adjustments (cost of operations adjustment and fiscal capacity adjustment) equalize responsibility among the local school systems based on variations in the cost of delivering services to students and in relative fiscal capacity.[39]

Thus, the "formula" calculates what funding is needed to support education in the state, but "**does not prescribe specific levels of expenditures of individual components.**" The classroom components are currently funded 75% by the state, with the remainder expected to be provided by the local districts. Non-classroom components, on the other hand, are shared fifty-fifty.

For 2003-2004, the technology related BEP Formula items are

Classroom Components (State share 75%)	Technology	$22.18 per total ADM $20,000,000 distributed on ADM basis
Non-Classroom Components (State share 50%)	Technology Coordinators	1 per system with one additional for each 6,400 ADM

While the BEP does include technology as part of the funding formula, the degree to which those funds are used locally for technology depends upon local discretion.

Federal Funds

The federal financial assistance provided as administrative funds under Title II Part supplements state funds. They do not supplant state funding. The state's administrative allotment from Title II Part D funds the annual statewide technology survey project and contributes to the cost of the external evaluation of the competitive grants.

All local applications for funding under Title II Part D include assurances signed by the Director of Schools. The Directors assure that the funds will be only used to supplement, and not to supplant, the local funds. Periodic program monitoring and audits are used to ensure integrity in this matter.

Title II Part D funds are allocated to local districts based upon their Title I Part A funding formula, as required by No Child Left Behind. Funds from districts that decline participation in Title II Part D are reallocated in a one-time redistribution. Reallocation recipients amended their projects to utilize the additional one-time funds.

[39] Tennessee Basic Education Program 2003-2004. Available online www.tennessee.gov/sbe/bepblue0304.pdf

7. Technologically Literate Educators

The State Board's vision is that "teachers … use… technologies to ensure that all students learn." In its strategies for technology, the Board states it will "support opportunities for teachers and administrators…[to] develop competence in using technology to meet instructional goals." It further asserts the intention to "ensure that all teachers use technology for instruction."

The state works to ensure that teachers and principals are technologically literate through its licensure standards, teacher evaluation process, and ongoing professional development opportunities.

7

"A description of how the plan incorporates teacher education, professional development, and curriculum development, and how the State educational agency will work to ensure that **teachers and principals** in a State receiving funds under this part are technologically literate."

NCLB §2413(b)(7)

Licensure Standards

Tennessee's State Board of Education's Professional Licensure Standards for all prospective teachers, adopted in 1997, incorporated the foundation technology standards developed by the International Society for Technology in Education. In December 2000, the Board adopted the performance-based approach of the National Council of Accreditation of Teacher Education (NCATE). Standard 11[40] (cited below) is the licensure standard that directly addresses technology performance.

Standard 11

Technology.

11.a. Candidates use technology and technology based resources to facilitate developmentally appropriate student learning.

Supporting Explanation

Candidates use technology resources to guide classroom decisions regarding student learning. They integrate instructional technology to facilitate interdisciplinary teaching and learning in their classrooms, to supplement instructional strategies, to design instructional materials, and to enhance hands-on experiences and problem solving activities. Candidates select and use grade-level and content-specific technology resources, including assistive technology, to increase student participation in the total curriculum. They apply technology to analyze assessment data and to target individual student learning needs.

11.b. Candidates use technology to enhance their professional growth and productivity.

Supporting Explanation

Candidates use technology in their own learning process and to change their current educational practice. They use technology to gather, sort, and analyze information needed for their own research projects and to communicate and collaborate effectively with other professionals. Candidates use tools such as databases and spreadsheets for sorting, compiling, and analyzing data gathered

[40] http://www.state.tn.us/sbe/profeduclicensure.htm

from a variety of sources. They use presentation tools in a networked environment for sharing information in multiple professional formats.

11.c. Candidates effectively use and manage all technology available to them and explore uses of emerging resources. They promote the equitable, ethical and legal use of technology resources.

Supporting Explanation

Candidates design effective environments for using and managing technology in the classroom. They are able to perform minor trouble-shooting operations. When planning units of instruction, candidates address software purchasing agreements, copyright laws, issues related to intellectual property, the importance of virus protection, and policies for acceptable use of Internet resources. Candidates seek information from technical manuals and journals as well as on-line resources to learn about emerging technologies and to explore their possible educational applications. They model the legal and ethical use of technology resources.

For initial teacher licensure for graduates of Tennessee colleges and universities, the state depends upon the recommendations of the accredited teacher education unit. The credentials of other candidates are reviewed by the Office of Teacher Licensing and Certification.

Thirty-nine Tennessee colleges and universities are approved by the state to offer a teacher education program. Of these, eighteen are also accredited by the North Central Association for Teacher Education (NCATE). The NCATE[41] program review program process includes technology as an overall theme throughout its six standards. It is the responsibility of these institutions and their accrediting agencies to ensure that the candidates presented for licensure are technologically literate and meet the performance based criteria described in the Technology Standard (11).

Licensure Renewal. At the present time, there is no requirement in the license renewal process that teachers and principals be technologically literate. While technology application courses and technology integration workshops may be used as part of an application for renewal, there is no mandate that this be the case.

The state believes it important to begin an investigation into how technology literacy can become a required part of the educator's licensure renewal process.

Teacher Evaluation. The State Model for Teacher Evaluation allows experienced or tenured educators to request a focused evaluation. One such focus can be a lesson that integrates technology. Anecdotal reports from recipients of recent EdTech competitive grants show teachers in these schools are now opting to include technology in their focused evaluations. This suggests that the professional development programs funded by the competitive grants are having the desired impact on teacher technology literacy.

Ongoing Data Reporting. Using part of its administrative project funds from Title II Part D, the state funds an annual technology survey. Since its inception in the 2002-2003 school year, this E-TOTE survey asked principals about the technology literacy of

[41] NCATE web site: http://www.ncate.org/

teachers and administrators. (Refer to the 2003-04 E-TOTE Survey Items in Appendix G. In particular, see the STaR chart items H and I.)

With the E-TOTE survey, the state asks school administrators each year to report the technology literacy of their teachers, the degree to which technology is integrated into the teaching strategies, and the manner in which technology is incorporated into core curriculum areas.

Systemic Professional Development

The state's most ambitious project that supports a systemic approach to professional development for technologically literate educators is found in the way it has designed its **competitive EdTech grant program, EdTech LAUNCH**[42]. The state's design for the competitive EdTech grants deals directly and purposefully with the need for educators to become technologically literate. These competitive grants focus specifically on effectively using technology as part of everyday teaching and learning.

In year 1 and year 2 of Title II Part D, the structure of the competitive grants funds whole school professional development programs in which 40% of the funds must be dedicated to professional development. While devoting significant resources to a small number of grant recipients, the state expects to establish a distributed network of model schools.

The state's design for the competitive EdTech grants scales up in its third year, developing regional technology professional development **ORBIT centers** that grow out of the network of model schools. The ORBIT project will thus extend the impact of the earlier competitive grants and thereby assist a wider range of educators in becoming technologically literate.

The vision for the distributed ORBIT network developed under the auspices of EdTech-competitive is based on the conviction that educators need to see real life models of what effective technology integration "looks like" and need to communicate with teachers who model effective practice. Access to technology in terms of infrastructure is certainly a necessary component of using technology to improve student learning. But the infrastructure access is meaningless if teachers do not actually employ the technology that is available to them. In most cases, the biggest impediment to this use is the absence of meaningful, job-embedded professional development that is both ongoing and sustained.

In the distributed ORBIT network, technologically literate teachers, who successfully integrate technology into the curriculum, will serve as the nucleus for a growing professional learning community extending beyond the walls of the initial Launch schools. Through this mutually beneficial approach of teachers learning from teachers who have gone before, Tennessee plans to ensure that technology literacy for educators is a valued and lasting characteristic of all educators in the state.

Ongoing professional development in technology literacy is further supported by the state as it seeks to utilize distance learning opportunities for its educators. The state funded the

[42] http://www.tennessee.gov/education/acctedtech3.htm (year 1) and http://www.tennessee.gov/education/acctedtech7.htm (year 2)

EdTech GEAR[43] program with residual monies from the first round of EdTech funds. The program trained fourteen educators throughout the state as on-line course facilitators. Program participants now have access to a catalog of on-line workshops which they can facilitate for educators in their district for a nominal fee. While the majority of the initial participants in these facilitated workshops are drawn from the facilitators' own districts, subsequent offerings can be made available to teachers at large to take advantage of the any-where, any-time features of on-line learning.

The department will encourage districts to collaborate in providing the workshops and to use funds from their formula EdTech awards to remunerate the workshop facilitators and provide stipends to educators who successfully complete the performance-based requirements of the workshops. As an additional incentive to administrators who seek to improve their technology literacy, professional credit for certain of the workshops can be provided by the Office of Professional Development's Tennessee Academy for School Leaders (TASL) program. In other instances, local districts are encouraged to offer its educators professional development credit.

Other Professional Development Approaches

1. The **Institutes for School Leaders** (ISL) is Tennessee's Gates Foundation Leadership project. Funded under the Bill and Melinda Gates Foundation, ISL engages all school administrators in evaluating the state of technology readiness and implementation in their schools. While essentially an exposure exercise, the administrator's use of the Taking a Good Look at Instructional Technology (TAGLIT) survey school-wide does represent a statewide approach to the significant need for developing the technology literacy of educators.

2. **Local uses of Title II Part D formula funding.** Each district's consolidated application for federal funds includes, as mandated, a minimum allotment of Title II Part D funds for professional development. Informal reports indicate that many districts use more than the minimum for educator professional development in technology integration. In some cases, the full Title II Part D allotment is used entirely for professional development. Choices for professional development providers and delivery systems are made at the local level, in ways that best fit the local needs. (In both 2002 and 2003, only two waivers for the professional development mandate were given.)

[43] The workshops offered through the EdTech GEAR program are provided through Education Development Center, Inc.'s EdTech Leaders Online (ETLO) initiative. Three Tennessee educators piloted the program in spring 2003 as part of a program made available by SREB to its member states. The training courses were funded by a grant from AT&T. For additional information on the EdTech GEAR program, see www.tennessee.gov/education/acct-gear.htm

8. Technical Assistance to LEAs

All school districts in Tennessee are eligible for formula allocations under section 2414. Those districts with the highest numbers or percentages of children in poverty are typically those districts with the largest formula allocations. Those with the greatest need in the application process are frequently those with much smaller allocations. Therefore, the state offers technical assistance to all section 2414 applicants.

> 8
>
> "A description of—
>
> "(A) how the State educational agency will provide technical assistance to applicants under section 2414, especially to those applicants serving the highest numbers or percentages of children in poverty or with the greatest need for technical assistance; and
>
> "(B) the capacity of the State educational agency to provide such assistance."
>
> *NCLB §2413(b)(8)*

The state provides assistance to these districts through the consolidated application workshops sponsored each year by the federal programs staff. This staff includes a Title II Part D formula specialist who provides specific technical assistance on IID issues.

To streamline the application process, each year the state has refined its application documents, resulting in a simple, straightforward set of forms. (See Appendix E for a copy of the IID application section.) The applicant uses the forms to outline what services it will provide its schools, which groups it will target, and what documentation and accountability measures it will employ. Technical assistance sessions are designed to assist district submit applications that are in substantially approvable form the first time. The state thoroughly reviews each application and provides additional assistance for those districts whose applications are found lacking.

Legislation requires all Section 2414 applications to have a state approved technology plan. The state reviews district technology plans on a three year rolling cycle planned to coincide with the E-rate review cycle. To assist districts develop plans that meet the mandate, the state reviews the technology plan criteria with districts in planning sessions scheduled specifically for this purpose. The state encourages districts to send their federal program directors and their district technology coordinators to these meetings, since implementing Title II Part D frequently involves both parties.

The IID formula specialist offers work sessions with districts whose technology plans are due for review. As a district revises its plan, it demonstrates how it aligns with the criteria and uses the provided TPC form to do this. (See Appendix D). As it reviews the plans, the state further assists the districts with written feedback that highlights areas that need to be strengthened or revised. The TPC document itself thus becomes a technical assistance record, as the plan may move through several iterations before it is finally approved.

The state maintains a Title II Part D web page that links to various components of Enhancing Education Through Technology.[44]

[44] http://www.tennessee.gov/education/acctedtech.htm

While all districts are eligible for the formula awards under Title II Part D, not all are eligible for the competitive grants. Technical assistance for the competitive grants begins with the regional information sessions held each year when the RFP for the grant application is published on the web. Much of the subsequent technical assistance to applicants is conducted through telephone and e-mail correspondence. The state posts the kernels of frequently asked questions (and answers) to a web page set aside during the application process.

Once the competitive grants are awarded and their technology coaches are identified, the state is actively involved in providing technical assistance to the grant recipients. The grant coordinator maintains a regular and ongoing mentoring relationship with the technology coaches who lead their respective schools in the grant program. The department provides professional development opportunities for the coach cohort, in concert with the services of its Regional Technology in Education Consortium member, ATEC. Each technology coach keeps a weekly reflective journal during the life of the program and submits entries once a month to the grant director. The director provides individualized technical assistance to the coaches, based on the formative assessment material contained in these journals.

The state has a vision for expanding and deepening the technical assistance that is available to all school districts. One way of accomplishing this is to harness the expertise that develops in the schools which receive the competitive grants. The plan for the future is to use the foundation established in the competitive grant schools as the basis for regional professional development centers throughout the state. At this point, these centers are referred to as ORBIT centers (Orchestrating Regional Bases for Integrating Technology).

The state's capacity to provide technical assistance comes, therefore, from a combination of resources. The Title II D formula specialist and the competitive grant director are the two primary resources. In addition, regional federal program consultants provide additional assistance. Acknowledging the limited human resources available for this technical assistance, the state recommends that grant recipients turn to prior grant recipients for mentoring assistance. The attempt to make this mentoring relationship systemic is embedded in the plans for the future ORBIT centers. Finally, the state's ability to provide technical assistance is bolstered by the publication of the Technology Coach Handbook which grew out of the support provided to the competitive grant recipients by ATEC, the federally funded regional technology in education consortium partner for the Appalachian region. The Technology Coach Handbook is a valuable resource for supporting effective technology integration and is available free as a web download.[45]

[45] See http://techcoach.memphis.edu

9. Best Practices

To establish best practices that can be widely replicated, the State is enlisting the efforts of competitive EdTech grant recipients in building a What Works knowledge base which will be brought to scale in the third year of the EdTech grant program when the state will pilot the ORBIT project.

> 9
>
> "A description of technology resources and systems that the State will provide for the purpose of establishing best practices that can be widely replicated by State educational agencies and local educational agencies in the State and in other States."
>
> *NCLB §2413(b)(9)*

The LAUNCH schools, like the pilot schools before them, identify juried best practices. As a first step in making their findings available, the state and local websites will feature these best practices. In consultation with grant recipients, the state will articulate a common What Works template.

The scientifically based research project, TEAM, is also designed to objectively identify what works in a professional development coaching model. The research project will produce an accountability model which schools and LEAs will be able to use in assessing their technology integration efforts at the classroom level. This model will be an integral part of the ORBIT project.

The recipients of the competitive EdTech grants will also produce a matrix of lesson objects designed to embed technology literacy in all curricular content areas across all grades. The state is working with its ATEC partner to post the results on the Techcoach website. These lesson objects will include the core content lesson object, a rubric for evaluating student technology literacy and core mastery, and sample student products.

Again in conjunction with its ATEC partner and its principal investigator at the University of Memphis, the state already has a Tech Coach Handbook which can be widely replicated by state and local education agencies in Tennessee and other states. This handbook will be invaluable to practitioners as they seek to replicate the best practices that have been identified.

These resources comprise a scaffold for a What Works project which will reach the distribution stage in the third year of the Title II Part D funding. At that time, the state has projected the creation of the regional professional development network called ORBIT centers. ORBIT centers will continue to develop the What Works project, at the same time that they fulfill their primary objective of assisting a wider audience adopt the proven best practices.

Since the first year of the ORBIT centers will be a pilot program, the state has incorporated a descriptive formative evaluation of the ORBIT centers within its TEAM research project. The data from the study will be used to refine the implementation of the system, further ensuring that what Tennessee adopts truly does represent Best Practice.

Upon the conclusion of its three year research study, Tennessee will actively disseminate the results of its study and participate in several national forums that ensure that the findings are available on a national scale.

10. Financing Strategies

10

"A description of the State's long-term strategies for financing technology to ensure that all students, teachers, and classrooms have access to technology."

NCLB §2413(b)(10)

Tennessee's strategic commitment to financing technology is clearly evident. First, the state provides statewide Internet access for all schools through the funding of ConnecTEN, at a current annual cost of $6 million (net of E-rate discounts). Further, as the earlier description of the BEP formula indicated in section 6, technology holds a recognized place in the algorithm for funding Tennessee's schools, with $20 million attributed to technology in the formula each year as well as salaries for the position of technology coordinator. In addition, the state takes advantage of regional consortia and grant opportunities to maximize potential. Finally, the state has adopted a capacity-building philosophy for all of its Title II Part D discretionary grant funding.

The "equity adjustment" that is a mainstay of the BEP program is a legislated mechanism which ensures that those districts with the least fiscal capacity receive a larger share of the funding formula. While the equity adjustment does ensure that all students, teachers, and classrooms are funded, it must be remembered that the decisions on the specific use of funds are made at the local level. The State Board specifies "adequate" classroom access to computers, and the State's target for student-to-computer ratio, as expressed in its consolidated application for federal funds, is five students to one Internet-capable computer ratio.

The state does ensure that the Internet, through the ConnecTEN network, is funded. The state also provides free web-based e-mail accounts to all public school teachers and administrators through its Ten-Nash e-mail system, currently operated as part of the ConnecTEN network.

Since Internet access is available to every school, the state has the infrastructure to provide students with access to on-line courses (through the AP Nexus program), teachers with access to practice assessments for students, and administrators with access to accountability report functions. The state's own Education website (http://www.tennessee.gov/education/) serves primarily as an information source as well as a repository of documents needed for the business of education in the state.

The state obtained an infrastructure grant from the Appalachian Regional Commission to improve the band-width of the Internet access in the Appalachian geographic area, in order to deliver online professional development for teachers of reading.

The state ensures that it takes advantage of the opportunities built into the state's participation in regional groups such as the SREB Technology Consortium, the Linking Leaders[46] program, and the national State Education Technology Directors' Association (SETDA).

Tennessee participated in an SREB sponsored program funded partially by a grant from AT&T to train a core group of educators as facilitators for on-line courses. (The EdTech GEAR grant originated as a result of this program.)

[46] The Linking Leaders state team is sponsored by the National Alliance of State Science and Mathematics Coalitions (NASSMC), in collaboration with the National Aeronautics and Space Administration (NASA).

Absent state funding for specific technology initiatives, the state has adopted a capacity-building philosophy for all of its Title II Part D discretionary grant funding. This approach requires grant participants to generate certain products which will be used to promote the common good in addition to meeting the grantee's own immediate goals.

Through the EdTech competitive grants, the state is building a cadre of technology coaches who become experts in job-embedded professional development; a network of schools whose teachers will become exemplars in integrating technology into everyday teaching and learning; and a cohort of faculties who are prepared to mentor other teachers in their modifications to teaching practice. The grant recipients are developing authentic assessment tools for student technology literacy, embedded in core content areas.

This use of federal discretionary grants is structured to culminate in regional collaboration among local school districts that will provide ongoing, sustained professional development to teacher cohorts. The state believes this dissemination model will maximize the impact of the conservative investments funded by federal monies.

The state utilizes the administrative project funds provided by Title II Part D to monitor the programs and provide ongoing individual mentoring to the technology coaches in their work with their teachers. This investment is designed to ensure that the regional collaboratives that are the eventual fruit of the grant program will be grounded with professionals who are experienced in scientifically based methodologies for using technology to help improve student learning.

11. Technology to Increase Parental Involvement

As the child's first and primary teacher, a parent's influence will often dominate over the influence of the school. For this reason, increased involvement of parents in their children's education is a significant objective for the state of Tennessee.

11

"A description of the State's strategies for using technology to increase parental involvement."

NCLB §2413(b)(11)

Web Presence. The Department maintains an extensive web presence that provides stakeholders with valuable information about its initiatives. A complete directory of schools is available, as well as curriculum standards, testing information, and program information. The Department of Education presents web-based district and school Report Cards so parents can find out how well their schools are doing with educating their children. The state's web site also maintains an online Directory of Public Schools at http://www.k-12.state.tn.us/sde/.

District and School Report Cards. Since 1995, the Department of Education has generated an annual statistical report identifying demographic data for the state.[47] This initial report was produced in hard copy and disseminated through the news media. As an accountability measure, beginning with the 1999-2000 school year, the department included system data in the Annual Report. With Report Card 2000, the accountability program added individual school report cards.

By publishing school report cards, the Department provides parents with significant information about their schools. The public awareness that ensued marshaled public opinion and parental involvement in unprecedented ways. (See http://evaas.sasinschool.com/tn_reportcard/welcome.jsp)

The impact of the web presentation of the school level report cards is strengthened by feature articles in the major daily newspapers throughout the state. Parents without easy web access ordinarily read about their school's progress in the newspaper or see features on the nightly news. (As required by law, parents of children in schools that have failed to make adequate yearly progress are notified directly by their school districts and are not left to rely upon web, newsprint, or television reports.)

Parental Involvement Reflected in District Technology Plans. In its local three-year Technology Plan, each Tennessee system includes a section listing steps it will take and activities it will initiate to increase parental involvement in their schools. An informal review shows that most systems maintain a website listing events and schedules of local interest, as well as "celebrating successes" within their schools. Individual schools also have websites listing specific information for students, parents and community members, points of contact for local personnel and links to resources for all viewers. The state encourages all systems to work with their county Adult Education Service providers to support and augment the services provided parents in their communities.

State Collaborations. The Tennessee Department of Education collaborates with many local and federally-funded projects utilizing technology for both publicity and training to increase parental involvement within their programs. Although statewide in scope, each collaboration has a specific purpose and focus for its individual project sites. Many of these cooperative agency groups use technology as part of their business model. Others explicitly include technology components in their client offerings.

[47] www.tennessee.gov/education/mrptarchive.htm

For a brief description of many of these state collaborations fostering parent involvement, see Appendix F. The auxiliary programs highlighted in the Appendix include "Smart from the Start," Head Start, Early Childhood Education Centers, Even Start, Family Resource Centers and Community Resource Centers, One Room Drop-in Schools (ORDIS), 21st Century Community Learning Centers, Character Education and Safe and Drug-Free Schools programs, and the Family Literacy Statewide Consortium.

Parental Technology Literacy. Technology is an integral part of today's society. To effectively increase parental involvement through the use of technology, parents and all adults working with children need to be technologically literate. This literacy is most effectively accomplished by permeating each and every community with appropriate personnel, programs and opportunities to equip all of its citizens to effectively use technology within their daily lives.

Parents of school children may find their initial exposure to technology comes from the technologically-generated materials which invite them to schools and other project sites to witness and learn methods used there and in the classroom. Using technology as a communication medium, schools encourage and entice parents to participate more fully in their child's learning and education. Becoming comfortable with their child's use of technology often leads these adults to learn the new skills themselves. Opportunities provided by many of the collaborative projects allow the parents to learn the needed skills for job placement and economic self-sufficiency. The Department of Education will continue to make information available to the parents of school children while it seeks, promotes, and encourages collaboration with local and national programs designed to foster parental involvement.

12. Competitive Size, Duration, Scope and Quality

12

"A description of how the State educational agency will ensure that each subgrant awarded under section 2412(a)(2)(B) is of sufficient size and duration, and that the program funded by the subgrant is of sufficient scope and quality, to carry out the purposes of this part effectively."

NCLB §2413(b)(12)

Section 2412(a)(2)(B) specifies that one half of a state's Title II Part D funds that flow through to school districts shall be used in a competitive grant program. The state designs the program to address the goals of the legislation. In designing a competitive grant program to Enhance Education Through Technology (Title II Part D's subtitle), Tennessee opted to build on what it had learned from the program it piloted in the final year of the Technology Literacy Challenge Fund program. The department's strategy funds large, quality, school-based sustained grants that not only generate lasting effect for the grantee, but also build capacity throughout the state and position the state for a regional service model that extends the reach of the newly developed quality programs.

Background. Prior to NCLB, Tennessee's main competitive technology program under the federally funded Technology Literacy Challenge Fund (TLCF) bankrolled individual teacher grants designed to reward teachers for producing small instructional modules that used the Internet. In the fourth year alone, over 6,000 teachers from 89 districts participated and completed nearly 10,000 "units", representing an 85% completion rate. The guiding principle behind this model was to provide vast numbers of teachers with hands-on experience in basic computer operations while attempting to find resources that would be useful in addressing a perceived learning gap in their students. The reward system provided funds to teachers through their school districts. For the most part, these funds were used to purchase classroom computer equipment. The program evolved into using the online repository known as Trackstar[48] to house the teacher products.

Facing the final year of the TLCF funding stream, Tennessee had to evaluate whether generating more tracks and paying technology dollars to more teachers would lead to the kind of systemic change that integrating technology into classroom instruction requires. A research study had been funded in the third year of the TLCF program which set about to determine the extent to which using the instructional modules affected the attitudes and performance of teachers and students. The study was conducted by Michael J. Hannafin of the University of Georgia.

The research reported that while teachers and students both attributed performance changes to the Internet units, actual improvements could not be confirmed using available achievement measures. The gaps identified by teachers could not be reliably linked to corresponding subtests in the state achievement test. Attitudinal changes were reported in both students and teachers, and a progressive increase in student ratings indicated a sustained impact. The study was not able to answer the extent to which the program improved student achievement. Since classroom implementation of the units was not observed, the study was also not able to determine the extent to which the units were implemented. .[49]

[48] Trackstar is an initiative of the High Plains Regional Technology in Education Consortium. See http://trackstar.hprtec.org/

[49] A copy of the report is available for download from http://www.tennessee.gov/education/acct-tlg-report.pdf

Pilot Program. The department recognized the inherent value of the site-based training that the TLCF grants provided. Preliminary discussions with Hannafin as he prepared his final report led the department to realize that a longer-term, more sustained and systemic approach was needed in order to see the desired lasting impact on teacher practice and student performance. The department capitalized on the site-based professional development that characterized the TLCF program. As a result, it built a pilot program that used a full-time technology coach to work year round with all teachers at an individual school. Teaching practice would extend beyond using the Internet and embrace all the common technology tools. Teachers would be coached in daily classroom activities that they designed to integrate technology into everyday practice. Grant funds would also be used to make certain that every teacher and every classroom had access to Internet-capable multi-media computers.

The state contracted with the Center for Research in Educational Policy (University of Memphis) to conduct an external evaluation including a series of classroom observations using a validated protocol at each of the 26 schools receiving the pilot program grant. The report indicated that concentrating resources for a sustained period of time did in fact produce significant change in those teaching practices that are associated with improving student learning.[50]

New Competitive Grant Program Following the success of its pilot program, the state designed the new competitive grant to use similar strategies: a full-time technology coach for an entire year, engaging all teachers in integrating technology in everyday practice, a site-developed ongoing professional development program, and sufficient investment in equipment to make everyday technology integration feasible. The state called the new program EdTech LAUNCH. Since Title II Part D requires the state to split its technology funds between formula and competitive awards, the state could only fund half the number of competitive grants it had in its pilot program.

The state built a mentoring component into the new LAUNCH grant program. Just as the teachers in the pilot program learned from their fellow-teacher-turned-coach, the state hypothesized that teachers in neighboring schools could learn from their peers who had participated in an earlier yearlong intensive program. The state struggled with the conflict that erupted when some stakeholders objected to such a small number of large-dollar competitive grants being available. (The struggle began when the state undertook the pilot year program that broke from the teacher-grant approach.)

For this reason, the state proposed continuing the single-school large-dollar competitive awards only twice after the pilot year. It would incorporate a mentoring model in the program to give participants quality peer-learning experience. Through two more years of intensive grants, the state believed it would have participant schools distributed throughout the state who would be qualified to assist other schools in integrating technology into their everyday practice.

Thus, from the outset, the state's strategic plan for the Title II Part D competitive grant program has projected a modified model in the third year. According to the plan, the third year will fund regional professional development collaboratives. The state coined

[50] Steven M. Ross, et al. Tennessee Technology Literacy Challenge Fund: Evaluation Report. 2002. Available online http://www.tennessee.gov/education/acct-tlcf-report.pdf

the term "ORBIT" centers for these entities, for they are conceived to become places that will be centers for **O**rchestrating **R**egional **B**ases for **I**ntegrating **T**echnology.

Duration. Findings in the external evaluation of the pilot program indicated that the ambitious program funded by those grants needed more than one year to accomplish their goals. As the researchers reported,

> Overall, we strongly feel that the TLCF program realized impressive progress in achieving its goals. Despite these accomplishments, there is only so much that can be done in a given year to create strong structures and communities of practice needed to ensure sustainability. Ultimately, for a program to be successful and sustaining, schools themselves must take ownership over implementing them. The one-year duration of the TLCF places schools on a much faster timetable for autonomy than is optimal. Still, if adequate ownership and interest exist at the school level, it should certainly be possible in future years for motivated teachers, coaches, and principals to maintain and improve the technology integration started under TLCF and documented in this report. (p. 9)[51]

Attuned to data-based decision-making, the state therefore used the evaluators' findings to make changes in the subsequent EdTech LAUNCH competitive grant proposal. Two changes relate to the program duration. First, grants are now awarded in the spring so that (a) purchasing can be completed before the new school year and (b) professional development can be initiated during the summer months. Second, to ensure the investment will result in sustainable change, the state requires local districts to commit to funding the coach for two years past the grant funded period. Additional consideration is being given to offering small supplemental continuation grants to recipients whose formula funding is too small to pay the coach salary.

Scope and Quality. Each school's competitive program will be led by a full-time indigenous "technology coach" who works closely with the school principal to ensure implementation success. The grant pays for the salary of the technology coach and can also pay for teacher stipends and substitute teacher pay.

To ensure local needs are met and all teachers are involved in a substantive manner, the schedule and content of the professional development sessions at each grant site are carefully crafted. While administrative and assessment uses of technology are certainly allowed, they are not permitted as the primary focus of the professional development program. Similarly, the use of integrated learning systems are not allowed as the primary focus.

To ensure quality, the state provides coach workshops that focus on integration and principles of job-embedded professional development to assist coached with program development. Mentor schools provide additional quality assistance. Through the work of ATEC, the state provides a Coach Handbook. Finally, the state maintains regular contact with each program by reviewing and responding to the coaches' required weekly reflective journals.

Through the EdTech LAUNCH grant program, Tennessee is confident that it is growing a network of living laboratory schools. Rather than attending a conference to hear about an

[51] Ibid.

innovative use of classroom technology, teachers will be able to visit a school to actually see the practice in action. Part of the unspoken social responsibility of the grant schools is to not only be open to these visits, but to cultivate informal mentoring relationships.

The state is committed to ensuring the quality of the program it has designed. The cooperative agreement with the U. S. Department of Education that funds Tennessee's scientifically based research program is designed to evaluate this very state educational technology program.

ORBIT Centers. The informal mentoring experiences of the LAUNCH schools will be formalized in the third year of the EdTech competitive program which will be designed for Orchestrating Regional Bases for Integrating Technology (ORBIT). These ORBIT grants will be awarded to multi-district collaboratives. The grants will fund the professional development program offered through the ORBIT centers. The grant program will also require district and business partner funding.

The centers will be physically located at one or more schools whose faculties demonstrate exemplary technology integration for improving student learning. The ORBIT coach and staff will provide sustained curriculum-centered technology professional development for cohorts of teachers. Cohorts will be engaged in the program for at least one entire academic year. These professional development cohorts come from schools within the collaborative's constellation. There will be an equipment component to the grant to ensure that the cohort participants are able to implement their integrated technology approaches in their home classrooms.

All educators involved in the Launch-to-Orbit program are expected to mature to a best practice performance level and ensure that students in their classes use technology as part of everyday learning for the 21st century. All are expected to contribute to an authentic assessment library. This state sponsored library will be made available online to provide educators statewide with portfolio-based objects for assessing student technology literacy.

Already available for LAUNCH schools, the Technology Coach Manual will continue to be a viable tool as the ORBIT centers become a reality. ORBIT staff will be encouraged to exploit the advantages of online professional development as part of their training protocol. Schools with teams in the ORBIT cohorts will be expected to adopt authentic assessment for student technology literacy.

With the Launch-to-Orbit sequence, therefore, the state has designed a competitive grant program in which the individual subgrants are of sufficient size and duration, with more than sufficient scope and quality, to implement the purposes of Enhancing Education Through Technology. The strategic plan is to scale the program so that teacher teams from schools whose entire faculty is not yet ready for full-scale technology integration will be able to participate in a program that will ensure that students in their schools will have the opportunity to use technology as part of everyday learning and so participate in the world where 21st century skills require the use of technology.

EdTech GEAR. The GEAR grants were funded in the fall of 2003 using residual competitive funds, as a one-time experiment. Enrolling fourteen educators in a semester long graduate level course, the grant's impact continues as the participants implement online workshops for educators in their area.

13. Full Integration by December 31, 2006

13

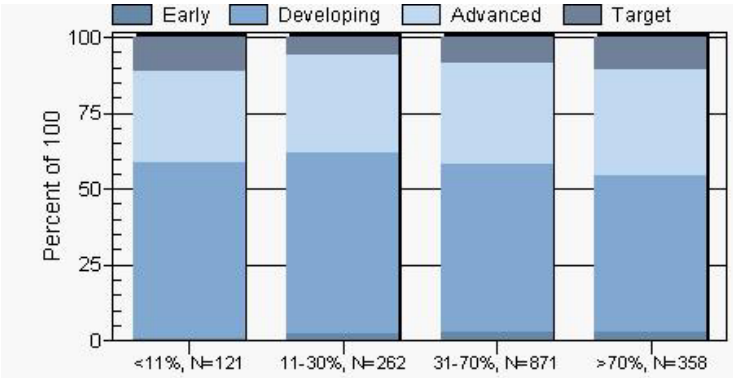
"A description of how the State educational agency will ensure ongoing integration of technology into school curricula and instructional strategies in all schools in the State, so that technology will be fully integrated into the curricula and instruction of the schools by December 31, 2006."

NCLB §2413(b)(13)

The state faces a critical situation in attempting to ensure that technology will be fully integrated into the curriculum and instruction by December 31, 2006. Baseline data collected in the 2002-03 E-TOTE self-reported survey data indicates that in over half of Tennessee's schools, technology is only minimally integrated into the curriculum. The good news is that less than 3% of schools statewide describe themselves at the Early level of technology integration in core curriculum area and around one-third of state schools consider themselves at the Advanced level.[52] However, tremendous strides will be needed to ensure full integration in all schools by the federal deadline.

However, given that half of the EdTech funds are distributed by formula to local districts, the state must rely on encouraging districts to focus their use of formula funds on technology integration. The state must encourage districts to consider increasing the extent to which all technology investments in other titles contribute to an integrated technology approach. The state's E-TOTE survey will provide the state with annual progress data which can be used to help guide districts toward achieving the federal expectations.

That the situation is critical is attested by the returns of the 2002-03 E-TOTE survey. (See Figure 7) The state will continue to exercise its creative strategic approach to competitive grants so that the grantee schools not only sustain their new teaching practice but also serve as active local dissemination models. The state's design for the discretionary, competitive grants will ensure that those grant recipients will demonstrate full integration. The ORBIT model slated for the 2005-06 academic year is designed to extend the integration into more schools, providing many more schools with opportunities to learn how to fully integrate technology into the school curricula and instructional strategies by the target date.



	<11%, N=121	11-30%, N=262	31-70%, N=871	>70%, N=358
Early	0.9%	2.5%	2.8%	2.8%
Developing	57.9%	59.3%	55.5%	51.8%
Advanced	29.8%	32.4%	33.1%	34.6%
Target	11.4%	5.8%	8.7%	10.7%

Figure 7: 2002-03 E-TOTE: Technology Integration STaR Chart D (Curriculum Areas)

On-line Professional Development. The state expects that the efforts of its school districts in meeting the federal goal will be enhanced by the introduction of a cadre of newly certified facilitators for online professional development workshops. These online specialists have been trained by the Education Development Center's EdTech Leaders Online Program[53]. The training program contained a practicum component which ensured that each specialist subsequently offered at least two workshops to educators within twelve months of completing the program.

[52] For the complete E-TOTE 2002-03 report, see Appendix C. Statewide and district level data are available online at http://tn.ontargetus.com/TNReports/. Publication of the 2003-04 survey data is expected early in the second quarter of 2004.

[53] http://www.edtechleaders.org/

Early reports from the participants in the EdTech GEAR initiative indicate that the professional development challenges in both large and small school districts are daunting[54]. The fact that Title II Part D mandates that one quarter of the funding be dedicated to ongoing sustained professional development underscores the federal recognition of the critical role professional development must play in achieving the national goals.

Districts with GEAR grants will also be in a position to include educators from other districts in the subsequent online workshops. Not only will this widen the circle of influence of these online courses, but it will broaden the professional learning communities by providing educators with ideas from teachers across the state.

One of the significant advantages of an online professional development model that offers high-quality curriculum-oriented content is its sustainability. Educators participate over an extended period of time (usually 5-6 weeks) which provides time for implementation practice. Participants frequently encourage fellow teachers to join in a subsequent class. The formula funding provided by Title II Part D, in even the most minimally funded district, can easily accommodate the cost of the workshops.

[54] A Tennessee participant reported that three trainers were responsible for the technology integration training for over 8,000 educators. Other participants cite the distances that teachers must travel to "show up" for after school professional development workshops. Facilitating and Implementing Online Professional Development: EdTech Leadership Online Specialist Program, Fall 2003. Unpublished asynchronous discussion board postings.

14. Incentives to Educators

A review of the technology plans and consolidated applications from local school districts reveal that districts are increasingly utilizing the expertise of their own staff to provide technology integration professional development to their educators. This method provides those educators with recognition, professional status, and, frequently, additional funding. While not an explicit strategy to encourage these technology leaders to remain in the urban and rural areas, the activities nonetheless support continuity within the district.

14.

"A description of how the local educational agencies in the State will provide incentives to teachers who are technologically literate and teaching in rural or urban areas, to encourage such teachers to remain in those areas."

NCLB §2413(b)(14)

Cultivating professional learning communities within schools can be a very effective stability incentive for teachers. When a teacher is valued for the professional contribution to peers, and when the contributions are financially remunerated, a teacher's commitment to the school is enhanced. Teacher turnover is an inevitable result of a mobile society. But anecdotal reports already indicate that when teachers in Launch schools adopt new teaching practices with technology, they value those increased opportunities which may become an incentive to stay.

Since the state piloted the technology coach model for building level professional development, and now offers a handbook for technology coaches, more local districts are considering their own technology coach programs, complete with financial incentives, which will encourage teachers who are technology literate to remain in their areas. By building a community of learners in schools with strong positive school climates, districts can generate the kind of incentive that money frequently cannot buy.

Technology Coaches

Tennessee began using the "technology coach" term with the inception of the TLCF2001 pilot school competitive grant program. The term "coach" was chosen carefully and the concept used in the original RFP purposely aligned the technology coach with other coaches in the school.

> As with other coaches, the technology coach gets to know the strengths of each team member and works with each player to improve skills and techniques. The technology coach cannot, however, hold team tryouts. All professional faculty members are automatically on the team. The coach encourages the players and is vital to team spirit.. The coach builds a playbook and seeks novel ways to enhance the team's effectiveness.[55]

The classroom teacher chosen to serve the faculty over the term of the grant program was expected to teach teachers how to integrate technology, to encourage teachers to actually implement the strategies they learned during training, to study best practices and to manage the overall professional development program that best fit the school faculty.

While some schools in Tennessee do, in fact, have a teacher who serves as the "go to" person for technology questions, and who frequently acts as a building-level technician,[56] the technology coach is a more formalized position. Schools receiving the competitive

[55] TLCF2001 Competitive Grant RFP (p. 6)

[56] Sometimes these teachers receive an additional stipend for performing these duties over and above their classroom teaching duties.

grants pay the technology coach position full-time. During the tenure as technology coach, the teacher was released from all classroom teaching duties. Sensitive to the fact that the tech coach may have already been functioning as building level tech support, and conscious that tech support could easily become a full-time responsibility, grant schools were advised that the new tech coach should not be the de facto tech support person.

The technology coach position was also conceived to be of limited duration. The intense work of the grant period was expected to bring all educators to the point of technology literacy and classroom integration. To the extent that goal was accomplished, the technology coach would no longer be needed in such an intensely focused manner.[57]

In the 2003 EdTech Launch competitive grant program, the technology coach is described this way:

> a building-level "technology coach" … effectively serves as the director of the professional development program designed to increase the extent and depth to which each teacher on the faculty integrates technology into everyday teaching and learning. The technology coach designs, implements, and delivers the ongoing professional development program; works directly with teachers to assist in implementing new instructional strategies through planning, observation, co-teaching and coaching; and administers the overall program.

As a direct result of the Tennessee's work with the "technology coach" concept, a Technology Coach Handbook was recently published by the Appalachian Education Technology Consortium. As the handbook states, "merely placing someone within a school district and calling her/him a 'technology coach' does not necessarily mean that that school or school district will be properly preparing students for the Information Age."[58] Three defined areas of responsibility for technology coaches are:

- Understanding effective technology integration,
- Enabling teachers to effectively integrate technology, and
- Facilitating a school-wide technology effort.

The majority of the technology coaches who served in the TLCF2001 pilot schools still serve in their school districts. In some cases, the local system asked the coach to take the coaching approach to a wider audience and to serve the district as a professional development leader. Such actions recognize the professional contribution of these teachers and encourage them to remain in their school districts. Interestingly, the technology coaches are often called upon by other schools and even other districts to provide technology integration professional development. Several of the original TLCF technology coaches today lead their entire school in serving as a mentor school to one or more EdTech Launch schools. Two of the original coaches now provide online professional development for the teachers in their districts and one more is being prepared to serve as an online course facilitator.

Thus, the "technology coach" concept, which the state designed as part of its competitive grant program, gives districts one method of recognizing a key group of technologically

[57] While this was the expectation of the program design, it became clear from the program evaluation that a single year was not sufficient to accomplish this expectation. Subsequently, the new competitive program provided a longer funding period to better ensure lasting impact.
[58] Technology Coach Handbook, pre-publication review copy. (p. 10)

literate teachers whose orientation is to help other educators in their school system mature in their own technology literacy. The state believes this approach to building lasting capacity is key to the overall design of the state educational technology plan.

Annual Tennessee Education Technology Conference

Each year, the Department of Education sponsors the Tennessee Education Technology Conference (TETC) in Nashville. The conference features three days of interest sessions, hands-on lab workshops, and a good number of half-day workshops. A full vendor exhibit hall which helps support the cost of the conference provides attendees with the latest information about new technology products and services. The vast majority of conference attendees are classroom teachers. Districts are obviously encouraging their teachers to attend the conference, providing them with opportunities to extend their professional associations while remaining committed to the district in which they serve.

Salary Equity

It is difficult to sustain progress in schools that have initiated programs with the help of special federal funds when teachers leave to teach in neighboring districts, simply for the benefit of a higher salary. When educators participate in targeted professional development programs and remain with their schools for longer periods of time, it is logical to expect their schools will be better able to realize the benefits of the targeted, formula, and competitive funds received. In Tennessee, salary equity has become a rallying cry for educators, particularly those in small school districts. The State Supreme Court has ruled that the state must move to equalize teacher salaries. As the Governor moves to address the resolution of the case, local education agencies will be in a better position to provide incentives to technologically literate teachers to remain in areas most affected by the salary equity issue.

Gubernatorial Support

The ultimate beneficiary of incentives to educators will be our school children. All students, whether rural or urban or suburban, need the 21st century skills. But, in the words of Governor Bredesen, "If we expect schools to prepare all students to succeed in today's economy, we must give them the tools they need, including strong teachers and modern resources." [59] Those modern resources undoubtedly include technology literacy and the teachers and curriculum and infrastructure necessary to make it happen for every child.

[59] http://www.tennessee.gov/governor/newsroom/releases/sept03/090403_no_child_behind.htm

15. Public and Private Entities

15

"A description of how public and private entities will participate in the implementation and support of the plan."

NCLB §2413(b)(15)

It is clear from the Governor's office that technology in K-12 classrooms has a priority in the education arena. Governor Bredesen is committed to education and repeatedly states his conviction that education is the key to "growing a strong economy and improving the quality of life for all Tennesseans."[60] The Governor lists making better use of technology in the classroom among his top priorities for education, along with paying teachers more, setting high standards, ensuring children can read, and implementing character education. The very fact that technology is listed with priorities of such indisputable import clearly indicates that education technology holds a high position in his vision for the state's education system.

This strategic technology plan is a starting point for making the Governor's vision a reality. To do so, the Department of Education must reach beyond its walls to enlist the support and dedication of public and private entities. Wider stakeholder investment is the first step toward greater financial commitment to sustaining the educational technology effort in the state.

While engaging private enterprise and other governmental agencies is time-consuming, the department believes that the benefits that ensue can more than pay for the investment. In the initial year of this strategic plan, therefore, the educational technology elements in the department will seek to marshal resources for a more effective collaboration with parties outside the Department of Education.

Many seeds for this collaboration already exist. The challenge to the department is to optimize the relationships with the various groups in ways that best ensure the state's education technology design is implemented and sustained. The following list of entities demonstrates that some steps are already underway in addressing the challenge that remains.

US Department of Education. A good project plan needs to include an appropriate accountability model. Tennessee's three-year cooperative agreement with the US Department of Education is designed to produce just that. By virtue of the scientifically based research project funded by the cooperative agreement, the state is developing a state accountability model for educational technology. The state's plan to establish regional professional development centers designed to encourage the effective integration of technology into research-based instructional methods will rely heavily on the results of this collaborative effort. The study is underway and is scheduled to conclude in 2006.

State Educational Technology Directors' Association (SETDA). No state can afford to implement its state technology plan in isolation. By collaborating with other state directors of educational technology, Tennessee has already enriched its own program. Therefore, the state will continue as an active member in the State Educational Technology Directors' Association and participate in the committees established to address issues of common concern. Each year SETDA holds an Emerging Technologies forum in tandem with the National Education Computing Conference which provides state directors with emerging information targeted at

[60] http://www.tennessee.gov/governor/priorities/education.htm

high level decision makers. Tennessee participates as a member of the Common Data Elements committee, and a staff member is the vice chair of its task force that recently published the National Trends study.[61] This task force is currently collaborating with the Metiri group to design building level technology evaluation instruments. SETDA continues to be instrumental in providing vital feedback to the US Department of Education that can help further define the expectations from No Child Left Behind.

Southern Regional Education Board. Tennessee continues to be an active participant in the Educational Technology Cooperative group of the Southern Regional Education Board (SREB) whose mission it is to focus on ways to help state leaders "create and expand effective uses of technology in schools and colleges."[62] Under the auspices of SREB, Tennessee is a member of the Multi-State Online Professional Development (MOPD) initiative. The EdTech GEAR program was developed as a direct outgrowth of this relationship. Tennessee's participation in the AP Nexus Online grant is also under the auspices of SREB. Through carefully mining the resources and relationships provided by the state's participation in the SREB, Tennessee benefits from the pioneering efforts of other states as well as contributing its own valuable perspective to the efforts of SREB's 38 member higher education and K-12 organizations.

Tennessee State Library and Archives and School Media Specialists. Operating under the Office of the Secretary of State, the State Library provides the Tennessee Electronic Library[63] to all libraries, including school libraries, in the state. In many schools across the state, the school library media specialist is the pivotal person in ensuring that electronic information resources are available to students and teachers. Emphasis on research-based teaching practices naturally leads educators to investigate what the latest research says. Their school media specialists can play a vital role in locating and disseminating needed information. .

Appalachian Technology Education Consortium (ATEC)[64]. The US Department of Education funds ten "RTECs" to promote the effective use of technology in education and help integrate computer technologies into K-12 classrooms by providing technical assistance, professional development, and resource dissemination. The RTEC which serves Tennessee, along with Kentucky, West Virginia, and Virginia is the ATEC whose offices are located in Alexandria, Virginia. ATEC has already played a vital role in the development and implementation of Tennessee's technology initiatives. It has collaborated with the state director in custom-designing professional development opportunities for the state's technology coaches and it continues to do so with each new cohort of coaches. From its work with Tennessee's coaches, the ATEC has published the Technology Coach Handbook. Using this material will be of utmost value as the state moves into its regional professional development ORBIT centers.

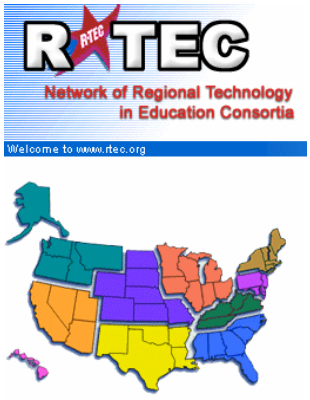


Figure 8: RTEC Map

[61] National Trends: Enhancing Education Through Technology: No Child Left Behind Title II D – Year One in Review. February 2004. Available online http://www.setda.org/docs/SETDANatlReport_022704.pdf

[62] http://www.sreb.org/programs/EdTech/edtechindex.asp

[63] This free online access to electronic databases is supported by federal funds under the Library Services and Technology Act.

[64] http://the-atec.org

Center for Research in Educational Policy (CREP)[65]. Located in the College of Education at the University of Memphis, CREP has long participated in the work of Tennessee's Department of Education. When the state undertook its pilot program in the final year of the TLCF funding, it contracted with CREP for conducting the external evaluation study. CREP is a vital partner in the state's technology research grant which continues through 2006.

Linking Leaders[66]. Tennessee is participating in the Linking Leaders Program, funded by the National Aeronautics and Space Administration (NASA) and The National Alliance of State Science and Mathematics Coalitions (NASSMC). Tennessee's Linking Leaders project is coordinated through the Tennessee Mathematics, Science, and Technology Center located at Middle Tennessee State University. The purpose of this three-year project (2002-2005) is to collaborate with NASA to align its resources with the state's math, science, and technology education reforms, and to build and strengthen a broad-based coalition of business, education, and public policy to address the state's needs in these areas. The Department of Education is excited about the broad base of this collaboration that informs the founding principles of the Linking Leaders project because the partners who are involved could become the catalyst for taking the state's educational technology plan to a new level and embrace a much wider scope. Members of the project could provide invaluable advice about crafting the next version of the state technology plan.

Tennessee Education Technology Association (TETA). The state maintains a working relationship with TETA[67] which is a three-chapter organization whose primary members are district level technology coordinators in Tennessee's K-12 schools. The Department of Education provides a non-voting ex officio member of the TETA board, as appointed by the Commissioner of Education. TETA supports and assists the state with the annual TETC conference. Buy-in from TETA is critical for implementing the state technology plan. Technology coordinators participated in the team of critical friends who reviewed the current plan, and will be invited to contribute to future revisions.

Internet2 Research Universities. The Department of Education is working with three research universities in the state (University of Tennessee-Knoxville, Vanderbilt University, and University of Memphis) to investigate how access to Internet2 would benefit K-12 schools. The University of Tennessee, Knoxville, is testing the robustness of the ConnecTEN network to determine whether it can handle the higher band width of video conferencing. This test will indicate the extent to which the state may be interested in asking the three Internet2 members to sponsor the K-12 community in a SEGP (Sponsored Education Group Participant). As of March 2004, there are 35 SEGP states, as shown in red (black) in the colored map.

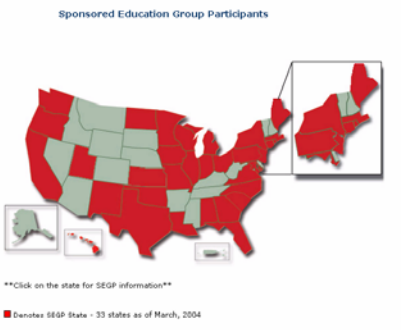


Figure 9: March 2004 SEGP Partners for Internet2

Beaumont Foundation. Tennessee schools are eligible to participate in the 2004 and 2006 Beaumont Foundation[68] grants. The Foundation is a private entity established to oversee technology grants made possible as a result of a

[65] http://www.people.memphis.edu/~coe_crep/
[66] http://www.mtsu.edu/~mscenter/leaders.htm
[67] http://www.teta.org/Bylaws/bylaws.pdf
[68] http://www.bmtfoundation.com/bfa/us/public/

Toshiba class action suit. The department provides grant application assistance to high need schools.

Other Grants. Some of the businesses that fund small grants to schools, typically for computer hardware, are: Dell Corporation[69], Gateway[70], Compaq/Hewlett Packard[71], and Ingram Industries[72]. Many times software vendors can be found to provide complimentary copies of their products to schools. In each region of the state, local businesses can be found contributing to the support of K-12 education to improve technology use in the classroom.

[69] http://www1.us.dell.com/content/topics/global.aspx/corp/foundation/en/index?c=us&l=en&s=corp

[70] http://www.gateway.com/work/ed/services/no_child.shtml

[71] http://grants.hp.com/us/programs/index.html

[72] http://www.ingrambook.com/Company_info/HR0523/html/philantropy.asp

Conclusion

Tennessee's state educational technology plan has been prepared in direct response to the requirements of Title II Part D of the No Child Left Behind act. At present, the Tennessee Department of Education does not have a distinct entity within its organization that could be called an "educational technology" division or department. The plan's authors have therefore elected to respond specifically to the prompts provided by the legislation.

In preparing the plan, the authors have consulted with innumerable individuals within the department, in an effort to be as inclusive in the responses as possible. As a result, the discourse in this state educational technology plan may suffer from being far-ranging in places. Part of this reality is due to the nature of the legislated prompts and part arises from the need to provide a broad picture of the current situation, together with specific indicators for future actions. The authors look forward to collaborations which will more keenly hone the focus of the plan for subsequent revisions. The department will undertake those collaborative discussions during the 2004-05 academic year.

A volunteer panel of critical friends critiqued the plan and their recommendations have been incorporated wherever possible. The plan has been reviewed by parties within the state Department of Education. The plan will be presented to the State Board of Education. The publication of the plan on the state's web site will inevitably stir comment from stakeholders throughout the state. In order for the plan to have any real impact on the way technology is used the schools of Tennessee, many more voices will need to enter the discussion.

Any strategic plan must exist in a state of delicate balance between the ability to fund what is dreamed, and the ability to envision where funds can be most effective in ensuring that technology truly does enhance education in Tennessee's schools. A realistic analysis of the present situation must be ready to embrace the potential that future funding might provide, whenever it might occur. Absent a viable vision based on an analysis of reality, one has no right to expect funding to follow.

Tennessee has piloted a program to study how educators can be led to integrate technology into everyday teaching, just as it is part of every other business organization in contemporary society. Based on the pilot, the state has launched an initiative to place technology integration model schools across the state. Pending the success of these launches, the state will be prepared to establish orbit centers across the state where educators from all schools can ensure that they are effectively using technology tools in their classrooms in ways that ensure the citizens of tomorrow are not only technologically literate but also prepared with vital twenty-first century skills. All of this will be accomplished through the funding provided the state for the competitive grants under No Child Left Behind.

The children in Tennessee's schools deserve no less. If citizens want our children to participate effectively in tomorrow's world, educators today need to use the tools of the technological information age to ensure that the education the children receive in Tennessee enables them to communicate, solve problems, evaluate information, and construct new knowledge.

The purpose of this document, therefore, has been to analyze the current situation, delineate the vision as it has evolved through recent endeavors, and outline how Tennessee can, within the current resources available, accomplish the noble goal of enhancing education through technology. Tennessee stands poised and ready. Let all educators belong to the quest to realize the potential of the investments of the past.

Sources

Becker, Henry Jay (2002). "Who's wired and who's not: children's access to and use of computer technology" in *The future of children* 10(20): *children and computer technology.* Available http://www.futureofchildren.org

Bransford, John D., Brown, Ann L., and Rodney R. Cocking, eds. (2000). *How people learn: brain, mind, experience, and school.* Washington, D.C.: National Academy Press.

Collins, Jim (2001). *Good to Great: Why Some Companies Make the Leap . . . and Others Don't.* New York: HarperCollins.

Cuban, Larry (2001). *Oversold and underused: computers in the classroom.* Cambridge, Harvard University Press.

Dede, Chris (August 2001). "State policy framework for assessing educational technology implementation." Available December 2001 from http://www.neirtec.org/statepolicy/documents/chart0112.pdf

Eisenberg, Michael B. and Doug Johnson. (September 2002) "Learning and Teaching Information Technology—Computer Skills in Context." Available June 10, 2003 from http://www.ericfacility.net/databases/ERIC_Digests/ed465377.html.

Hannafin, Michael J. (June 2002) "An Evaluation of Tennessee DOE's Internet Professional Development Initiative on The Attitudes and Performance of Teachers and Students." Available March 25, 2004 from http://www.tennessee.gov/education/acct-tlg-report.pdf

Jonassen, D. H. (1996) Computers *in the classroom: mindtools for critical thinking.* Englewood Cliffs, NJ. Prentice Hall.

Lowther, Deborah, Michael Grant, Eric Marvin, Fran Clark, Blake Burr-McNeal. *Technology coach handbook: a resource to facilitate technology integration in your school*. Appalachian Technology in Education Consortium. In press. (www.The-ATEC.org)

Partnership for 21st Century Schools. *Learning for the 21st century: a report and mile guide for 21st century skills.* Available November 13, 2003 from http://www.21stcenturyskills.org/

Ross, Steven M. et al (2002). *Tennessee technology literacy challenge fund: evaluation report 2002.* Available online http://www.tennessee.gov/education/acct-tlcf-report.pdf.

State Education Technology Directors Association (January 2003). *National leadership institute toolkit.* Available November 13, 2003 from http://www.setda.org.

Sheekey, Arthur D., ed. (2003). *How to ensure ed/tech is not oversold and underused.* Lanham, Maryland: Scarecrow Press.

Tennessee Department of Education. *Where do we stand in 2003? A status report on technology in Tennessee schools.* Available July 2003 from http://www.tennessee.gov/education/acctetote-exsumm2003.pdf

Tennessee State Board of Education master plan 2003. Available October 15, 2003 from www.tennesse.gov/sbe/mp03Internet.pdf

Vincini, Paula. *The spectrum of cognitive tools.* Available December 29, 2003 from http://at.tccs.tufts.edu/pdf/newsletter_apr_2003.pdf

Visions 2020: transforming education and training through advanced technologies. U. S. Department of Commerce, September 17, 2002. Available September 30, 2003 from www.technology.gov/reports/TechPolicy/2020Visions.pdf

GLOSSARY

AEL: Appalachian Education Laboratory

ATEC: Appalachian Technology Education Consortium

BEP. Basic Education Program

DIANE, Project: Project Diversified Information and Assistance Network

EDC: Education Development Center

EdTech: Educational Technology. Short for Title II Part D of No Child Left Behind: Enhancing Education Through Technology (Other states also use IID, 2D, EETT, or E2T2 to refer to this section of the federal legislation.)

ETLO: EdTech Leaders Online. A program of the Education Development Center

E-TOTE: EdTech Tennessee Online Technology Evaluation system. Tennessee's annual online technology survey

GEAR: Generating Equal Access for Remote areas. A one-time competitive EdTech grant for developing online course facilitators

ISL: Institute for School Leaders. The professional development program designed for Tennessee's Gates Leadership grant.

ISLLC: Interstate School Leaders Licensure Consortium standards, around which the Institute for School Leaders is built.

ISTE: International Society for Technology in Education

LAUNCH: Leading All Users to New Challenging Heights. Tennessee's competitive EdTech grant in first two years of federal funding Title II Part D

NASSMC: National Alliance of State Science and Mathematics Coalitions

NCLB: No Child Left Behind. Reauthorization of the federal Elementary and Secondary Education Act

*NEI*RTEC*: North East and Islands Regional Technology Education Consortium

NETS: National Education Technology Standards

ORBIT: Orchestrating Regional Bases for Integrating Technology. Tennessee's competitive EdTech grant in the third year of federal funding of Title II Part D

SEGP. Sponsored Education Group Participant

SETDA: State Educational Technology Directors Association.

SREB: Southern Regional Education Board

STaR Chart: School Technology and Readiness Chart. Developed originally by the CEO Forum; now available through ISTE. Tennessee's STaR Chart is based on the revision by the Texas Education Agency

TAGLIT: Taking a Good Look at Instructional Technology. An online survey required of all participants in the Gates Leadership professional development program.

TEL: Tennessee Electronic Library

TASL: Tennessee Academy for School Leaders, a professional development service of the Department of Education's Office of Professional Development.

TETC: Tennessee Education Technology Conference

TLCF: Technology Literacy Challenge Fund (competitive federal technology grant program that preceded Title II Part D competitive grants)

TPC: Technology Planning Criteria sheet, used by districts to show the alignment of district technology plans to the requirements of Title II Part D and the E-rate program

USDoE: United States Department of Education