Board of Education Agenda Item

Item: K. **Date:** January 14, 2010

Topic: Final Review of *Educational Technology Plan for Virginia: 2010-15*

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Origin:

____ Topic presented for information only (no board action required)

__x__ Board review required by
- __x__ State or federal law or regulation
- ____ Board of Education regulation
- ____ Other: _____

__x__ Action requested at this meeting ____ Action requested at future meeting:

Previous Review/Action:

____ No previous board review/action

__x__ Previous review/action
date 10/22/09
action accepted for first review

Background Information:
Code of Virginia § 22.1-253.13:6. Standard 6. Planning and public involvement.

A. The Board of Education shall adopt a statewide comprehensive, unified, long-range plan based on data collection, analysis, and evaluation. Such plan shall be developed with statewide participation. The Board shall review the plan biennially and adopt any necessary revisions. The Board shall post the plan on the Department of Education's Web site if practicable, and, in any case, shall make a hard copy of such plan available for public inspection and copying.

This plan shall include the objectives of public education in Virginia, including strategies for first improving student achievement, particularly the achievement of educationally at-risk students, then maintaining high levels of student achievement; an assessment of the extent to which these objectives are being achieved; a forecast of enrollment changes; and an assessment of the needs of public education in the Commonwealth. In the annual report required by § 22.1- 18, the Board shall include an analysis of the extent to which these Standards of Quality have been achieved and the objectives of the statewide comprehensive plan have been met. The Board shall also develop, consistent with, or as a part of, its comprehensive plan, a detailed comprehensive, long-range plan to integrate educational technology into the Standards of Learning and the curricula of the public schools in Virginia, including career and technical education programs. The Board shall review and approve the comprehensive plan for educational technology and may require the revision of such

plan as it deems necessary.

The *Educational Technology Plan for Virginia: 2010-15* builds on the work of previous six-year technology plans, especially in the areas of technology infrastructure, integration, and evaluation. It reflects current state and national standards relating to student, teacher, and administrator technology skills. It also incorporates recent research into the skills needed by 21st century citizens, the way the brain acquires knowledge, and capabilities of current and future technologies. Because the world in which we use technology is changing just as rapidly as technology, the basis of the new technology plan is a framework for how technology can most effectively be used. Technologies may evolve in many ways, but the characteristics of educationally-potent technology are well-established. The conceptual framework also encourages divisions to view educational technology in the context of all the myriad functions of an educational system. The flexibility of the framework allows divisions to leverage their unique strengths and minimize their local gaps between promise and practice.

No public comments were offered during the public comment period. However, the following language in support of assistive technology has been added on page 56:

That being said, careful consideration should be given to the importance of assistive and learning technologies for students with special needs. To address this topic more fully, there is a companion document to present solutions that maximize communication, instruction, learning, and convenience for users across the lifespan. This document is available at www.ttaconline.org.

Also, one sentence in the sidebar on page 72 was changed to read:

Classroom teachers can pull up test scores, drill down to see which students struggled with certain topics, and then formulate remediation for individual students; they also can examine students' strengths and weaknesses longitudinally over several years to determine possible curricular weakness.

Summary of Major Elements
The introduction to the *Educational Technology Plan for Virginia: 2010-15* provides a concise overview of the current educational environment, both for the state and the nation. The conceptual framework for this plan is briefly introduced and illustrated with an example of one educational technology project. Goals and objectives for the six-year technology plan are provided in outline form with particular strategies for implementation as well as evaluation. Recent research applicable to each of the five focus areas of the conceptual framework is summarized, and the various characteristics of the focus areas are more fully explained. Three appendices provide further detail*: Essential Elements of ICT (Information and Communications Technology) Literacy*, *Status of Technology Use in Virginia*, and *Division Plan Alignment: 2010-15.*

An Executive Summary is provided in a separate document.

Superintendent's Recommendation:
The Superintendent of Public Instruction recommends that the Board of Education approve the proposed *Educational Technology Plan for Virginia: 2010-15.*

Impact on Resources:
The *Educational Technology Plan for Virginia: 2010-15* will be implemented using existing fiscal and administrative resources.

Timetable for Further Review/Action:

EXECUTIVE SUMMARY

DRAFT

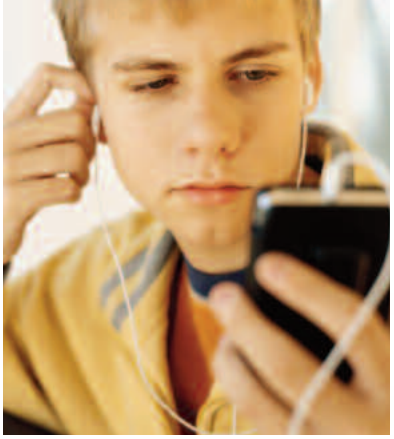
2010-15

Educational Technology Plan for Virginia

2010-15

Educational Technology Plan for Virginia

EXECUTIVE SUMMARY



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Preface

The *Educational Technology Plan for Virginia: 2003-09* opened with the following statement:

Virginia's leaders have prepared the commonwealth to be attractive to companies and investors by providing the technology infrastructure and skilled workforce today's businesses require. Critical to the commonwealth's ability to capitalize on this advantage is the extent to which Virginia's schools prepare the next-generation workforce for knowledge-based jobs that utilize cutting-edge information technology.

These sentiments are remarkably insightful for not only 2003 and 2009 but likely 2015 and beyond. Virginia remains ahead of the curve nationally in its commitment to educational technology and focus on preparing students for the changing economy and information age.

While preparing children for this rapidly changing world, educators must incorporate technology that helps students better learn the skills they will need to participate fully in the global community. In the last six years, research (Hefzallah, 2004; Brown, 2006; Harwood & Asal, 2007) has revealed new realities about how the brain works and how people learn best; these studies not only reinforce Virginia's focus on technology integration but encourage greater use of the most recent technological advancements.

Students have discovered—often outside school—that new technologies offer excitement and challenges; these technologies, like mobile phones, worldwide interactive gaming, and social networks, are just now finding a place in schools. Interestingly, cognitive science is discovering that the interactive, creative, social, and real-life capabilities of these new technologies are precisely what students need to learn the skills required by today's world (Gee, 2003; Gee, 2005). Having accepted the possibilities and limitations of technology, students are more prepared than ever to take charge of their own learning.

One challenge for the current education system is how to prepare students for the future when the half-life of technology often is measured in weeks rather than years and when the stream of new information grows exponentially. Twenty-first century learning is often suggested as the answer to this challenge; however, it is an amorphous concept that cannot be defined by a mathematics equation, chart of periodic elements, or historic dates—therefore, it does not fit neatly into traditional education paradigms.

Twenty-first century learning, and the technology that supports it, is a broad concept—actually, much too broad—requiring us to rethink every aspect of our education system. It demands more than teaching students to be problem solvers and effective collaborators. It entails tough, broader questions, like how do we make room for 21st century skills in the current curriculum? What, if anything, can we throw out and still ensure that students have the knowledge and skills they need to succeed? We must look critically at our pedagogy and how we can move to more active learning in student-centered classrooms. How can we build reliable, valid, and useful assessment systems that meet accountability needs and ensure that all children receive a customized education reflecting their personal learning styles, needs, and interests? Confined to the current school day, schools cannot guarantee students will acquire 21st century skills and knowledge; consequently, we need to reconceptualize school more generally as a place and time for learning.

These are the underlying issues of Virginia's educational technology plan for 2010 through 2015. What role can technology play in addressing these questions?

When technology emerged as a significant education topic in the 1980s and 1990s, the focus was on teaching students to use specific software applications. All of those word-processing, database, and graphics programs—at least, the original versions—are now unrecognizable and obsolete; in all likelihood, today's most popular software applications eventually will go the same route, possibly before the end of this six-year plan. Although students need to learn how to use specific software programs, this must not be the end goal. It is more important for them to understand *why* they should choose a particular application or *how* that application functions in ways that support their learning and creative expression.

The process of developing a six-year plan for educational technology is intimidating if not impossible. Anticipating technological changes is a challenge six months in advance, let alone six years. Paradoxically, the quickly evolving nature of technology actually requires educators to develop long-range plans. Without a long-term framework, educational technology could easily be sidetracked by the latest fad. At the same time, though, the plan must be flexible enough not only to *allow* for the integration of technology innovations but to *encourage* teachers to take advantage of new tools.

Although it seems like educational technology has existed for a long time—which it has in some ways—it really is in a nascent stage. The possibilities for the future are infinite, making it all the more difficult to anticipate where educational technology will be in six years. In fact, a reader examining *this* plan with the benefit of six years of hindsight may rightfully wonder, "What were they thinking?"

The reality is that educational technology has become pervasive, interlinking with every aspect of teaching and learning. When the *Educational Technology Plan for Virginia: 2003-09* was published in 2003, the principal objective was to integrate technology into classrooms across Virginia. This goal largely has been achieved with exceptional results—thanks, in part, to an aggressive financial commitment by the General Assembly and by the mounting indispensability of the Internet. While some schools are still struggling to integrate technology effectively, most educators are prepared to take the next steps.

Perhaps the greatest change during the last six years is that students of all ages have transitioned from being just *consumers* of content and media to also being *producers*. Educational technology is no longer a one-way learning resource. The Internet is much more than a high-tech encyclopedia; it is a virtual world, with all the pros and cons of the real world. To oversimplify the daunting goal of the next six years, educators must find ways to maximize the positives of the Internet and other technologies while preparing students and their families for the potential negatives. This is an ambitious goal, especially when set against the demands of meeting state and federal standards.

The realities of the world and economy further complicate the immense challenges of planning the future of educational technology. For decades, U.S. schools emphasized mathematics and science in direct response to the Soviet Union's launch of *Sputnik 1* in 1957 and the belief that the Cold War would be won through superior technological knowledge. While mathematics and science are as important now as they were a half-century ago, the challenges of the 21st century have supplanted the threats of the Cold War as the driving force behind American education.

Computers can easily perform complicated mathematics equations, and complex scientific formulas are instantly available with the click of a button. The test for students is to understand how these subjects relate to the real world and evaluate when to perform a particular mathematics equation or apply a scientific formula. Mathematical logic problems should no longer consist of phrases like "two trains leaving Cleveland at different speeds"; rather, they should concern real issues such as the rate of the Earth's temperature change or the world's ability to provide enough food to satisfy a swiftly multiplying population. In other words, good educational logic problems are no longer hypothetical; they must be developed and solved in the context of the real world. Today's students potentially will confront some of the most severe problems in the history of the planet; the next six years will be a key part of their training.

As a result of the continually changing nature of educational technology, state and federal standards, and the world's economy, this six-year plan is not a *plan* in the traditional sense; rather, it is a framework that permits ongoing changes, innovations, and emerging technologies. It allows educators and students to think differently about how technology can change teaching and learning. Education in the 21st century is a complex system, and we must consider it from this perspective. By their nature, children are naturally creative and curious; however, self-expression does not come easily for some children. Over the next six years, countless emerging technologies could help all students better communicate their questions, knowledge, skills, and thoughts, which can only help them learn more. The challenge for educators is to help students identify and use tools to express themselves more effectively and creatively and accomplish work that would be difficult, or even impossible, to do without technology.

To meet this challenge, most educators will need to approach technology from a radically different perspective. They increasingly will spend more time modeling creative thinking and showing how to probe information rather than teaching facts. In many instances, they will find themselves serving more as facilitators of information gathering and analysis than as the conduits.

This evolution does not portend the end of teaching; to the contrary, educators will play a larger role than ever before. The availability of the Internet and other instant-technology-information sources will free up time, which can be dedicated to teaching critical-thinking skills, encouraging creativity, and relating learning directly to real-world situations that are meaningful to students. As a result, this plan takes a systemic approach, focusing on the roles of technology in the entire education process.

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21st Century Skills

In 1983, the U.S. Department of Education alerted Americans that failures in the education system could hinder economic development and the country's role as a global leader (USDOE, 1983). A quarter-century later, the U.S. Department of Education revisited this assessment and warned Americans once again:

> If we were "at risk" in 1983, we are at even greater risk now. The rising demands of our global economy, together with demographic shifts, require that we educate more students to higher levels than ever before. Yet, our education system is not keeping pace with these growing demands (USDOE, 2008a, bullet 1).

Increasingly, employers look for skills beyond academic knowledge (U.S. Department of Labor, 2000). A decade ago, these nebulous aptitudes were labeled under the extremely broad term *21st century skills*. As the new century has unfolded, various studies have postulated about the likely competencies that will be needed in the workplace of tomorrow; one consistent conclusion is that technology will be integrated into every facet of business and life. The research also indicates that for students to compete in the global economy and be responsible citizens, education clearly must focus on 21st century skills (Metiri Group, 2003; Conference Board, Corporate Voices for Working Families, Partnership for 21st Century Skills, & Society for Human Resource Management, 2006; CEO Forum, 2001; Partnership for 21st Century Skills, 2007).

The *Educational Technology Plan for Virginia: 2010-15* focuses primarily on one specific component of 21st century skills: information and communications technology (ICT) literacy. The most recognized definition for this topic was formulated by the International ICT Literacy Panel (2002): "ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (p. 2). The State Educational Technology Directors Association (SETDA) (2002) further explained: "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" (n.p.).

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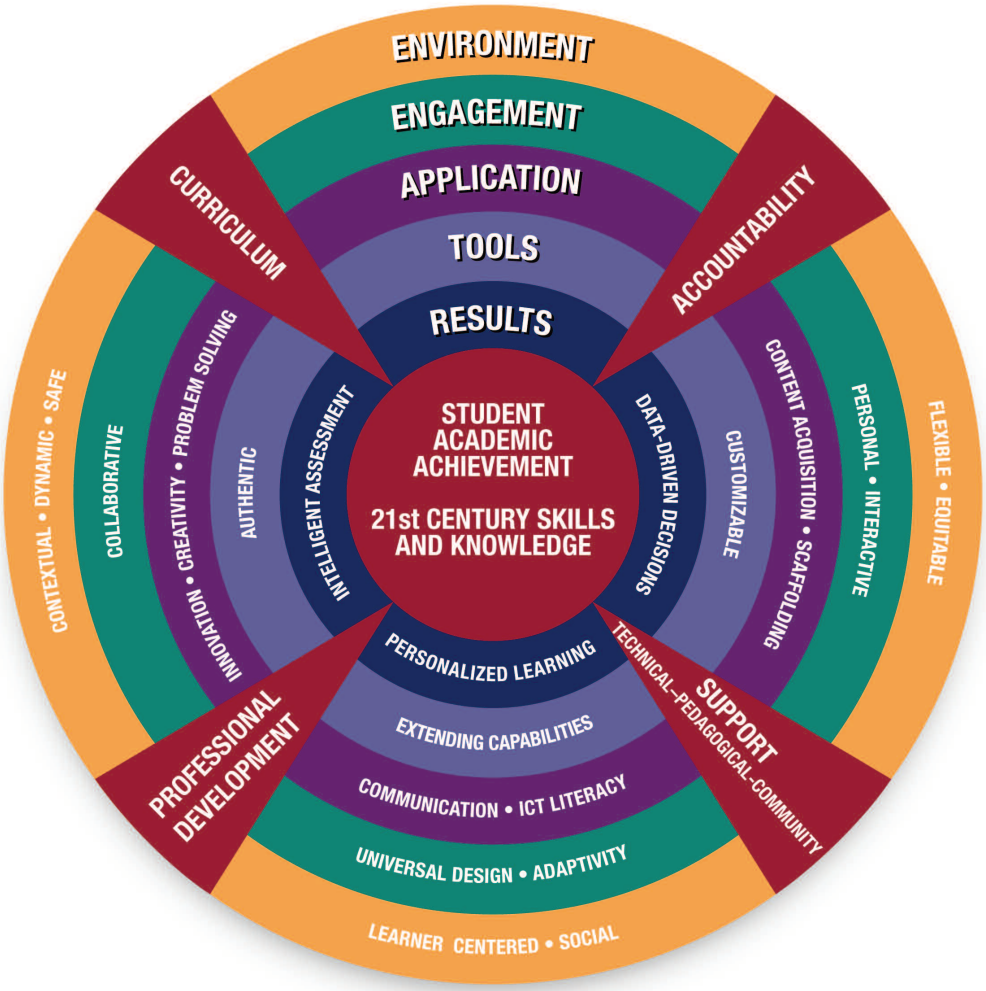
Conceptual Framework

The *Educational Technology Plan for Virginia: 2010-15* builds upon the foundation established by the *Educational Technology Plan for Virginia: 2003-09*, Computer/Technology Standards of Learning, Technology Standards for Instructional Personnel, NETS*S, NETS*T, NETS*A, and the goals for ICT literacy. To foster the development of 21st century skills, the plan relies extensively on factors that support effective technology use:

1. Appropriately and adequately designed environment
2. Meaningful engagement
3. Purposeful application of tools for learning
4. Use of authentic technology tools to extend learning capabilities
5. Authentic and intelligent assessments

Conceptual Framework

Educational Technology Plan for Virginia: 2010-15



The conceptual framework shows five focus areas for educational technology in Virginia between 2010 and 2015:

- Schools need to consider physical and virtual **environments** in new and innovative ways to support learning activities.

- Educators must employ multiple ways to engage students in learning through technology. This **engagement** should reflect student learning styles, cultural backgrounds, and personal interests.

- Students need to understand the proper **application** of technology tools (i.e., choosing and applying the most appropriate technology for communicating and problem solving) and to be creative and innovative.

- Students should not use technology **tools** just to replicate paper-and-pencil activities. Tools should extend student capabilities to perform functions that would be difficult, if not impossible, without technology. Tools should be authentic—ones students will encounter in the nonschool environment.

- **Results** are not just a matter of meeting accountability requirements but using data, including real-time assessments, to inform instruction. Teachers addressing 21st century skills and knowledge must employ intelligent assessments.

These five focus areas underlie the plan's goals. Each focus area comprises a number of topics that form the basis for the plan's objectives. Four key educational components cut across these focus areas:

- Accountability

- Support

- Professional development

- Curriculum

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Goals and Objectives

The *Educational Technology Plan for Virginia: 2010-15* imparts state-level goals and objectives grounded in a foundation of research and based on identified needs. School divisions must develop locally appropriate strategies and measures that address these statewide goals and objectives while, at the same time, leveraging their unique strengths and minimizing the gaps between promise and practice. Beyond the goals and objectives of the state's plan, division technology committees may create effective plans by adding goals and objectives that support division missions and visions.

Virginia school divisions are practiced in the art and science of good planning procedures. Division technology plans need to follow these procedures, reflect state and local goals, and be useful to all stakeholders. With an increased emphasis on supportive data collection, divisions also must collect appropriate and useful information during the evaluation phase of the planning cycle.

The Virginia Department of Education has generated some tools to help divisions formulate their technology plans. An alignment document focuses on both the planning process and the plan itself. Additionally, the Department has developed an outline of the educational technology data that must be collected.

Goal 1: Provide a safe, flexible, and effective learning environment for all students

Objective 1.1: Deliver appropriate and challenging curricula through face-to-face, blended, and virtual learning environments.

Objective 1.2: Provide the technical and human infrastructure necessary to support real, blended, and virtual learning environments.

Objective 1.3: Provide high-quality professional development to help educators create, maintain, and work in a variety of learner-centered environments.

Goal 2: Engage students in meaningful curricular content through the purposeful and effective use of technology.

Objective 2.1: Support innovative professional development practices that promote strategic growth for all educators and collaboration with other educators, content experts, and students.

Objective 2.2: Actualize the ability of technology to individualize learning and provide equitable opportunities for all learners.

Objective 2.3: Facilitate the implementation of high-quality Internet safety programs in schools.

Goal 3: Afford students with opportunities to apply technology effectively to gain knowledge, develop skills, and create and distribute artifacts that reflect their understandings.

Objective 3.1: Provide and support professional development that increases the capacity of teachers to design and facilitate meaningful learning experiences, thereby encouraging students to create, problem-solve, communicate, collaborate, and use real-world skills by applying technology purposefully.

Objective 3.2: Ensure that students, teachers, and administrators are ICT literate.

Objective 3.3: Implement technology-based formative assessments that produce further growth in content knowledge and skills development.

Goal 4: Provide students with access to authentic and appropriate tools to gain knowledge, develop skills, extend capabilities, and create and disseminate artifacts that demonstrate their understandings.

Objective 4.1: Provide resources and support to ensure that every student has access to a personal computing device.

Objective 4.2: Provide technical and pedagogical support to ensure that students, teachers, and administrators can effectively access and use technology tools.

Objective 4.3: Identify and disseminate information and resources that assist educators in selecting authentic and appropriate tools for all grade levels and curricular areas.

Goal 5: Use technology to support a culture of data-driven decision making that relies upon data to evaluate and improve teaching and learning.

Objective 5.1: Use data to inform and adjust technical, pedagogical, and financial support.

Objective 5.2: Provide support to help teachers disaggregate, interpret, and use data to plan, improve, and differentiate instruction.

Objective 5.3: Promote the use of technology to inform the design and implementation of next-generation standardized assessments.

The goals, objectives, and methods of this plan incorporate the best thinking about ICT literacy and cognitive science. The overarching goal is to craft a flexible framework that allows individual schools and divisions to implement systemic changes that support 21st century learning and greater academic achievement. Just as this plan builds upon national standards, division plans should not only align with the statewide framework but also define specific objectives based upon local-needs assessments. The bottom line is that technology should be an essential means for supporting 21st century learning and academic achievement; it is not, however, an end unto itself.

While technology can generate new and innovative opportunities, the more important consideration is its value and applicability to meeting each school's goals and objectives. This occurs through understanding these goals and objectives, learning about the capabilities of the technology, and carefully planning for technology use and application in the educational environment. By understanding these factors thoroughly, schools will use time and resources efficiently and effectively while creating opportunities for student academic success.

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All Web sites were available as of 13 August 2009.

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