TAKING NOTE by SCORE

# USING TECHNOLOGY TO TRANSFORM EDUCATION

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## INTRODUCTION

The use of technology for educational purposes is on the rise. More students than ever before are taking courses online or being exposed to blended learning opportunities that infuse traditional instruction with digital components. Increasingly, teachers are using tools that enhance student participation during class and allow for ongoing assessment of student progress. New technologies are also helping to inform teachers' instructional practices and provide students with additional avenues for learning outside the classroom.

To prepare students for success after high school, Tennessee has committed to a comprehensive education reform plan that includes raising academic standards, supporting teachers and leaders, and using data to enhance student learning. Tennessee's educators are using technology to support all components of this plan. The work to date has included using technology to deliver information to students in new ways and engage them as active learners in the classroom, connect students with access to rigorous or individualized coursework, help practitioners develop and share their best practices, and give teachers real-time access to data on student performance in their classroom.

In January 2013, Tennessee Governor Bill Haslam made an unprecedented commitment to significantly enhance the technological capacity of schools and districts to use technology to improve education. To ensure that this investment is used in a meaningful way, it is crucial to not only understand how our newest technology is and can be used in classrooms, but also what steps should be taken to support educators to use new tools and techniques and build the infrastructure to support technology use over time. From a state and national standpoint, technology must continue to be used to enhance learning. Many current challenges and barriers to integrating technology in schools exist, but there is much Tennessee can do to improve moving forward.

## HISTORICAL CONTEXT

The term "educational technology" refers to a broad range of devices, applications, and curricular materials used by schools to facilitate and enhance teaching practices and student learning.[i] The term also refers to the ways schools use these tools and materials to create more educational opportunities for students that are tailored to their individual abilities and learning styles. Results from several studies show that the use of technology in classrooms increases student interest and engagement in specific content areas and creates opportunities for cooperative and project-based learning.[ii]

The current influx of technology is not the first time that reformers have sought to dramatically improve learning and instruction through new media. In the 1920s, film was supposed to provide teachers with an engaging presentation platform and a broad range of content. Reformers in the 1930s wanted radio to open classrooms to the world and "allow students access to the finest teachers, the best authorities in every field, and the world's leaders."[iii] In the 1970s, people had high hopes for instructional television, but its introduction into the classroom did not come with effective training for teachers and essentially became entertainment for students while teachers graded work. The exciting new advances of film, radio, and television were not able to transform education as intended because of three key issues: 1) After investing in the initial purchases, schools and districts failed to allocate funds for upkeep and new equipment; 2) teachers were not trained on how to integrate new technology into their classrooms; and 3) teachers were not involved in decisions about content and format, and were often not consulted on how to best integrate technology into the classroom.[iv]

**Tennessee has an unprecedented opportunity to leverage technology to transform education and prepare students for success in college and the workforce.**

# TECHNOLOGY INTEGRATION IN TENNESSEE SCHOOLS

**GOAL:**
Expand access to technology.

**STRATEGY:**
Students receive the opportunity to engage with technologies and develop digital skills they may not otherwise have access to and will need in college and career.

**IN PRACTICE:**
Memphis's Power Center Academy, a 2011 SCORE Prize winner, partners with Apple Inc. to provide every student with a MacBook to use for homework assignments and school projects. The school also partners with Comcast to help disadvantaged students purchase low-cost computers and affordable home internet.

**GOAL:**
Engage students in the classroom.

**STRATEGY:**
Various classroom devices provide students the opportunity to learn through multiple pathways. Modern design elements invite students to engage with the teacher and each other.

**IN PRACTICE:**
Teachers in Metropolitan Nashville Public Schools use student response systems to meet the needs of individual students. Technology is also embedded in open and flexible learning spaces that can be adapted to specific activities and subjects. Instead of computer labs, for example, schools such as Buena Vista Elementary incorporate technology into regular classroom activities with netbook and iPad carts. At Hillwood High School, the new library offers a multitude of technology resources to support instruction; students can check out computers to aid with homework and projects, and teachers can book the library's presentation space to bring lessons to life with the help of an audio-video setup.

**GOAL:**
Tailor instruction for individual students.

**STRATEGY:**
Online platforms can be used to provide opportunities for rigorous learning and remediation.

**IN PRACTICE:**
The Northeast Tennessee College and Career Ready Consortium (NETCO) uses technology to expand opportunities for high school students to earn college credit. For example, audio-video equipment in Advanced Placement classrooms enables teachers to broadcast their lessons from one school to students in 29 different high schools across the region, while facilitators in the remote-classrooms supervise the learning that takes place there. In rural Putnam County, district leaders saw geographic challenges as a catalyst for action to adopt district-wide technology programs. Putnam provides opportunities for students to earn dual credit and credit recovery through online courses with the support of a learning facilitator through the Virtual Instruction to Accentuate Learning (VITAL) Labs.

**GOAL:**
Support and train educators.

**STRATEGY:**
Online resources can be used to provide professional development and facilitate professional learning communities.

**IN PRACTICE:**
Faculty members at the University of Memphis have developed a professional development program for science, technology, engineering, and math (STEM) K-12 educators that uses an online portal to supplement their training. Faculty post relevant articles and resources on the portal throughout the year for teachers to reference. In addition, they facilitate a discussion board online to answer content and pedagogy questions. The goal is to create a virtual professional learning community that reaches across schools and districts and can be sustained over time.

**GOAL:**
Enhance assessments and use of data.

**STRATEGY:**
Technology can provide immediate feedback on student performance that can help teachers identify individual student progress and specific needs.

**IN PRACTICE:**
At Prescott Elementary and Middle School in Putnam County, classrooms are equipped with Promethean boards and student response systems that allow teachers to administer benchmark assessments and use data immediately to target student needs. Results from a 2012 survey of Tennessee educators as well as an opinion poll of Tennessee voters show that there is strong support for assessments that provide immediate feedback and can be used to improve instruction. However, the polling data also show that the public does not yet understand the connection between technology and immediate assessment results. Sharing best practices such as the work occurring at Prescott can help educators and the public better understand how technology can be used to support instruction.

## THE POWER OF TECHNOLOGY

Today, computer technology and internet access have the ability to connect students from diverse locations across the globe to one shared universe of knowledge. Since the mid-1990s, states across the country have focused on increasing access to technology and in particular the internet. According to the U.S. Department of Education, in 2010 all public schools had at least one computer with internet access that was used for instructional purposes, and more than half of all public schools had laptops available for students. The vast majority of schools are using this access to technology for online student assessment, gathering instructional materials from the internet, engaging students in learning with new technology, and using the internet to provide standardized assessment results and data for teachers to inform instructional planning. Tennesseans can look to our own schools and educators for examples of classroom practices that effectively integrate technology. The table on page 2 outlines strategies for using technology in the classroom to achieve multiple goals and provides specific examples from Tennessee.

In addition to supplementing the traditional classroom experience, technology is transforming the way that education is being delivered. Each year, K-12 students take nearly 2 million courses online, and, in the 2010-11 school year, approximately 250,000 students were enrolled in full-time virtual schools.[v] Technology is also being used as a vehicle to create more educational opportunities for students that are tailored to their individual interests, abilities, and learning styles. While research on technology use in education is limited, studies have consistently found that technology can help to engage students in their learning. Researchers at the University of Memphis found that students in classrooms that used technology were more often engaged in cooperative and project-based learning, and that the level of student interest and engagement in academic content was higher than in classrooms where technology was not actively integrated. Comparable analyses of programs in Florida, Michigan, and Texas found similar effects.[vi]

Tennessee has made progress in increasing access to technology and the internet, but more work remains to ensure that all students have equal access. We must also focus on providing schools with resources aligned with their needs and teachers with the appropriate training to make the best use of computer-based and online learning.

## CHALLENGES

While technology is emerging as an effective strategy to enhance teaching and learning in the 21st century, there are two key challenges that prevent the leveraging of this resource: infrastructure and training. The Foundation for Excellence in Education's Digital Learning Now state report card gave Tennessee low marks for infrastructure that supports digital learning, in part because current state law does not require schools to have high-speed internet access or provide teachers with internet access devices. SCORE has found, through our First to the Top progress monitoring work, that there is variability across the state in terms of technological capacity, but even the more digitally advanced districts are concerned about the system's ability to accommodate whole-school online testing. This underdeveloped infrastructure inhibits the ability of districts to administer new, online assessments aligned with the Common Core State Standards, higher and more rigorous academic standards that Tennessee is currently implementing. It also limits the extent to which technology can be used to meet other school and district needs, like individualized learning for students, professional development for teachers, and greater access to advanced and college-level coursework.

Governor Haslam's proposal to allocate $51 million to education technology in the 2013-14 fiscal year has the potential to help districts address their infrastructure and training needs. In addition to the financial investment, there must be a clear strategy in place to ensure the funds are used most effectively across the state.

While infrastructure and access are important, we must ensure that teachers have the training they need to incorporate new technology. A 2012 report from the Bill & Melinda Gates Foundation found that teachers believe technology is an important tool to supplement traditional instruction, but feel intimidated by the need to keep pace with the ever-changing technology landscape. Responses from teachers indicated that they are overwhelmed at times by the new technologies available and are still struggling to make the best use of the tools that are already in their classrooms. Furthermore, teachers "cited inadequate training as a reason they would not use technology to support their teaching."[vii]

## RECOMMENDATIONS

To prepare students for success after high school, Tennessee has committed to a comprehensive education reform plan. Schools and districts throughout the state have been using technology to support all components of this plan, from using technology to individualize learning so students can meet higher academic standards to using technology to connect teachers across the state to share innovative practices. However, there are several steps that policymakers, educators, and communities should take to help advance technology integration across all schools and districts in the state:

- **Use technology to support clearly identified needs in school districts.** District leaders need to have a strategic plan in place as they work to integrate technology in schools. Investments in technology should be tied to district needs with a clear understanding of

how that specific technology will meet the need. For example, Hamblen County Schools set out to improve ACT performance by providing all students access to preparation courses. With funding from the federal Investing in Innovation grant, Hamblen County invested in distance learning technology so that teachers and students from different high schools could participate in the same ACT prep course. Since 2010 scores in Hamblen have increased from 19 to 20.1.

- **Leverage existing resources and relationships.** Districts should work together to leverage current technology to expand student access to rigorous coursework and effective teachers. The science, technology, engineering, and math (STEM) regional innovation hubs across the state, for example, provide an established network that districts can work through not only to partner with each other, but also with higher education and business. Businesses can work with local school districts by lending their expertise, perspective, and resources. While this is happening in some communities, there is great opportunity to expand such partnerships. An example of an innovative solution can be seen in the partnership between the Upper Cumberland STEM hub that serves 21 mostly rural districts and Averitt Express – a national trucking company. Since many schools in this area lack access to new technology and science tools, the hub and Averitt are converting a tractor-trailer into a mobile laboratory that will bring the latest technology and STEM equipment to the students at their schools.

- **Clarify roles and responsibilities for new, online assessments.** The Tennessee Department of Education must communicate with districts to clarify responsibilities regarding infrastructure development and specific technology needs. At the same time, districts must understand their responsibilities for implementing online assessments, specifically in terms of devices, networks, and technical support. It is critical that the state and districts have a plan to move forward with the new online assessment system. The Tennessee Consortium on Research, Evaluation, and Development (TNCRED) conducted a survey of Tennessee educators and district assessment coordinators in the spring of 2012 and found that only two out of 92 districts felt that they were prepared to implement the new online assessments. Districts will not only need guidance on purchasing hardware and software, but will also need information regarding upgrades to their existing system so that they can support whole-school online testing without overloading the network. Furthermore, districts must plan for human capital needs to support the technology as well as training for both teachers and students on how to take the computer-based assessments. As mentioned previously, there is strong public support for immediate feedback from assessments that can be used to inform instruction, but that support is accompanied by a lack of understanding regarding the role of technology. The state and districts need to clearly communicate with the public about the need for a computer-based assessment system to provide immediate results.

- **Engage the Centers of Regional Excellence.** Through all of this work, state and district leaders need to take full advantage of the Centers of Regional Excellence (or CORE offices) to share best practices and facilitate training on how to use technology to enhance instruction. The state department has thoughtfully restructured the field service centers into the CORE offices that are focused on providing differentiated, targeted support to districts. This includes personnel and resources that will help districts make the best use of data and technology.

The new technology landscape provides seemingly endless options for integrating computer-based and online learning tools in the classroom. However, history shows us that to make the best use of these technologies we must strategically plan for new technologies, support educators in updating their existing practices, and plan for long term usage. Tennessee has an unprecedented opportunity to leverage technology to transform education and prepare students for success in college and the workforce. Now is the time to prove if we are up to the challenge.

[i] *Aziz, H. (2010). "The 5 Keys to Educational Technology." Transforming Education Through Technology Journal. Retrieved from http://thejournal.com/articles/2010/09/16/the-5-keys-to-educational-technology.aspx.*

[ii] *Lowther, Ross, and Strahl, "Influence of Technology on Instructional Practices" in The International Journal of Knowledge, Culture, and Change Management, 2006;*
*Bates, Inan, Lowther, and Strahl, "Freedom to Learn Program Michigan 2005-2006 Evaluation Report" from the Center for Research in Education Policy at the University of Memphis, 2007.*
*Inan, Lowther, Strahl, and Ross, "Does Technology Integration "Work" When Key Barriers are Removed?" from paper presented at annual meeting of the American Educational Research Association, 2008.*

[iii] *Kent, T.W. and McNergney, R.F. (1999). Will Technology Really Change Education? From Blackboard to Web. Corwin Press, Inc.*

[iv] *Ibid.*

[v] *Barth, P., Hull, J., and St. Andrie, R. (2012.) "Searching for the Reality of Virtual Schools" from the Center for Public Education and the National School Boards Association.*

[vi] *Bates, Inan, Lowther, and Strahl, "Freedom to Learn Program Michigan 2005-2006 Evaluation Report" from the Center for Research in Education Policy at the University of Memphis, 2007. Inan, Lowther, Strahl, and Ross, "Does Technology Integration "Work" When Key Barriers are Removed?" from paper presented at annual meeting of the American Educational Research Association, 2008. Allen, Lowther, Slawson, and Strahl, "West Orange Collaborative STARK Program 2001-2006 Evaluation Report" from the Center for Research in Education Policy at the University of Memphis, 2006.*

[vii] *Bill and Melinda Gates Foundation (2012). "Innovation in Education: Technology & Effective Teaching in the U.S."*