Empowering Learning

A Blueprint for California Education Technology 2014–2017

A Report to State Superintendent of Public Instruction Tom Torlakson by his Education Technology Initiative
April 2014

Empowering Learning: California Education Technology Blueprint, 2014–2017, is the product of the Superintendent's Initiatives Office of the California Department of Education under the direction of State Superintendent of Public Instruction Tom Torlakson and in collaboration with the California Department of Education's Educational Data Management Division.

Table of Contents

This page intentially left blank.

CALIFORNIA
DEPARTMENT OF
EDUCATION

TOM TORLAKSON
STATE SUPERINTENDENT OF PUBLIC INSTRUCTION

April 2014

Dear Fellow Californians:

Fifteen years into the 21st Century, technological advancements continue to change the way we interact with each other and with the world. Preparing our students to succeed in the society and the economy they will find when they leave our classrooms means preparing them to use technology effectively, safely, and productively.

Empowering Learning: California's Education Technology Blueprint gathers the recommendations of some of our leading experts in education and technology—and in where and how the two may intersect. We must always remember that technology is a means, not an end—a tool and component of achieving a world-class education for every child in California.

Since taking office in 2011, I have visited schools all over California and seen our great state's diversity in all its forms. In these schools, I have seen the potential that can be unlocked by access to the right tools. I have seen students discuss the books they are reading in class online. I have seen desktop robots used to demonstrate engineering concepts. And I have seen everything from virtual frog dissections to student-produced newscasts. Most importantly, I have seen how technology can be tailored to respond to the strengths and challenges of each student as an individual.

As first William Shakespeare and later Aldous Huxley said, it is a brave new world. It is a world that is full of limitless potential for the young people of California, a state that has always led the way in these areas and much more. This is what is also at the heart of the Common Core State Standards and modern assessments that can help guide teaching and learning in the classroom.

Those of us who have made education our life's work know that we must ensure students are given the tools and opportunities they need to succeed, both in school and out. Education technology—if pursued thoughtfully—is both one such tool and one such opportunity.

Sincerely,

Tom Torlakson
State Superintendent of Public Instruction

This page intentially left blank.

Executive Summary and the California Context

California's public education system is undergoing a series of transformations toward the goal of ensuring every child has access to a world-class education.

Today, part of the strategy toward reaching this goal is access to technology. In 2011, a key United Nations report declared broadband access as a basic human right for all the world's citizens when United Nations Special Rapporteur Frank LaRue emphasized that "the Internet has become a key means by which individuals can exercise their right to freedom and expression."[1]

This *Blueprint for California Education Technology* is a call to action for educators, community leaders, and businesses to work together to find solutions to the challenges we face.

Since its founding, California has been the state defined by dreams and innovation. For more than a century, people throughout the nation and the world have traveled to California in search of a better life. This aspiration is a foundation of our state's culture, one helping to propel California into the world's eighth largest economy.

Given our history, no one should be surprised that the modern technology industry calls California home and continues to thrive here.

California leads the nation in technology jobs, and the technology industry is a vital part of the California economy. The TechAmerica Foundation's *Cyberstates 2013* report notes that the tech industry employs nearly 8 percent of California's private sector workforce and that tech workers have an annual average wage 131 percent higher than the state's private sector average.[2]

Technology is changing nearly every aspect of our lives. We live in a world filled with text messages, social networking, and multimedia content delivery.

Technology innovations have changed everyday commerce and communications. Traditional industry sectors such as banking, music, television and film, and newspaper and

[1] United Nations General Assembly Human Rights Council. *Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression*, Frank La Rue, p. 7. Accessed on March 22, 2014, from http://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf

[2] TechAmerica Foundation, Cyberstates 2013. Accessed January 22, 2014, from http://www.techamericafoundation.org/cyberstates

book publishing—to name some of the most obvious—have been transformed by technology.

The products and services produced by our technology sector have permeated into virtually every industry and into our everyday actions, conversations, and learning.

Education must be the next sector to embrace the future that is being transformed by technology. As the International Society for Technology in Education explains, "Today's educators must provide a learning environment that takes students beyond the walls of their classrooms and into a world of endless opportunities."[3]

[3] International Society for Technology in Education, National Educational Technology Standards Project.

In fact, this transformation has already begun. This *Blueprint* addresses a time period of just over three years into the future—through 2017.

One only needs to look back over the past three years to understand the magnitude of the pace of change technology fosters. At the beginning of 2010, the iPad® had yet to be introduced. That device, proudly branded by its manufacturer as "designed in California," began a monumental shift.

It took more than three decades for education to embrace the personal computer era, but within three years of the arrival of the iPad®, schools embraced it and other tablets (running, among others, the Google Android™ operating platform, Linux® operating system, and Microsoft Windows® operating system). In 2014, students in some of our school districts—including the state's largest—are taking online assessments not just on desktop computers but on tablets.

In recent presentations, Stanford University Professor Linda Darling-Hammond cites a summary of recent studies by Chris Wardlaw included in his report, *Mathematics in Hong Kong/China: Improving on Being 1st in PISA* to highlight some of these 21st century skills:

- Ability to communicate
- Adaptability to change
- Ability to work in teams
- Preparedness to solve problems
- Ability to analyse and conceptualise
- Ability to reflect on and improve performance
- Ability to manage oneself
- Ability to create, innovate and criticise
- Ability to engage in learning new things at all times
- Ability to cross specialist borders

We are moving into a period where mobile learning will allow students to work with their teachers and parents to utilize a cloud of knowledge and master key 21st century skills.

A three-year technology window can lead to dramatic changes. Today, mobile users use their smart devices to access the web, check heart rate, study seismic activity, translate languages, and describe images for the visually impaired. Users will have the power of entire libraries in the palm of their hands.

Mobile devices are being used for formative assessments, for Common Core implementation evaluation, and to support the curriculum. By 2017, they may be essential for personalized instruction in blended learning environments. As more of our students own and use portable devices, mobile learning could become a more important part of the K–12 educational experience.

Teachers may have the capability to offer their students instruction in ways that best match a child's needs, best learning style, and ideal pace. Teacher librarians can provide critical support and transmission of technical knowledge and education technology teaching and learning techniques.

Teacher librarians can also help implement in a mobile education context the existing model frameworks that include technology fundamentals, including the *Model Library Standards for California Schools*[4] and the *California Career Technical Education Model Curriculum Standards*.[5]

The *NMC Horizon Report > 2013 K–12 Edition*[6] argues that the K–12 time-to-adoption horizon for mobile learning nationally will be one year or less. This report, which covers a range of technology adoptions, is enriched by K–12 examples from California. But what are now isolated examples should become commonplace.

As the report explains, "After years of anticipation, mobile learning is positioned for near-term and widespread adoption in schools. Tablets, smartphones, and mobile apps have become too capable, too ubiquitous, and too useful to ignore, and their distribution defies traditional patterns of adoption, both by consumers, where even economically disadvantaged families find ways to make use of mobile technology, and in schools, where the tide of opinion has dramatically shifted when it comes to mobiles in schools."

But in California—home to Silicon Valley and the world's leading technology companies—too many schools have been left out of this technology revolution. California must not only keep up with mobile technologies. It must lead.

That is why we should be concerned over reports from the California Emerging Technology Fund that "more than nine

As more of our students own and use portable devices, mobile learning could become a more important part of the K-12 educational experience.

According to the Pew Research Center's Teens and Technology 2013 report http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/:

- 78 percent of teens now have a cell phone.
- 37 percent of teens own smartphones.
- 74 percent of teens say they access the Internet on cell phones.
- 23 percent of teens have a tablet computer.

[4] Accessed April 2, 2014, at http://www.cde.ca.gov/ci/cr/lb/schlibrarystds.asp

[5] Accessed April 2, 2014, at http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp

[6] Accessed February 2, 2014, at http://www.nmc.org/publications/2013-horizon-report-k12

million Californians who live in remote rural communities, on tribal lands, in low-income neighborhoods, or who have a disability"[7] do not have the benefit of high-speed connections to the Internet.

Our education leaders, including Superintendent Torlakson, have identified the pressing need for all students to graduate from high school with the skills required to succeed in college and careers. Given California's size and diversity, one-size-fits-all solutions are unlikely.

Preparing our students to succeed in college or careers requires that they understand technology and master 21st century skills like critical thinking and problem solving, communication and collaboration, and creativity and innovation.

Stanford University Professor Dr. Linda Darling-Hammond, the co-chair of Superintendent Torlakson's Transition Advisory Team, described this new mission for schools in her book *The Flat World and Education*:

> "The new mission of schools is to prepare students to work at jobs that do not yet exist, creating ideas and solutions for products and problems that have not yet been identified, using technologies that have not been invented."[8]

There is a role for everyone in this education transformation. It will require both a sense of wonder and the courage to take on new roles as the landscape of learning transforms.

We will need to make communities and parents aware of the enhanced potentials for teaching and learning. We will need to build political will around the urgency of making it happen.

Teachers will never be more important and administrators never more crucial. Superintendents must lead into sometimes unfamiliar territory. We must all be inspired by examples, empowered by training, and committed to embracing new challenges, overcoming obstacles, and envisioning great successes.

[7] California Emerging Technology Fund 2012–13 Annual Report. Accessed February 6, 2014, at http://www.cetfund.org/annual-reports.

Teacher librarians can provide critical support and transmission of technical knowledge and education technology teaching and learning techniques.

[8] *The Flat World and Education*, Dr. Linda Darling-Hammond, p. 2.

We must be prepared to embrace a landscape where technology in teaching and learning becomes part of the fabric of modeling, observation sharing, and the new and expanded peer groups all of us can experience.

Mobile devices and wireless systems are transforming the very definition of place-based learning environments. They also create many new learning opportunities.

As a result of our commitment to the Common Core State Standards and the development of the new Smarter Balanced assessment system, California must take steps to ensure that an appropriate technology network is in place to support these education transformations.

However, there are millions of students in California who do not have adequate access to technology in their classrooms or at home. According to the K–12 High Speed 2013 Annual Report, 791 California schools today have a T-1 line (1.5 Mbps) or lower broadband access[9]—inadequate for the needs of today's students.

We must ensure that every one of California's 6.2 million students can take advantage of the opportunities education technology presents. We must not allow some students to fail to have the opportunity to learn basic skills required to interact in a digital world. We need to make sure every student has access to, and the knowledge to use, the technology needed to successfully participate in the Smarter Balanced assesssments.

We must not allow a lack of technology—or ineffective implementation—to become the roots of the next achievement gap.

[9] K–12 High Speed 2013 Annual Report. Accessed April 2, 2014, at http://www.k12hsn.org/about/news/archive.php/view/news/8260

Education Technology Task Force

Teachers will never be more important and administrators never more crucial.

To respond to the demands for this mobile learning transition and for the need to prevent the creation of a new achievement gap from the digital divide, State Superintendent of Public Instruction Tom Torlakson convened a 48-member Education Technology Task Force.

Superintendent Torlakson charged the Task Force with writing a memo containing recommendations to form the foundation of a new California Education Technology Blueprint—a Blueprint creating a roadmap to an education system where, as he put it, "No Child is Left Off-Line."

The Task Force and the Superintendent's Strategic Initiatives Office collaborated with the California Department of Education's Education Data Management Division and designed a transparent, public process providing multiple opportunities for stakeholder involvement. These included web-based discussions, in-person presentations, and a series of town hall events across the state.

Guiding Principles for the Education Technology Task Force

Mission of the California Department of Education

California will provide a world-class education for all students, from early childhood to adulthood. The Department of Education serves our state by innovating and collaborating with educators, schools, parents, and community partners. Together, as a team, we prepare students to live, work, and thrive in a highly connected world.

Vision for Education Technology in California

Education technology will be as effective and productive a tool in the school environment as it is in the world beyond schools (p.12, *A Blueprint for Great Schools*).

Call to Action

The State Superintendent's Transition Advisory Report: *A Blueprint for Great Schools* called out a key recommendation for the comprehensive use of technology in California schools:

Facilitate the infusion of 1:1 computing in school, after school and in the home; provide devices, Internet access, new digital curriculum materials, capacity for ongoing diagnostic assessment, professional development and network support, and institute an open standard for the exchange of educational information (p.13, *A Blueprint for Great Schools*).

The Task Force met three times in person and had frequent online conversations. They focused on what California could do to enhance the positive impact education technology has in four key areas:

- **Learning:** The group sought to ensure that all learners will have engaging and empowering learning experiences both in and out of school to prepare them to be active, creative, and ethical participants in our globally networked society.

- **Teaching:** The group focused on actions supporting and enabling teachers to make effective use and integration of technology into all areas of instruction from pre-school, through grades K–12, and continuing on to adult and career education.

- **Assessment:** The group examined how assessments are key to preparing our students for a competitive world and discussed how they should not only allow a student to demonstrate their learning of concepts, but also allow them to be creative and personalize their learning.

- **Infrastructure:** The group sought to provide specific recommendations about how California could modernize the infrastructure across California's public schools in response to Superintendent Torlakson's "No Child Left Off-line" vision.

The Education Technology Task Force presented their recommendations to the Superintendent in the form of an open, public memo in August 2012.[10]

The Superintendent's staff then met with the public and representatives of technology companies and digital content providers to discuss the work of the Task Force and gather their input regarding California education technology policy.

After those public meetings, the Education Technology Task Force collected all of the information and drafted this *Blueprint for California Education Technology* to offer a plan to ensure every California student will benefit from what education technology can offer.

[10] A copy of this memo is at http://www.cde.ca.gov/eo/in/documents/efftmemo.pdf

Based on this input, this *Blueprint for California Education Technology* is carefully designed to support four California education transformation initiatives:

- Implementation of the Common Core State Standards.
- Development and deployment of new assessments as a governing state in the Smarter Balanced Assessment Consortium.
- Implementation of a statewide collaboration with the Partnership for 21st Century Schools.
- Implementation of Superintendent Torlakson's "No Child Left Off-line" vision of one-to-one computing for every student and educator.

Blueprint Recommendations

Technology, and how we use it, is changing rapidly. New products become available every day. Education policy has also changed significantly since the work of the Superintendent's Education Technology Task Force concluded.

Superintendent Torlakson has been traveling around the state to discuss the benefits he sees from the implemention of education technology to support student learning—including more individualized and dynamic learning experiences for each student.

Work on implementing policies based on these recommendations has already begun. For example: ensuring adoption of the Local Control Funding Formula, transitioning to a new vision of assessments outlined in Assembly Bill 484 (Bonilla), leading a national E-rate modernization initiative, and securing $1.25 billion to help our educators implement the transition to the Common Core State Standards, including the integration of these academic content standards through technology-based instruction for purposes of improving the academic performance of pupils.[11]

[11] Acceptable expenditures of these funds may include, but are not necessarily limited to, expenditures necessary to support the administration of computer-based assessments and provide high-speed, high-bandwidth Internet connectivity for the purpose of the administration of computer-based assessments.

For educators and policy makers, keeping up with the accelerating pace of technological change and policy changes could prove a formidable challenge.

That is why we did not design this *Blueprint* to be a series of specific policy implementation checklists. Instead, this *Blueprint* outlines a vision to support California educators using technology to enhance the learning experience for every child.

We must not allow a lack of technology—or ineffective implementation—to become the roots of the next achievement gap.

All parties should consider including processes to measure how well these programs improve student learning. That will allow us to have the ability to inform Californians about our progress and seek the additional investment required to ensure every student can benefit.

As we work to implement the recommendations contained in this *Blueprint*, we will review existing state, regional, and local educational technology programs, resources, and services. We will consider adapting these existing resources to support these recommendations as appropriate. We should not assume we must replace programs that are already working, but instead seek to include them in a more comprehensive and coherent education technology policy system.

The following recommendations contain actions for partners—at all levels—in the education of California's students. A summary of the *Blueprint's* recommendations follows.

Summary of the California Education Technology Blueprint's Recommendations

Learning

1. To ensure a technology skills gap will not become the next achievement gap, California should work toward providing every student, teacher, and administrator with access to at least one Internet-connected device.

2. Ensure student safety by outlining policies and best practices to prevent cyberbullying and protect student data.

3. Enhance classroom technology integration throughout California's K–12 and higher education systems.

4. Provide all students age- and grade-appropriate instruction in the use of technology, including computer science and programming.

Teaching

5. Remove barriers that restrict teacher flexibility in using technology to educate our children.

6. Create professional development and teacher certification programs in education technology instruction.

7. Create a ranked-data platform to allow educators, parents, and students to evaluate online and blended learning resources.

8. Determine how to provide regional and statewide education technology support in the new Local Control Funding Formula policy climate.

9. Build capacity for local and regional decision making regarding instructional materials, including digital curriculum resources.

10. Lead state and multi-state efforts to define and establish education resource standards to improve the development of low-cost, shared resources.

Summary of the California Education Technology Blueprint's Recommendations

Assessment

11. Based on the Smarter Balanced field test experience in spring 2014, further identify technology readiness gaps in schools and advocate for funding to ensure schools have the necessary technology and professional development support.

12. Establish professional development programs and platforms for using technology in formative learning assessment.

13. Develop and support student recognition programs that measure 21st century skills, demonstrate learning of standards-based concepts, and allow students to personalize their learning.

Infrastructure

14. Aggressively pursue statewide and regional partnership opportunities to enhance broadband connectivity and access to Internet-connecting devices.

15. Ensure school districts design school facilities with technology and the Common Core State Standards in mind.

16. Monitor and expand network bandwidth to support the move toward deployment of one-to-one computing.

17. Pursue measures to close the digital divide among California students and promote broadband adoption among California residents.

18. Explore the deployment of statewide cloud computing data centers.

19. The California Department of Education should help lead this transition by creating a senior-level position for education technology.

Learning

Recommendation #1:
To ensure a technology skills gap will not become the next achievement gap, California should work toward providing every student, teacher, and administrator with access to at least one Internet-connected device.

These one-to-one initiatives can enhance any time, any place learning. To ensure they do, these devices should meet the Smarter Balanced minimum hardware specifications (a description of them is available at http://www.cde.ca.gov/ta/tg/sa/ under the Technology Components section).

In addition, if these devices are provided to students in lieu of traditional textbooks or instructional materials, then districts will need to have systems or policies in place to ensure compliance with *California Education Code* provisions relating to the sufficiency of textbooks and instructional materials (*California Education Code* Section 60000, et seq.)

This transition will require the adoption of new policies and learning strategies to foster student engagement and individualized learning using technology.

Recommendation #2:
Ensure student safety by outlining policies and best practices to prevent cyberbullying and protect student data.

It is important to teach students about the ethical, legal, and safe use of online information and resources. It is also important to help students learn about how they can protect themselves and their personal information in online environments.

The California of Department of Education (CDE) and stakeholder organizations can disseminate samples of use and safety policies, technology plans, insurance agreements, social media guidelines, anti-piracy, and acceptable use policies. The CDE and stakeholder organizations can also highlight and distribute curriculum resources, including those found in the *Model School Library Standards for California Schools* and the *California Career Technical Education Model Curriculum Standards*.

These resources can help students learn 21st century skills such as digital citizenship, information literacy, and safe and legal Internet use (for example, those surrounding plagiarism and pirating music and movies).

Recommendation #3:
Enhance classroom technology integration throughout California's K–12 and higher education systems.

The state should coordinate its education technology policies among all of the institutions impacting students. While education technology will be a key part of the educational experience, it should enhance student learning and not be seen as a way to replace the in-classroom experience. Blended learning and flipped classrooms are examples of ways to make this possible.

Recommendation #4:
Provide all students age- and grade-appropriate instruction in the use of technology, including computer science and programming.

Computer science can aid with the development of 21st century skills such as critical thinking, problem solving, analysis, and collaboration. Computer science shows students how to create—and not only use—21st century technologies while also preparing students for careers in a variety of fields.

Teaching

Recommendation #5:
Remove barriers that restrict teacher flexibility in using technology to educate our children.

All levels of our education system should take actions to encourage, support, and reward teachers and administrators for their use of technology to support current and emerging models of learning.

Districts and schools can develop and implement learning resources that exploit the flexibility and power of technology to reach all learners any time and any place. Special education classes also offer opportunities for technology to enhance the student learning experience.

Education stakeholders can also develop model policies based on the expectation that students will use devices to enhance their learning rather than the all-too-frequent requirement for students to turn off their technology when they arrive on campus.

Recommendation #6:
Create professional development and teacher certification programs in education technology instruction.

Stakeholder organizations should take steps to develop programs that allow teachers to gain the skills necessary to teach Common Core-aligned curriculum effectively in blended learning environments. Certification programs can be designed to give teachers continuing education credit for upgrading their skills and to ensure teachers with demonstrated expertise can have the option to gain credit through an alternate assessment process.

Teaching institutions should be encouraged to incorporate into their programs the use of education technology to enhance the opportunities to engage students and use tools to provide individualized instruction. The state should investigate ways to provide appropriate recognition to teachers who develop skills in this area.

Recommendation #7:
Create a ranked-data platform to allow educators, parents, and students to evaluate online and blended learning resources.

Develop the necessary infrastructure to create this online learning community for sharing educational resources across all learning platforms and encouraging collaboration among educators. This effort could include an update of *Brokers of Expertise* (http://www.myboe.org) to align with current technological and social media standards to ensure students and teachers have access to high-quality content and digital resources.

The CDE could also seek to play a facilitation and convening role to link current resources. Creating these kinds of professional learning communities are especially timely given the ongoing transition to the Common Core State Standards and are consistent with the principles outlined by Superintendent Torlakson's Educator Excellence Task Force report *Greatness by Design* (available at http://www.cde.ca.gov/eo/in/documents/greatnessfinal.pdf).

Recommendation #8:
Determine how to provide regional and statewide education technology support in the new Local Control Funding Formula policy climate.

The need for statewide and regional education technology support for teachers and schools has never been higher. State education leaders should take steps to design a new system to meet the needs of educators.

Recommendation #9:
Build capacity for local and regional decision making regarding instructional materials, including digital curriculum resources.

The CDE, State Board of Education, and education stakeholders should develop guidance and procedures to ensure alignment with the state curriculum and to support local school district decision making. These efforts should ensure flexibility and variety in formats and allow for the use of open education resources.

Recommendation #10:
Lead state and multi-state efforts to define and establish education resource standards to improve the development of low-cost, shared resources.

Projects such as these can create a comprehensive suite of support for educators across the state more economically than if efforts are duplicated by multiple districts. They are also a potential solution to deliver support to many small and medium sized rural and suburban districts.

Assessment

Recommendation #11:
Based on the Smarter Balanced field test experience in spring 2014, further identify technology readiness gaps in schools and advocate for funding to ensure schools have the necessary technology and professional development support.

The field test provides schools the opportunity to prepare students for success and serves as a barometer of technology capability, which allows the state and local educational agencies to assess computer availability and server capacity to prepare for the new testing in spring 2015.

Recommendation #12:
Establish professional development programs and platforms for using technology in formative learning assessment.

The CDE and education stakeholders should collaborate to provide technical assistance to educators. This may include constructing an approval process on a state platform (possibly including an updated *Brokers of Expertise* website) to collect, review, and process these de-

velopment opportunities to ensure quality and alignment to the Common Core State Standards. It may also be possible to create a reasonable fee schedule so development costs can be recouped, thereby incentivizing county offices of education, local districts, and charter schools to share their programs.

Recommendation #13:
Develop and support student recognition programs that measure 21st century skills, demonstrate learning of standards-based concepts, and allow students to personalize their learning.

Develop creative assessments and credentials to validate accomplishments—including digital badges, portfolios, and other innovative ways to ensure learning is relevant to the real world and validated by experts in various fields. The CDE can help lead state and multi-state efforts to define and develop useful metrics for the educational use of technology data that support individualized and personalized instruction.

Infrastructure

Recommendation #14:
Aggressively pursue statewide and regional partnership opportunities to enhance broadband connectivity and access to Internet-connecting devices.

Identify state and federal funding sources, develop advisories on local funding options, and explore industry partnerships to connect student homes to the Internet at lower prices.

Statewide and regional groups can pursue public-private partnerships—and seek to leverage the scale of California purchasing power—to provide for discounts on technology hardware, software, and other services or resources. They can also help build local and regional capacity by creating a clearinghouse of model practices, policies, and contracts school districts may choose to adopt.

The CDE and education stakeholders should also work with other agencies to develop e-waste mitigation partnerships as devices are replaced to stay current with the rapid pace of technological change.

Recommendation #15:
Ensure school districts design school facilities with technology and the Common Core State Standards in mind.

Based on Superintendent Torlakson's *Schools of the Future* report (available at http://www.cde.ca.gov/LS/fa/sf/documents/sotfreport.pdf), establish statewide recommendations for funding, building, and modernizing schools to accommodate new education technologies and classroom designs for modern curriculum configurations. Seek and share successful, cost-effective funding strategies to support technology initiatives independent of facilities projects.

Recommendation #16:
Monitor and expand network bandwidth to support the move toward deployment of one-to-one computing.

Students and educators must have the ability to use Internet-connected devices to enable 24/7 learning. These devices must also have the capability to be used as tools for assessments. In addition to adopting and supporting minimum bandwidth standards, the state should provide tools and guidance to schools and districts to ensure they are ready and have the capacity for emerging education and testing environments.

Recommendation #17:
Pursue measures to close the digital divide among California students and promote broadband adoption among California residents.

The CDE should take a national leadership role in seeking federal E-rate reform. The CDE should engage directly with the California Public Utilities Commission (CPUC) to advocate for the continued growth of the California Teleconnect Fund to support education-eligible services for at-home learning. In addition, the CDE should engage with the Federal Communications Commission (FCC) and the United States Congress to provide network and Internet connections and technology resources to high-need areas. Policymakers should also examine establishing a universal lifeline broadband policy.

Recommendation #18:
Explore the deployment of statewide cloud computing data centers.

These scalable and flexible data centers can support instruction through the capacity to address changing requirements quickly and cost-effectively. The CDE and education stakeholders should work with technology industry representatives to help districts, county offices of education, and other service providers outline technical requirements.

These conversations could include a determination of cloud-computing options, including the feasibility of different solutions, cost analysis, and implementation recommendations—such as matters of privacy, access, and security of data in these systems.

Recommendation #19:
The California Department of Education should help lead this transition by creating a senior-level position for education technology.

This position should provide visionary and innovative advice to CDE leadership and education stakeholders to support the integration of mobile learning concepts throughout our state's education system. These efforts could include the coordination with stakeholders of the compilation of a roadmap to assist school districts in their efforts to achieve the technology infrastructure required to support the goals of this *Blueprint*. The position also should promote the effective use of technology-related goals, initiatives, and funding opportunities to improve teaching and learning for California's school districts and schools. All education organizations—from county to local—should also ensure representation of education technology personnel at the executive level.

Appendix A: Blueprint Development Process

Immediately after being sworn in as California's 27th State Superintendent of Public Instruction, Tom Torlakson convened a 59-member Transition Advisory Team.

This team included parents, teachers, classified staff, administrators, superintendents, school board members, business and union leaders, and higher education and nonprofit representatives. The team was tasked with studying issues facing California public education and creating a Blueprint of recommendations for improving education in California. Their work ended in the publication of *A Blueprint for Great Schools: Transition Advisory Team Report* (August 9, 2011).

A Blueprint for Great Schools provides a new direction for our education system. Its key elements include a focus on 21st century skills, the need to meet the needs of the whole child, and a call to rebuild the ranks of California's educators with the resources and respect they deserve.

The Transition Advisory Team's report also cites an urgency to address the effective use of technology across the education enterprise. Its findings included a call for the increased use of digital instructional materials. It recommends that California education should "facilitate the infusion of 1:1 computing in school, after school, and in the home: provide devices, Internet access, new digital curriculum materials, capacity for ongoing diagnostic assessment, professional development and network support, and institute an open standard for the exchange of educational information." (*A Blueprint for Great Schools*, page 13).

To address these recommendations Superintendent Torlakson sought the expertise of a 48-member Education Technology Task Force (Task Force) of state educational practitioners, leaders, board members, and technicians.

He charged this group to review current research provided by the *National Education Technology Plan: Transforming American Education: Learning Powered by Technology* (available at http://www.ed.gov/technology/netp-2010) and to use that model and conceptual framework to develop a long-range plan to further integrate 21st century skills into California's K–12 education system.

Upon completion of this process on August 16, 2012, the Task Force delivered to Superintendent Torlakson a memorandum outlining their recommendations on the topics presented above.

Superintendent Torlakson and his staff then spent several months making presentations around the state and receiving comments on the recommendations. This "listening tour" process was designed to receive input and ensure there was ample support and agreement with the recommendations.

California Department of Education staff also reviewed the work and research-based reports of several leading organizations.

The staff began work on this Education Technology Blueprint by reviewing and building upon the work and research-based reports of several leading education organizations. These reports, along with ten years of annual reports to the CDE and the State Legislature from the California Technology Assistance Project (CTAP), demonstrate the ongoing and complex need for education technology planning, collaboration, and the leveraging of resources across the state.

California educational leadership groups have prepared position papers and provided thoughtful recommendations since the mid-1990s.

The Association of California School Administrators (ACSA) published a position paper prepared by its Technology Leadership Group. This paper provides guidance to teachers, site leaders, district leaders, and state leaders. It takes a systemic view and calls for "changes across all levels of the complex network of the education system."

These suggested changes include encouraging teachers to teach 21st century skills, advising school site leaders to provide resources and training to classroom teachers, suggesting that district leaders provide access to new tools for communication and online digital tools, and proposing that the state consider revisions in all curricular areas to better support digital learners including expanding the use of online instructional materials.

The California County Superintendents Educational Services Association (CCSESA) issued a call for revision of the regulations surrounding the implementation of online learning in K–12. The proposed changes included recommendations about seat-time requirements and associated daily attendance accounting, site-based requirements and independent study provisions, contiguous counties and other charter school restrictions, and provisions to student access and equity in regard to online content and learning opportunities.

Since the 1990s, the CDE has worked diligently to stay abreast of issues in educational technology. The CDE has also worked to provide state leadership to leverage collaborative work and provide economies of scale. It also has sought to implement support systems for students, teachers, and administrators.

The previous work and planning documents served to guide the discussions and reviews during the development of this new version of an educational technology plan for the state, now called the Education Technology Blueprint.

The 2014–2017 Education Technology Blueprint will not be the final word on this subject. Just as technology evolves so will our state's Education Technology Vision. Please continue to visit our website at http://www.cde.ca.gov for more information.

Appendix B: Blueprint Conceptual Framework

To organize the Education Technology Task Force and conduct group and private interviews, briefings, and input sessions, the Principal Advisor to the State Superintendent of Public Instruction and the staff of the CDE's Education Data Management Division utilized the design of the National Education Technology Plan 2010 as a construct to organize comments, feedback, and document submissions (see box below).

This framework allowed for a full review of the technology landscape in California and prevented a premature call to action without the necessary context. This broad construct also helped to direct a thoughtful consideration of current and emerging trends. It helped ensure these conversations did not inadvertently overlook any area of education technology policy.

CDE staff presented the focus areas and the goal statements in the National Technology Plan 2010 to the Education Technology Task Force Members. Staff also presented them during the various public input sessions and meetings.

The Task Force discovered that the structure of the National Plan was well-known in the field of education technology. It also received comments online that were formulated to align with the National Technology Plan construct. The Task Force used this structure to prepare and organize its final memo of recommendations to the Superintendent.

The National Technology Plan Goals

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

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

Teaching: Professional educators will be supported individually and in teams with technology that connects them to data, content, resources, expertise, and learning experiences that enable and inspire more effective teaching for all learners.

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

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

Bibliography

Association of California School Administrators (ACSA). 2010. Technology Leadership Group Position Paper. http://alturl.com/yucus (Accessed July 1, 2012).

California County Superintendents Educational Services Association. 2011. California eLearning Framework. http://ccsesa.org/?wpfb_dl=1070 (Accessed February 11, 2012).

California Department of Education. California Career Technical Education Model Curriculum Standards: Grade Seven through Twelve. Sacramento: California Department of Education, 2013. http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp (Accessed February 2013).

California Department of Education. Model School Library Standards for California Public Schools. Sacramento: California Department of Education, 2010. http://www.cde.ca.gov/ci/cr/lb/schlibrarystds.asp (Accessed February 3, 2012).

California Department of Education, California Education Technology Task Force. Connect, Compute and Compete. Sacramento: California Department of Education, 1996.

California Department of Education, Commission on Technology in Learning. 2003. "Recommendations for California K–12 Education Technology." A report accepted by the California State Board of Education. May 7, 2003.

California Department of Education, Education Technology Task Force. 2012. "Education Technology Task Force Recommendations." A memo presented to the California State Superintendent of Public Instruction, Sacramento, August 16, 2012. http://www.cde.ca.gov/eo/in/documents/efftmemo.pdf (Accessed August 18, 2012).

California Department of Education, Transition Advisory Team. 2011. *A Blueprint for Great Schools.* A report presented to the California State Superintendent of Public Instruction, August 2011. http://www.cde.ca.gov/eo/in/bp/bpcontents.asp (Accessed February 1, 2012).

Common Core State Standards Initiative: Preparing America's Students for College and Career (CCSS). 2012. http://www.corestandards.org/ (Accessed March 2, 2012).

National Alliance of Business. 2000. *A Nation of Opportunity: Report of the 21st Century Workforce Commission*. (Washington, D.C.: National Alliance of Business.

National Association of State Boards of Education. 2012. Born in Another Time: Ensuring Educational Technology meets the Needs of Students Today—and Tomorrow. http://www.nasbe.org/wp-content/uploads/Born-in-Another-Time-NASBE-full-report.pdf (Accessed December 6, 2012).

National Research Council. 2000. How people learn: Mind, brain, experience, and school

(Expanded edition). J. D. Bransford, A. Brown and R. Cocking (eds.). Washington, D.C.: National Academy Press.

National Research Council. 2009. Learning science in informal environments: People, places, and pursuits. P. Bell, B. Lewenstein, A. W. Shouse, and M. A. Feder (eds.). Washington, D.C.: National Academy Press.

National Research Council. 2003. Planning for two transformations in education and learning technology: Report of a workshop. R. D. Pea, W. A. Wulf, S. W. Elliot, and M. Darling (eds.). Washington, D.C.: National Academy Press.

National Research Council. 2007. Taking science to school: Learning and teaching science in grades K-8. R. A. Duschl, H. A. Schweingruber, and A. W. Shouse (eds.). Washington D.C.: National Academy Press.

Partnership for 21st Century Skills (P21). 2013. http://www.p21.org/ (Accessed March 5, 2012).

Project Tomorrow. 2012. Speak Up 2012 Survey. http://www.tomorrow.org/speakup/index.html (Accessed August 2012).

State Educational Technology Directors Association (SETDA), 2012. Leading, Inspiring, Empowering: SETDA 2013-2016 Strategic Plan. http://setda.org/ (Accessed April 11, 2014).

U.S. Department of Education, Office of Educational Technology. Transforming American Education: Learning Powered by Technology. Washington, D.C.: U.S. Department of Education. 2010. http://www.ed.gov/sites/default/files/netp2010.pdf (Accessed January 5, 2012).

Vockley, Martha. *Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System*. Washington, D.C.: Partnership for 21st Century Skills. 2007. http://www.eric.ed.gov/PDFS/ED519463.pdf (Accessed May, 10, 2012).

Education Technology Task Force Members

The Superintendent wishes to thank the following individuals for their contribution to the Education Technology Blueprint Planning Process:

- Ambassador Frank Baxter, Co-Chairman, Alliance of College-Ready Public Schools
- Michael Berg, Superintendent, Central Unified School District
- Kenneth Brown, Associate Systems Engineer, Booz Allen Hamilton
- Kelly Calhoun, Assistant Superintendent, Chief Technology Officer, Santa Clara County Office of Education
- James Carreon, Assistive Technology Coordinator, California School for the Blind
- Vanitha Chandrasekhar, Education Technology Coordinator, Long Beach Unified School District
- Steve Clemons, Assistant Superintendent, Chief Technology Officer, San Diego County Office of Education
- John Cradler, President, Educational Support Systems
- Robert Craven, Chief Technology Officer, Fullerton Elementary School District
- Shirley Diaz, Deputy Superintendent, Educational Services, Glenn County Office of Education
- Dawn Egan, Teacher/Categorical Projects, Lassen Union High School District
- John Fleischman, Assistant Superintendent, Technology Services, Sacramento County Office of Education
- Jo-Ann Fox, Teacher, California, Teachers of the Year Semi-Finalist, Escondido Union School District
- Lisa Gonzales, Coordinator, Curriculum and Instruction, Santa Clara County Office of Education
- Brigette Hunley, Principal, Brigette Hunley Consulting
- John Ittelson, Professor Emeritus, California State University, Monterey Bay
- Anjali Kausar, School Board Trustee, Cupertino Union Elementary School District
- Stephen Kay, Assistant Professor, San Jose State University
- Machele Kilgore, Principal, Pacific Coast High School
- Kurt Larsen, Senior Research Associate/Producer, WestEd
- Mike Lawrence, Executive Director, Computer-Using Educators, Inc.
- Anne Mallory, Superintendent, Imperial County Office of Education

- Nonette Martin, Assistant Superintendent, Business Services, Bassett Unified School District
- Chuck McMinn, President, NapaLearns
- Steve Midgley, Principal, Mixrun LLC
- Richard Miller, Superintendent, Riverside Unified School District
- Jane Mintz, Director, Educational Technology, Oak Park Unified School District
- Barbara Nemko, Superintendent, Napa County Office of Education
- Michelle Pacansky-Brock, Online Associate Faculty, Mt. San Jacinto College
- Richard Quinones, Assistant Superintendent/Chief Technology Officer, Los Angeles County Office of Education
- Rebecca Randall, Vice President Education Programs, Common Sense Media
- Marisa Rivas, Educational Consultant, Digital Edge Learning
- Ron Rohovit, Deputy Director of Education, California Science Center
- Bill Selak, Teacher, Covina-Valley Unified School District
- Ken Shelton, Teacher, Los Angeles Unified School District
- Kevin Silberberg, Superintendent, Standard Elementary School District
- Brad Strong, Senior Director, Education, Children Now
- Hilda Sugarman, School Board Trustee, Fullerton Elementary School District
- Torrence Temple, Teacher, Murrieta Valley Unified School District
- David Tokofsky, Strategist, Associated Administrators of Los Angeles
- Rebecca Wardlow, Provost, Ashford University
- Glen Warren, Teacher, Orange Unified School District
- Paul Watters, Director, Regional Occupational Program, Butte County Office of Education
- John White, School Administrator, Los Angeles Unified School District
- Esther Wojcicki, Teacher, Palo Alto High School
- Amy Wong, Director, Science, Technology, Engineering, and Mathematics Integration, Silicon Valley Education Foundation
- Alexander Zwissler, Executive Director/CEO, Chabot Space and Science Center

California Department of Education Staff

- Craig Cheslog, Principal Advisor to the State Superintendent of Public Instruction
- Jennifer Anderson, Chief Scheduler to the State Superintendent of Public Instruction
- Lara Azar, Interim Communications Director
- Rebecca Barrett, Special Advisor to the State Superintendent of Public Instruction
- Christopher Dowell, Education Programs Consultant, K–12 Innovation and Improvement Office, Improvement and Accountability Division
- Megan A. Ellis, M.A., Strategic Initiatives Coordinator, Executive Office
- Dina Fong, Staff Services Manager, Superintendent's Initiatives Office
- Alyssa Hanou, Special Assistant to the State Superintendent of Public Instruction
- Larry Hiuga, Education Programs Consultant, Education Technology Office, Educational Data Management Division
- Joyce Hinkson, Education Programs Consultant, Instructional Resources Unit, Curriculum Frameworks and Instructional Resources Division
- Amy Bisson Holloway, General Counsel
- Giorgos Kazanis, Information Officer I
- Kelly Madsen, Strategic Initiatives Coordinator and Policy Advisor
- T. Michelle Magyar, Education Programs Consultant, College Preparation and Postsecondary Programs Office, Career and College Transition Division
- Katina Oliphant, Staff Services Analyst, Superintendent's Correspondence Unit
- Jose Ortega, Administrator, Education Technology Office, Educational Data Management Division
- Joseph Radding, Administrator, College Preparation and Postsecondary Programs Office, Career and College Transition Division
- Barbara Ross, Education Programs Consultant, Education Technology Office, Educational Data Management Division
- Cindy Quiralte, Special Assistant to the State Superintendent of Public Instruction
- Justin Adelman, Staff Services Analyst, Superintendent's Correspondence Unit
- Jason Spencer, Senior Policy Advisor to the State Superintendent of Public Instruction

Californians Dedicated to Education Foundation Staff

- Shelly Masur, Chief Executive Officer
- Jordan Wente, Chief Operations Officer
- Tim Sbranti, Executive Director (2011-2013)

Special Acknowledgements

The members of the Education Technology Task Force join the State Superintendent of Public Instruction and his staff in thanking The Californians Dedicated to Education Foundation, a 501(c)(3), for their generous financial support during the development of this *Blueprint*. The California Department of Education also acknowledges the generous support from the S.D. Bechtel Jr. Foundation, the Intel Corporation, and Bridgepoint Education.

This page intentially left blank.