Connecticut State Department of Education

2011 Educational Technology Plan

The State Department of Education in collaboration with the State of Connecticut Educational Technology Plan Working Group and the Regional Service Center Technology Leads presents the following State Educational Technology plan as a guide to all Local Public Schools and Educational Entities.

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Introduction

This technology plan is not about boxes or wires; this technology plan is about students. The Connecticut State Department of Education Technology Plan provides a blueprint for creating structures to enhance teaching and learning in Connecticut schools through the use of technology tools. The plan is designed to encourage the advancement of student skills and understandings in all curricular areas and the development of behaviors and competencies that will increase student success in today's global society.

Why Technology in Education?

"Literacy in the 21st century requires more than the ability to read, write, and compute. The [Connecticut] State Board of Education believes that every student must develop strong technological skills and continually use them in order to function adequately in our 21st century world. Connecticut schools must ensure that technology resources are integrated across the curriculum in pre K-12 and become part of the fabric of instruction. Students must be able to use the many forms of technology to access, understand, manage, interpret, evaluate and create information. They also must be able to analyze information for content, relevancy, and accuracy and be able to present that information in a variety of formats, including those with technology platforms.

An education that is technologically rich produces high school graduates with the tools, competencies and level of sophistication necessary to be successfully employed in an ever changing global economy. Such an education enables all students to understand and use current and emerging technologies in their personal, academic, and work environments. For many students, especially those with disabilities, technology often provides access to the general curriculum and allows them to perform tasks or demonstrate skills they would otherwise be unable to do."

(Connecticut State Department of Education Board of Education Position Statement on Educational Technology and Information Literacy, December 2004)

We want to develop inquisitive, creative, resourceful thinkers; informed citizens; effective problem-solvers; groundbreaking pioneers; and visionary leaders. We want to foster the excellence that flows from the ability to use today's information, tools, and technologies effectively and a commitment to lifelong learning. All these are necessary for Americans to be active, creative, knowledgeable, and ethical participants in our globally networked society.

To accomplish this, schools must be more than information factories; they must be incubators of exploration and invention. Educators must be more than information experts; they must be collaborators in learning, seeking new knowledge and constantly acquiring new skills alongside their students. Students must be fully engaged in school—intellectually, socially, and emotionally. This level of engagement requires the chance to work on interesting and relevant projects, the use of technology environments and resources, and access to an extended social network of adults and peers who support their intellectual growth.

(Transforming American Education Learning Powered by Technology, National Education Technology Plan 2010)

What is Technology?

The term Technology dates back to 1615 and is defined as “discourse or treatise on an art or the arts," from Gk. tekhnologia "systematic treatment of an art, craft, or technique," originally referring to grammar, from tekhno- (see techno-) + -logia. The meaning "science of the mechanical and industrial arts" is first recorded 1859. High technology attested from 1964; short form high-tech is from 1972. Tech as a short form of Technical College (Institute, etc.) is Amer.Eng., attested from 1906. ("technology." *Online Etymology Dictionary*. Douglas Harper, Historian. Retrieved 23 Nov. 2010. <Dictionary.com http://dictionary.reference.com/browse/technology>.)

In our current world, the word technology has become shorthand for computers and their related software and peripheral devices. For the purpose of this plan technology emphasis should not only be on the use of existing technology but also on the development of new technologies. History has shown that economic superiority rests with the countries and individuals who build the tools the rest of the world uses. It is essential that we improve the abilities of our students to thrive in the new global economy by ensuring that they are not just technology tool users, but are capable of building the next generation of technology tools." (Feedback on the State of Connecticut Educational Technology Plan 2011, *Submitted by the Connecticut chapter of the Computer Science Teachers Association, 11/5/2010)*

The Benefits of Educational Technology

When used well, technology enables teachers and administrators to be more effective and productive, and provides students with more interesting, engaging, and successful classroom experiences. Within the context of core knowledge instruction, students must also learn the essential skills for success in today’s world, such as critical thinking, problem solving, communication and collaboration. (The partnership for 21st Century Skills, *Framework for 21st Century Learning*. Retrieved 23 Nov. 2010. < http://www.p21.org/documents/P21_Framework.pdf >.) These skills are commonly known as 21st century skills and they are essential for students to survive and thrive in the 21st century.

Assignments which infuse 21st century skills can allow students greater opportunities to develop critical thinking and problem solving abilities. They widen students’ perspectives and knowledge through interactions with others from outside the walls of the classroom. Technology opens students to a world of information, cultures, and structures, and blurs obstacles that may have existed because of where they live or the wealth of their communities. For educators, technology offers opportunities to more easily individualize instruction, monitor student progress, effectively and efficiently manage routine tasks, and provide current, motivating, and meaningful learning activities.

Addressing Connecticut's Challenges

In addition to providing the benefits just described, technology can be an agent to help address some of the key challenges faced by Connecticut and other states. These challenges are listed in alphabetical order since all are high priorities. They include:

- **Academic Achievement:** Close achievement gaps and provide an exemplary educational experience for every Connecticut student. Ensure that all students graduate with skills and understandings to succeed in post high school educational experiences.
- **Economic and Workforce Development**: Equip students with 21st century skills useful for today's and tomorrow's workforce needs.
- **Efficiency:** Provide vehicles that allow for greater efficiency at a time when resources are particularly limited.
- **Equity and Access:** Provide access to high quality educational offerings, materials, and resources for all Connecticut students.
- **Teacher Shortages:** Address the problem of insufficient numbers of "highly qualified" teachers, especially in some subjects or geographic areas of the state.

Academic Achievement

Our goal is to help all Connecticut students achieve to their highest potential. Technology offers new ways and multiple opportunities to enrich student learning, for those who have struggled in the past as well as for students who have reached their goals.

Interactive hardware, software and Internet resources can provide virtual manipulatives and simulate real-life events that might be difficult or even impossible to replicate in a classroom without technology. These learning opportunities help make content more meaningful for all learners. Specialized learning management software can allow each student to learn at a level and pace that is appropriate, offering systematic instruction of targeted skills, and providing valuable information for teachers to best address learner needs. Subject-specific hardware and software enables students to engage deeply in the content. Video and audio recordings of lesson elements can be reviewed by students multiple times to assist in attainment of key concepts. Programs that utilize artificial intelligence can provide frequent and specific feedback to students quickly. Assistive technologies offer accessibility to information previously unavailable to students with disabilities. These are just a few examples of ways technology can positively impact student academic achievement.

Economic and Workforce Development

Now more than ever, Connecticut must devote increased attention to developing the skills of our current and future workforce. Clearly, students' attainment of 21st century skills, including collaboration, innovation, communication skills, problem solving skills, creativity, and facility with a variety of technology tools, is essential for their success in today's world. Directly and indirectly, technology's use in schools can encourage the development of these skills in our students.

Technology can also be a vehicle for providing students with expanded learning experiences and skills in areas such as engineering, health services, and other high-tech fields where the need is critical.

Efficiency

From the moment a student enters the building, to well after the last student has left in the afternoon, schools are collecting data – attendance, achievement, behavior – and much, much more. Some of the data is used to inform and improve teaching and learning, while other data is used for management purposes. But the collection, storage, and analysis of this data takes teachers, administrators, and other staff away from time that could be focused on students. Technology tools can help educators manage school data better, more efficiently and in greater depth, thus freeing them to spend more of their time and energy directly on teaching and learning activities.

Equity and Access

There is a wide disparity among and within Connecticut schools in the technology tools that are available to students. This disparity exists in both the availability of equipment and also in the currency and capabilities of the equipment that is in place in school and in homes. Large differences also exist in teacher and administrator skill levels in knowing how to powerfully and meaningfully integrate technology that *is* available. Through the Connecticut Education Network (CEN), Connecticut has an infrastructure which allows the state to be able to distribute educational resources on any scale as they become available to ALL schools and public libraries. The CEN provides a platform to offer professional development to school administrators and teachers. It also includes online venues for educators to share successful practices with each other. There is great potential for using the CEN to equitably provide a range of resources to assist with teaching and learning in every district in Connecticut.

Teacher Shortages

Finding highly qualified teachers is becoming increasingly difficult, particularly in subject areas like mathematics, science, and world languages. Smaller schools, because of their limited faculty size, have difficulty providing students with a wide range of subjects from which to choose. They are often not able to offer advanced courses since only a few students might be ready to take them. Online learning can assist with these issues, by offering courses taught by highly qualified teachers living in other parts of the state, country, or world. Teachers can be "shared" by several schools using a variety of distance learning methodologies. Students can participate in, and learn from professors teaching college-level courses at universities – while never leaving their own schools – through the use of video conferencing technologies.

Learning: A Model for the 21st Century

Goal 1: Engaging and Empowering Learning Experiences

All learners will have engaging and empowering learning experiences both inside and outside of school that prepare them to be active, creative, knowledgeable, and ethical participants in our globally networked society.

Connecticut schools must ensure that learning in the 21st century provides all students with educational opportunities to become creative thinkers, adept communicators, effective problem-solvers and informed global citizens.

Our education system of the past supported learning in classrooms and from textbooks. It depended on the relationship between individual educators and their students. In the past a learner went to school, spent a prescribed amount of time on a particular assignment for a class, passed all classes, and then in the allotted time, graduated. Resources now exist to allow classrooms to be more individualized, dynamic and to extend beyond the traditional school day. Today's learners can access information and take ownership of their learning. Students are able to adapt new technologies that increase communication and productivity. Many students are aware of the chasm that exists between school and home. Outside of school, many create and share their own learning experiences by tapping into available digital applications, resources, and experts.

Fully engaging students in school requires "*the chance to work on interesting and relevant projects, the use of technology environments and resources, and access to an extended social network of adults and peers who are supportive and safe"* (National Educational Technology Plan [NETP], page 1). Students should work *"with others in project-based learning built around challenges with real-world relevance. Well-designed projects help students acquire knowledge in specific content areas and also support the development of more specialized adaptive expertise that can be applied in other areas" (Learning Model for the 21st Century",* page 12). Likewise, the Connecticut State Department of Education continues to promote the development, dissemination, and sharing of engaging projects that:

- incorporate online learning, mobile devices, current available digital content, and collaborative tools
- provide students with opportunities to practice and demonstrate relevant technology literacy skills,
- relate to the academic curriculum,
- provide relevant real-world problems or tasks,
- take a reasonable amount of instructional time, and
- can be completed using available technology.

Goal 1: Engaging and Empowering Learning Experiences

All learners will have engaging and empowering learning experiences both inside and outside of school that prepare them to be active, creative, knowledgeable, and ethical participants in our globally networked society.

1.1 Recommendation: Revise, create, and adopt standards and learning objectives for all content areas that reflect 21st century expertise and the power of technology to improve learning.

At the state level:	**At the district/community level:**
• Utilize the Common Core State Standards as a foundation for project-based learning focused on solving problems or challenges while collaborating with others in the classroom, or via social networks. • Develop a template and/or guidelines for an electronic reflective portfolio for sixth-twelfth graders that is connected to student success plans, aligned to state standards, managed by each individual student and easily accessible to the student's learning team (teachers, parents, experts, mentors, etc.). • Promote the sharing of research-based technology-infused models of instruction and resources that increase student learning. • Incorporate an online learning component into the high school graduation requirements for all students. • Increase opportunities for students to access accredited distance and online courses to accelerate learning, reinforce skills, and/or recover credit. • Improve the learning process and student outcomes for all students by integrating data systems so that educators have access to the information they need. • Provide examples of 21st Century Learning Experiences, Assured Experiences or Successful Practices at each grade level. • Modernize the Information and Technology Literacy Framework (January 2006) by recruiting a group of educators to develop grade level expectations that define technology literacy skills that are teachable, measurable, directly related to technology and linked to curriculum.	• Embed 21st century skills into all content area standards to enhance learning, increase collaboration, innovation, communication, problem solving and creativity. • Ensure that curriculum includes project-based learning focusing on solving problems or challenges while collaborating digitally with a global audience. • Provide an online student success plan for every student that includes goals for social, emotional, physical and academic growth and allows for dynamic sharing so there is timely and effective communication. • Adopt and disseminate state expectations to all district stake holders. • Refine methods of assessing students in technology literacy based on state and national standards. • Develop a district technology roadmap of skills and project-based learning opportunities. • Develop an electronic reflective portfolio for sixth-twelfth graders that is connected to student success plans, aligned to state standards, managed by each individual student and easily accessible to the student's learning team (teachers, parents, experts, mentors, etc.). • Share 21st century best practices with districts and state.

1.2 Recommendation: Develop and adopt learning resources that use technology to embody design principles from the learning sciences.	
At the state level:	**At the district/community level:**
• Move toward dynamic curriculum documents that allow for changes to be made as needed. • Design and deliver technology-based learning courses, content and tools by partnering with the colleges/universities in the state. • Encourage the integration of information and technology literacy skills in all content areas. • Ensure that students are technologically competent by 6th grade. • Develop resources to help all students understand and develop responsible behavior when using technology. • Provide a portal of resources for districts (e.g., private business sector, nationally recognized curriculum developers Internet Safety, assistive technologies, and global collaborations). • Increase opportunities for students to take online courses to accelerate learning, reinforce skills, and/or recover credit. • Examine learning resources from other states to use as a guideline for the state of Connecticut. • Continue to support and enhance the Connecticut Education Network (CEN) to provide a portal of resources for districts. • Continue to provide Connecticut middle school science educators with Discovery Education Science Middle School. • Enhance curriculum revision embedding Internet resources and software that encourage creativity, collaboration, and problem solving and intervention tools.	• Encourage students to use available assessment data to reflect and set learning goals. • Align district curriculum with state information technology standards and grade-level expectations. • Explore ways to use technology to extend learning opportunities outside of the typical school day. • Review and revise curricula to integrate technology in ways that advance student understanding and achievement. • Design and deliver technology-based learning content, resources, courses and tools by partnering with the colleges/universities in the state. • Continue to tap into resources to support Science, Technology, Engineering, and Mathematics (STEM) initiatives (e.g., Discovery Education Science and Streaming) and their partnerships with science institutions (e.g., Siemens). • Develop rubrics to evaluate the use of online collaborative tools. • Develop and promote online learning opportunities for all staff and students.
1.3 Recommendation: Develop and adopt learning resources that exploit the flexibility and power of technology to reach all learners anytime and anywhere.	
At the state level:	**At the district/community level:**
• Provide guidance to LEAs in the use of emerging technology tools in curriculum applications especially as they relate to ongoing collaboration and communication in a	• Develop partnerships with international/global organizations (e.g., Global School Net, ePals, etc.) and encourage classroom global collaborative projects.

<table>
<tr><td>global society.
• Ensure equity in the distribution of and access to media and technology resources for all students.
• Provide state-wide access to web-based content, tools, and collaborative spaces.
• Identify, develop, disseminate, and maintain resources to support the effective use of technology across curricula and at varying levels of integration expertise.
• Support pilot projects to help educators better understand the impact of new and emerging technologies on the learning environment and develop strategies to integrate them effectively into schools.</td><td>• Utilize online resources to collaborate and communicate in a global society.</td></tr>
<tr><td colspan="2">1.4 Recommendation: Use advances in the learning sciences and technology to enhance Science, Technology, Engineering, and Mathematics (STEM) learning, and develop, adopt, and evaluate new methodologies with the potential to enable all learners to excel in STEM.</td></tr>
<tr><td colspan="2">At the state and district/community level:</td></tr>
<tr><td colspan="2">• Utilize online resources in STEM fields and by STEM professionals to create relevant and applied curricula.</td></tr>
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Assessment: Measuring What Matters

Goal 2: Assessment

Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.

To assess in the 21st century, you need to look beyond pencil and paper assessments and conventional grading. Students will employ a variety of ways to demonstrate their project-based learning (e.g., portfolio, multimedia productions, or an online artifact). A variety of measurement tools such as performance rubrics and electronic portfolios need to be used to assess learning in all content areas. Students need to be much more involved in the process of monitoring their own learning. The measurement of personal growth and attainment of material should not come as a "surprise" to students. They should know "what they know" and understand what they they need to do next. Performance tasks, exemplars and rubrics should be available to view online through a secure login. Assessment results need to be readily available online for access by stakeholders. Technology-based formative assessments can be used to diagnose and modify immediate instruction.

<table>
<tr><td colspan="2">Goal 2: Assessment

Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.</td></tr>
<tr><td colspan="2">2.1 Recommendation: Design, develop, and adopt assessments that give students, educators, and other stakeholders timely and actionable feedback about student learning to improve instructional practices.</td></tr>
<tr><td>At the state level:</td><td>At the district/community level:</td></tr>
<tr><td>• Provide a list of resources to develop online assessments that contain interactive performance-based questions and multiple choice, knowledge-based questions to measure and report technology literacy for K-8 students.
• Continue to provide resources to assist districts in the development and implementation of technology-based assessments in content areas.
• Provide districts with technology-based tools that can help educators manage the</td><td>• Use technology to collect and analyze meaningful assessment data. Use existing programs, such as student information systems and state-mandated assessments, to inform instructional practice and allow students to exhibit higher order thinking and to demonstrate knowledge.
• Incorporate grade-level expectations, successful practices, assured experiences, and e-portfolios into the overall assessment of students.
• Design project-based, technology-enhanced</td></tr>
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assessment process, analyze data and plan accordingly. • In concert with local districts, develop a pilot program (e.g., in a charter school or alternative education setting) that allows the use of project-based online learning portfolios to be evaluated in lieu of standardized testing.	assessments that make use of rubrics, exemplars, and non-traditional questioning strategies. • Develop or implement ready-made parent portals for viewing assessments and report cards online. • Develop assessments which employ adaptive techniques and assistive technologies. • Ensure that teachers have support in learning how to use technology-based assessments and data systems to improve instructional practices.
2.2 Recommendation: Build the capacity of educators and educational institutions to use technology to improve assessment materials and processes for both formative and summative uses.	
At the state level:	**At the district/community level:**
• Incorporate technology into the Connecticut Accountability for Learning Initiative (CALI) modules. • Continue the CT Data Conference and the sharing of best practices and assessment methods among districts. • Include assessment best practices (e.g., data wall exchange) in the Alliance of Regional Educational Service Centers portal.	• Use technology for collection and analysis of meaningful assessment data with existing programs such as student information systems and state-mandated assessments to inform practice. • Design and implement pilot projects to explore scientifically-based, research-supported assessments using technology.
2.3 Recommendation: Conduct research and development that explore how gaming technology, simulations, collaboration environments, and virtual worlds can be used in assessments to engage and motivate learners and to assess complex skills and performances embedded in standards.	
At the state level:	**At the district/community level:**
• Convene a committee of experienced Connecticut educators to research and vet the most promising examples of alternative assessment practices (e.g., simulations, collaborative environments, virtual worlds, gaming technology, etc.).	• Encourage and support educators to use gaming technologies, simulations, collaborative environments and virtual worlds for assessment; share best practices. • Evaluate the use of and implement gaming technologies, simulations, collaborative environments or virtual worlds as an alternative model for assessment (e.g., universal design, assistive technology, etc.).
2.4 Recommendation: Revise practices, policies, and regulations to ensure privacy and information protection while enabling a model of assessment that includes ongoing student learning, data gathering and sharing for continuous improvement.	

At the state level:	At the district/community level:
• Develop and communicate a set of model practices, policies, and regulations to ensure privacy and information protection	• Adopt and apply model practices, policies, and regulations to ensure privacy and information protection. • Create a governance document that provides guidance to district staff about electronic communication and social networking in relation to privacy of information and information protection.

Teaching: Improving Learning through Connected Teaching

Goal 3: Connected Teaching and Learning

Professional educators will be supported individually and in teams by technology that connects them to data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective teaching for all learners.

Technology provides the opportunity for educators to be connected to each other and to a vast array of resources that have never before been available. Educators must exploit this opportunity in order to prepare students to be successful and productive citizens in the 21st century,

<table>
<tr><td colspan="2">Goal 3: Connected Teaching

Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.</td></tr>
<tr><td colspan="2">3.1 Recommendation: Design, develop, and adopt technology-based content, resources, and online learning communities that create opportunities for educators to collaborate for more effective teaching, inspire and attract new people into the profession, and encourage our best educators to continue teaching.</td></tr>
<tr><td>At the state level:</td><td>At the district/community level:</td></tr>
<tr><td>• Revise the Connecticut Code of Professional Responsibility for School Administrators (July 1, 2003) and the Connecticut Code of Professional Responsibility for Teachers (February 2003) to include language that shows a commitment to increasing one’s own information and technology skills as well as those of our students.
• Collaborate with higher education institutions to develop authentic experiences for students to create software resources/applications that facilitate communication and collaboration among K-12 educators (e.g., Scratch from MIT).
• Foster the growth of online professional learning communities by leveraging and strengthening existing relationships among state organizations (e.g., AFT Connecticut, CABE, CAS, CASL, CEA, CECA, CTASCD, and RESC Alliance), higher education institutions,</td><td>• Develop a learning project for each content area that encourages interdistrict teacher-to - teacher, classroom-to-classroom collaboration.
• To provide Continuing Education Unit (CEU) activities that can be shared through webinars or a learning management system.
• Assure that access to professional online learning communities are not inhibited by content filtering.</td></tr>
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and the business community. • Model the use of online learning communities to disseminate and exchange information (e.g., Classroom 2.0 and the Discovery Educator Network). • Offer online professional development to all teachers in the state. • Establish a portal as an interdistrict professional learning network to include Grade Level Expectations (GLEs), Assured Experiences, Successful Practices and educational technology resources.	
3.2 Recommendation: Provide pre-service and in-service educators with preparation and professional learning experiences powered by technology that close the gap between students' and educators' fluencies with technology and promote and enable technology use in ways that improve learning, assessment, and instructional practices.	
At the state level:	**At the district/community level:**
• Provide educators with a variety of online professional development opportunities. • Provide teacher preparation programs with guidance on moving pre-service educators from college students with productivity skills to educators able to use technology for learning, instruction and assessment. • Help districts identify economically feasible technology tools to support teaching and learning. • Encourage higher education teacher preparation programs to include technology projects that incorporate the National Educational Technology Standards for Students (NETS-S) and are documented through the use of portfolios. • Establish a portal as an interdistrict professional learning network to include Grade Level Expectations (GLEs), Assured Experiences, Successful Practices and educational technology resources. • Provide opportunities for extended immersion training for teachers that focuses on attainment of information technology skills to reach beyond the initial levels and build competence in integrating technology in classroom practice. • The State Department of Education and	• Assure local Teacher Education and Mentoring (TEAM) plans support the development of initial educators into practitioners who use technology to improve learning, assessment, and instructional practice. • Provide training to increase the competency of teachers and administrators in the National Educational Technology Standards for Teachers (NETS-T) and National Educational Technology Standards for Administrators (NETS-A). • Support the use and integration of technology through local professional development and evaluation plans. • Develop district level goals that support the use of technology and are reflected in district, building, administrative and teacher professional development goals and classroom lesson plans.

Regional Educational Service Centers should work with professional organizations and local districts to develop working guidelines for Digital Citizenship for Connecticut Educators. • Create a governance document that provides guidance to district staff about electronic communication and social networking in relation to privacy of information and information protection. • Identify and disseminate information and resources that help schools provide ongoing, personalized, and just-in-time professional development for teachers implementing technological and pedagogical innovations. Offer online opportunities for cross-endorsements.	
3.3 Recommendation: Transform the preparation and professional learning of educators and education leaders by leveraging technology to create career-long personal learning networks within and across schools, pre-service preparation and in-service educational institutions, and professional organizations.	
At the state level:	**At the district/community level:**
• Encourage teachers to create online learning communities composed of other educators, students, and professional experts. • Create a resource bank of experts willing to volunteer their time and expertise as classroom resources. • Develop partnerships with other states to enhance learning networks across states.	• Create a resource bank of experts willing to volunteer their time and expertise as classroom resources. • Share affiliations with organizations and businesses with the State Department of Education. • Leverage public/private/nonprofit partnerships to join learning communities focused on technology integration strategies and the development of teachers' and administrators' 21st century skills.
3.4 Recommendation: Use technology to provide access to the most effective teaching and learning resources and to provide more options for all learners at all levels.	
At the state level:	**At the district/community level:**
• Support the use of the Connecticut Education Network (CEN) as a clearinghouse of resources for educators. • Research other states' practices in the use of state level centralized clearing houses and where practical and efficient, create partnerships with other states and regional organizations. • Guide Local Education Agencies (LEAs) to	• Identify community resources that allow students and educators to have connectivity 24/7. • Identify learning resources that can be shared across other districts. • Provide sustainable professional development which provides educators with the skills and knowledge to design learning experiences for students in a 21st century classroom.

ensure equity in the distribution of and access to media and technology resources for all students. • Guide LEAs in the use of emerging technology tools in curriculum applications, especially as they relate to ongoing collaboration and communication in a global society. • Support the state-wide Discovery Education Middle School Science initiative beyond its initial funding, through direct funding or the use of collaborative purchasing to lower costs to LEAs. • Expand the use of online multimedia experiences to elementary school science and other content areas.	• Participate in professional development and utilize the resources, such as Discovery Education, iConn, Verizon Thinkfinity, provided by the State Department of Education.
3.5 Recommendation: Develop a teaching force skilled in online instruction.	
At the state level:	**At the district/community level:**
• Adopt or endorse the ISTE National Education Technology Standards for Teachers (NETS*T) and the ISTE National Education Standards for Administrators (NETS*A). Adoption of these standards will provide a statewide framework for discussions on effective teaching practices, professional development, and assessment in a digital age. • Support efforts to develop and expand opportunities for teachers to participate in content development and delivery of online services. • Develop a state-wide learning management system site (e.g., Moodle) to serve as the repository of core and elective coursework. • Provide professional development in the design, development and maintenance of online courses.	• Adopt or endorse the ISTE National Education Technology Standards for Teachers (NETS*T) and the ISTE National Education Standards for Administrators (NETS*A) as local framework for discussions on effective teaching practices, professional development, and assessment. • Incorporate NETS*T and NETS*A as one component of teacher professional development and evaluation. • Incorporate NETS*S as one component of creating effective 21st century learning experiences for students. • Expand the number of online course offerings available to students.

Infrastructure: People, Processes, and Technologies for Learning

Goal 4: Infrastructure for Teaching and Learning

All students and educators will have access to a comprehensive infrastructure for learning when and where they need it.

The ubiquitous and mobile nature of information and communication technologies has resulted in a world far different from that of those of us whose childhood was once surrounded by large box televisions, rotary dial telephones, and transistor radios. What was once characterized as a digital divide has transformed into a digital disconnect. Outside of the classroom young people regularly engage with music and videos via MP3 players, constantly text their friends with their cell phones, check the latest videos on YouTube, and even upload ones themselves. But, upon entering the classroom they are expected to disengage from this interpersonal, producer-oriented, digital world. If we hope to make learning relevant and meaningful for students in the 21st century,(social studies) classrooms need to reflect this digital world so as to better enable young people to interact with ideas, information, and other people for academic and civic purposes. (http://www.socialstudies.org/positions/medialiteracy)

The National Educational Technology Plan states:

> *An essential component of the 21st century learning model is a comprehensive infrastructure for learning that provides every student, educator, and level of our education system with the resources they need when and where they are needed. The underlying principle is that infrastructure includes people, processes, learning resources, policies, and sustainable models for continuous improvement in addition to broadband connectivity, servers, software, management systems, and administration tools. Building this infrastructure is a far-reaching project that will demand concerted and coordinated effort.* (NETP, 2010)

Technology infrastructure reaches far beyond the tangibles of computers and network equipment to include connectivity and digital resources, processes and policies for productivity and use, and people both as users and maintainers. All these aspects are essential to helping our students and staff develop into ethical, respectful, productive and successful digital citizens. We further believe that the implementation of technology should be driven by curriculum; it should not drive curriculum.

Goal 4: Infrastructure for Teaching and Learning *All students and educators will have access to a comprehensive infrastructure for learning when and where they need it.*
4.1 Recommendation: Ensure that students and educators have adequate broadband access to the Internet and adequate wireless connectivity both inside and outside school.

At the state level:	At the district/community level:
• Explore ways to promote the use of the CEN (Connecticut Education Network) for collaboration and resource sharing. • Provide to all districts, either free or at a minimal cost, digital resources that support the state standards. • Provide the resources necessary to house a database of technology-based learning resources aligned to the Connecticut standards and suitable for all levels of learners. • Ensure system interoperability by creating common formats of data elements shared at the federal, state, and district levels. • Seek funding for state longitudinal data systems that will provide primary decision support functionality for districts.	• Work with Connecticut businesses and municipalities to extend free Wi-Fi into core areas in each community. • Provide staff and students with filtered Internet access meeting CIPA requirements. • Establish an online presence for the dissemination of information (e.g., student achievement, school business, etc.) to enhance the ability of schools and teachers to communicate and increase parental involvement.
4.2 Recommendation: Ensure that every student and educator has at least one Internet access device and software and resources for research.	
At the state level:	**At the district/community level:**
• Provide grants for technology to extend the existing technology and the replacement of obsolete equipment. • Encourage ubiquitous access to computers for every student. • Make resources available to districts to assist in the evaluation and "any necessary" redesigns of network topologies. • Maintain and update the CEN to ensure free access to the Internet for all Connecticut schools and libraries. • Secure and maintain Internet filtering appliances so that filtering is available to schools to meet state and federal requirements. • Explore the hardware necessary to bridge voice networks to facilitate distance learning.	• Establish policies to designate a fixed percentage of the annual budget to technology purchases. • Establish the criteria for obsolescence and a plan for replacement. • Define the minimum technology necessary to deliver the curriculum and adopt a plan with a timeline to equip each instructional space. • Work to define and deploy hardware and software to create an always-available learning resources environment. • Deploy hardware and software necessary to aide in data driven decisions both for business and student achievement. • Address bottleneck and access issues in a timely manner. • Explore and implement new technologies to assess students and facilitate the delivery of the curriculum. • Adopt assistive technologies to ensure equitable access to all students. • Provide reasonable access to Internet-connected devices that offer the students the flexibility to learn anytime, anywhere.

4.3 Recommendation: Leverage open educational resources to promote innovative and creative opportunities for all learners and accelerate the development and adoption of new open technology-based learning tools and courses.

At the state level:	**At the district/community level:**
• Seek ways to provide educators with open educational resources. • Research and evaluate open educational resources utilized by other states.	• Identify and utilize open educational resources within the district curriculum. • Provide opportunities for students to participate in global communication and collaboration.

4.4 Recommendation: Build an infrastructure of people at the state and local education agency level for evolving an infrastructure for learning.

At the state level:	**At the district/community level:**
• Provide staffing adequate to ensure that the CEN will remain a viable resource for all school districts. • Provide staffing adequate to facilitate, collect, manipulate and maintain data collected from districts. • Provide staff to assist districts in the maintenance of student information. • Provide ongoing technical training opportunities for the technology support staff in each district.	• Provide staffing to ensure the maintenance of all hardware (recommend a ratio of no more than 300 computers per technician). • Provide resources to support for one technical support position per 500 students to ensure that technology and infrastructure is operational, secure, and properly maintained. • Provide necessary staff to meet the needs of data collection and state reporting. • Provide staffing necessary to assist with the integration of technology into the curriculum. • Provide resources and support for one instructional technology integration resource teacher per 500 students to assist teachers in integrating technology into teaching and learning. • Provide professional development addressing the styles of the various learners to ensure they are aware of and acquire the knowledge necessary to use existing district technologies. • Provide opportunities for staff to explore new technologies whether through purchases or conferences to help them become more aware of the possibilities. • Share best practices with the state and local RESCs. • Facilitate the implementation of wireless access to the Internet in every school.

4.5 Recommendation: Support "meaningful use" of educational and information technology in the state and its school districts by establishing definitions, goals, and metrics.

At the state level:	**At the district/community level**:
• Review the requirement for seat time to allow online coursework to reach not only the regular students but those at-risk, with special needs such as learning or health-related issues. • Review all state reports to eliminate redundancies of data collection. • Provide policy templates such as acceptable use and data retention for district use. • Explore, establish and document backup and retention guidelines for all digital data. Develop the processes used for the collection of data with a goal of automating the process where possible.	• Establish policy to designate a fixed percentage of the annual budget to technology purchases. • Review use policies to ensure they address the changing technologies as they are adopted. Review business procedures to find ways to increase productivity and streamline • processes. • Establish and document backup and retention policies for all digital data including email. Establish guidelines for the use of social networking sites. • Promote the safe and responsible use of social networking sites and other Web 2.0 tools.

Productivity: Improving Learning Outcomes While Managing Costs

Goal 5: Productivity and Efficiency

Our education system at all levels will redesign processes and structures to take advantage of the power of technology to improve learning outcomes while making more efficient use of time, money, and staff.

Technology can and should be used to increase the productivity of the people involved in the teaching and learning process and of the interaction between the divisions, departments, and stakeholders involved in the education process as a whole.

- It is important to consider the productivity of ALL of the people: students, teachers, administrators, support staff, etc.
- It is just as important to look at ALL of the divisions, departments, and stakeholders: certification and personnel, teaching and learning, administration, facilities, data collection, and finance.

When technology is implemented and used properly the power and efficiency of the organization is amplified and the resulting extended human capacity can remake the organization. Technology does not simply provide an easy way to store and manage information; it should also be looked at as a set of tools that should be used by educators *with* students to maximize learning and deepen understanding.

To increase and maximize the efficiencies of the learners, children and adults alike, resources must be cross platform and transportable. This will enable flexible responses, distributive collaboration, and transparency.

<table>
<tr><td colspan="2">Goal 5: Productivity and Efficiency

Our education system at all levels will redesign processes and structures to take advantage of the power of technology to improve learning outcomes while making more efficient use of time, money, and staff.</td></tr>
<tr><td colspan="2">5.1 Recommendation: Develop and adopt a common definition of productivity in education, and more relevant and meaningful measures of learning outcomes and costs.</td></tr>
<tr><td>At the state level:</td><td>At the district/community level:</td></tr>
<tr><td>• Design and provide online training or webinars as an alternative to face-to-face meetings or training for state and national initiatives (e.g.,</td><td>• Participate in opportunities offered by the State Department of Education.
• Extend online district professional</td></tr>
</table>

CALI, CMT/CAPT, ETS, RTI, SRBI, etc.). • Design and provide online training or webinars as alternatives to face-to-face meetings or training for best educational practice initiatives. Allow greater economical participation by districts who do not qualify for free attendance (e.g., curriculum mapping, curriculum development and revision, data teams, data mining, data analytics, etc.). • Index state documents and utilize Web 3.0 technologies as they become available to assist in easier data culling by districts. • Provide a learning management system for districts to utilize for professional development. • Establish partnerships with other states for online professional development opportunities.	development opportunities to other districts.
5.2 Recommendation: Improve policies and use technology to manage costs including those for procurement.	
• Provide a platform for sharing strategies for cost saving and productivity improvement and highlight policies at the federal, state and local level that may inhibit progress.	• Share strategies for cost saving and productivity improvement and highlight policies at the federal, state and local level that may inhibit progress.
5.3 Recommendation: Fund the development and use of interoperability standards for content, student learning data, and financial data to enable collecting, sharing, and analyzing data to improve decision-making at all levels of our education system.	
• Research and develop a Schools Interoperability Framework (SIF)-based data collection system for districts to upload data for state reports. • Recommend that any new state data collection must be SIF compliant, web-based with open architecture, which will function on multiple operating systems and browsers. • Develop a secure way for student data to be transferred electronically. • Develop an online, web-based grant submission, revision, and review process. • Refine and enhance the online budget submission process. • Refine and enhance the state website to include more Web 2.0 and 3.0 options as they become viable such as RSS feeds of communications.	• Recommend that any new district data collection programs must be SIF compliant, web-based with open architecture, which will function on multiple operating systems and browsers. • Utilize the state resources that are offered to the districts.

• Promote the existence of current web-based programs such as the Connecticut Educator Certification System (C.E.C.S.) • Assess other areas where the State Department of Education can develop web-based alternatives for districts to submit information. • Utilize the RESCs to build out the infrastructure and assist with the implementation of the above recommendations.	
5.4 Recommendation: Rethink basic assumptions in our education system that inhibit leveraging technology to improve learning, starting with our current practice of organizing student and educator learning around seat time instead of the demonstration of competencies.	
• Fund, enhance, and provide technical support for the Connecticut Education Network (CEN) • Fund, enhance, and provide technical support for iCONN. • Fund, enhance, and provide technical support for CTReports. • Research, fund as possible, and provide technical support for online learning applications. • Research, fund as possible, provide technical support, or partner with existing consortia and organizations that use cooperative technologies which facilitate group formation, network building, transparency, aggregating distributed resources, and leveraging self-interest to create broader social value. • Research, fund as possible, and provide technical support for online data collection software. • Partner with higher education to provide models for teaching and learning. • Leverage higher education partnerships to assist schools in instructional design and media production. • Refine and rework curriculum building, warehousing, and sharing options with a CT focus. • Research and model use of open source software to meet both business and learning needs. • Encourage the use of e-books through iConn • Research and catalog available resources and	• Make use of, promote the existence of the CEN at the district level, provide constructive feedback to the state for improvement, and provide political support for continued funding. • Make use of, promote the existence of iCONN at the district level, provide constructive feedback to the state for improvement and on quality of databases, and provide political support for continued funding. • Make use of, provide constructive feedback, and/or help populate state-provided data collection software, online offerings, and curriculum warehouses. • Appropriate district funds in a manner that works in concert with state-funded resources. • Appropriate district funds for technology acquisition to allow for equal access to state resources from all levels within a district.

tools for universal design and assistive technologies; model usage when appropriate. • Reference free, open source and Web 2.0 tools that are specific to the GLEs.	
5.5 Recommendation: Design, implement, and evaluate technology-powered programs and interventions to ensure that students progress through our K-16 education system and emerge prepared for the workplace and citizenship.	
• Develop or sponsor online professional learning communities that can promote deeper thinking about data analysis and best practices. • Sponsor, potentially through RESC leadership,) testing and piloting of emerging technologies with partnerships with business and universities, and encourage districts to implement cost effective technologies in their districts. • Utilize cooperative technologies to facilitate group formation, network building, transparency, aggregating distributed resources, and leveraging self-interest to create broader social value. • Model use of cloud technologies and help develop statements/guidelines on how FERPA can be maintained in the cloud. • Collaborate with CABE on model policies, position papers, and model handbooks and OSHA guidelines.	• Rethink the role of "people in the room" and how they can interact differently to be more productive. • Research and utilize resources that track students beyond the current educational system. • Rethink the role of "the room". Community spaces can become classrooms that are interactive and aware learning environments with ubiquitous computing and wireless connectivity. Environments that recognize people, information, and activities and automatically provide appropriate access and resources. • Rethink scheduling and how it can be adjusted to accommodate sharing of teacher resources, experts, authentic audiences, and medical needs.

Conclusion

The 2011 State of Connecticut Educational Technology Plan is the result of a long range technology planning process which began during the winter and spring of 2009-2010 and was completed during the 2010-11 school year. It included key stakeholders, educators from school districts and Regional Educational Service Centers from every corner of the state. All members shared a common interest in exploring how technology can enhance the teaching and learning process paired with a strong desire to make the State of Connecticut's Educational Technology Plan a guiding document for every school district across the state. The Working Group received input from colleagues who represented all grade levels and content areas.

The Plan was opened for public comment during the month of October, 2010, to ensure a high quality document that will guide us through the beginning of the 21st century. Those comments were reviewed and incorporated in this final document.

"The very phrase 'long range technology plan' is an oxymoron. Technology plans are really 'works in progress'" ("After the Plan's Approved: Keeping the Technology Planning Process Alive and Moving", *Technology and Learning*, March, 1996, p.29). The dialogue that was begun during the long-range technology planning process must continue to ensure the successful implementation of the Connecticut State Department of Education Educational Technology Plan.

2012 Update

The fall of 2011 brought a new commissioner to the State Department of Education with a renewed focus from the Governor's office on Education Reform. The following guiding principles are at the core of this new reform movement –

Principle 1 – Enhance Families Access to Early Childhood Education
Principle 2 – State Support and Intervention in Low Performing Schools
Principle 3 – Expand Availability of High Quality School Models
Principle 4 – Removing Red Tape and Other Barriers to Success
Principle 5 – Develop the Very Best Teachers and Principals
Principle 6 – Deliver More Resources to Districts That Embrace Reform

As with any new direction or in this case, reform, educational technology will need to play a key role in meeting the objectives of these principles. The exact details as to any new or modified changes to this educational technology plan will be incorporated into this document as they become known.