

BUILDING YOUR ROADMAP TO 21ST CENTURY LEARNING ENVIRONMENTS

A planning tool for education leaders.

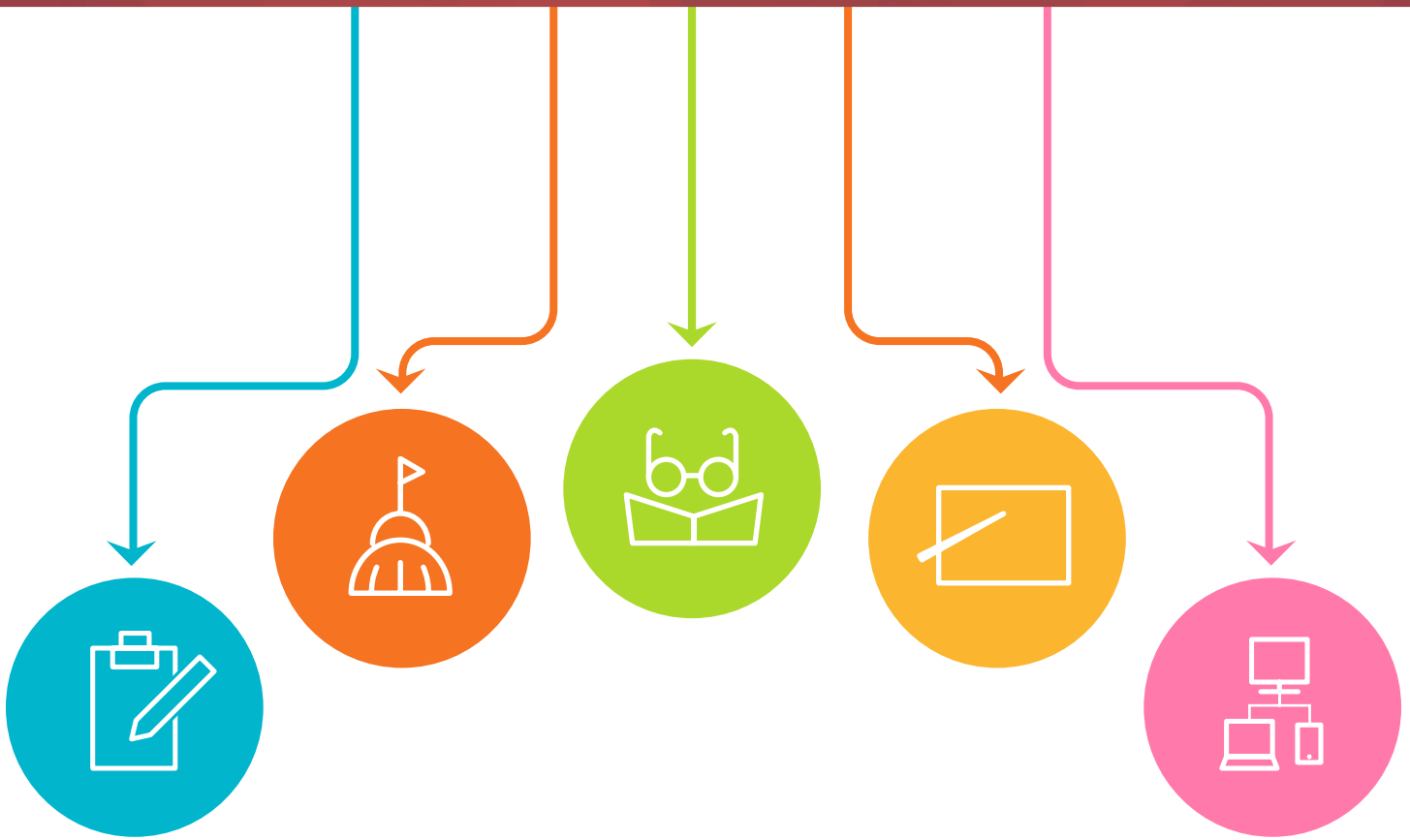


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FOREWORD

What will it take to prepare today's students for their future in a world that may look very different from today?

They will need to know science, math, language, history, civics and the arts. They will also need to be able to do something with that knowledge—use critical thinking, communication, collaboration and creativity to solve problems and create new ideas, products, and services. They will need to be flexible, adaptable, persistent lifelong learners who are digitally fluent and literate.

That's a tall order for any education system. But a confluence of factors is setting the stage for a remarkable transformation in schools that can help bring this vision to reality.

New standards, curricula and assessments are beginning to highlight higher order thinking skills and creative problem solving. Teaching practice is changing to emphasize facilitating student-centered learning. Laptops, tablets and smart phones are coming down in price as they get more powerful and easy to use, helping to enable personalized learning and flipped classrooms. Interactive digital textbooks and other learning objects, learning management systems and school administrative tools are better than ever. Research is showing how we can assess higher order thinking skills and new, computer-based assessments are rolling out. And robust broadband connections are empowering and enabling powerful digital learning.

Over the years, Cable Impacts Foundation, the Partnership for 21st Century Learning and the State Educational Technology Directors Association have been leaders and catalysts for moving toward this new vision of education. Now, many school systems have embarked on a major transformation into these 21st century learning environments.

There are many resources available to help smooth the way, but we saw a need for a high level planning tool that would help education leaders create their own roadmaps for change. This planning framework would outline a thoughtful, systemic approach. It would prompt a deep examination of, and careful planning around, the interrelated components of leadership, school culture, teaching, professional learning, student learning, assessments, accountability, and infrastructure.

The resulting “Building Your Roadmap to 21st Century Learning Environments” represents the contributions of dozens of experts and thought leaders who participated in working groups under the direction of our three organizations. We hope you find it useful.

INTRODUCTION

Today's global economy and high-speed broadband infrastructure demand a workforce that can keep pace with unprecedented technological advances. This world requires knowledge workers who are adept at analysis and problem solving, and highly adaptable—as change will be an ever-present force in their lives. It also requires an active, educated and engaged citizenry, fluent in new literacies and 21st century skills. This reality calls for radical changes in our educational institutions—a shift from 19th century, three R's schooling to 21st century learning that encourages higher order thinking, flexibility, creativity and expert use of technologies.

There is recognition by policymakers and education leaders that technology, including robust broadband access, is critical to meeting this challenge. The Federal Communication Commissions' e-Rate reforms, the White House's ConnectED initiative, the Leading Education by Advancing Digital (LEAD) Commission report, and various educational organizations underscore the need for ever-increasing technology capacity in our schools.

Yet technology alone isn't enough. The Hewlett Foundation and the Partnership for 21st Century Learning, among others, have called for educational curriculum that provides students with opportunities to develop critical thinking, communication, collaboration, and creativity skills while strengthening personal attributes like persistence and leadership. Such skills are essential for success in college and the workforce.

How do institutions of education respond to this need? We believe that fundamental change is both necessary and required to prepare students who are college and career ready. To fundamentally change our practices, educators need to thoughtfully examine all aspects of the education system. Too often, in the past, experts have failed to recognize the interconnectedness of components like technology and leadership, or teaching and accountability. Making adjustments to one component of a learning environment typically fails to produce predictable and sustainable improvement. This report describes an effort to connect the dots between the technology—broadband, devices, digital content—and critical elements of the education enterprise—teaching, learning, assessment, accountability, leadership, culture and infrastructure. The ultimate outcome of this systemic approach is to produce students who are equipped for college, career, citizenship and life through digital learning.

Reports from the Aspen Institute, the LEAD Commission and others provide high-level guidance for making these connections. Detailed diagnostic tools like the International Society for Technology in Education's (ISTE) *Lead and Transform*, and the Alliance for Excellent Education's *Project 24*, provide prescriptive solutions and granular planning tools for digital learning. There is, however a need for an approach, that, while prescriptive, also promotes a more holistic approach to system-wide change.

BUILDING YOUR ROADMAP FOR 21ST CENTURY LEARNING ENVIRONMENTS

Building Your Roadmap for 21st Century Learning Environments is a planning framework intended to bridge the gap between the prescriptive and holistic approaches to 21st century learning. The roadmap highlights the major milestones school districts must achieve, and provides supporting collateral written by five working groups who contributed to this report.

The framework embraces the fact that every school and district is unique—one size does not fit all. A given school may judge itself as excelling in one area, and needing improvement in another. This planning tool acknowledges that there is no single, nor optimal pathway. Different schools and school systems will have different goals, depending on their local circumstances.

Therefore, the tool has been designed to help schools and school districts plot their own unique course to 21st century learning environments. We hope it will prompt careful consideration of the interrelated components it presents, and serve as an impetus for meaningful discussion of your school or school district's goals, priorities and ultimate plan.

In addition to this report, an interactive, online version of the roadmap is available at www.roadmap21.org.



ENGAGING 21ST CENTURY LEARNERS

Twenty-first century learners, and their ultimate success, are the impetus for the *Building Your Roadmap to 21st Century Learning Environments*. While we frequently hear the term “21st century learners” in conversation, who are they? How are they different from previous generations?

This opening section describes a unique generation of students and highlights some of the significant trends that intersect with efforts to provide effective learning environments for this population.

By better understanding the current generation of students and the realities of their college and career trajectory, schools and educators can envision the change and adaptation necessary to effectively serve these students.

Twenty-first century students are the most diverse and advanced generation of American students to ever enter our country’s 130,000 schools (Digital Learning Now, 2014). They are independent thinkers, multitaskers, and collaborative learners who are just beginning to define themselves. They are digital learners who absorb the world around them via an array of digital computing devices including cell phones, iPads, laptops, computers, and gaming consoles (Palfrey & Gasser, 2008).

Twenty-first century students reflect the global, highly interrelated society in which we live (Aspen Institute Task Force on Learning and the Internet, 2014). They have almost instantaneous access to the world around them, communicating with the click of a button (Perry & Stallworth, 2013). Those who accept this level of connectivity think from multiple and diverse perspectives, which is a reflection of technological advancements as well as demographic changes.

Twenty-first century students also have high expectations for speediness (Lemley, Schumacher & Vesey, 2014). As technologies such as computers

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Technology is a significant driver of change—in today’s workplace, as well as today’s learning environments. Yet the digital divide can still make technology access for learning outside of the traditional school day a challenge. A White House broadband report indicates that while 91% of Americans have access to high-speed Internet service, only 71 percent subscribed to broadband at home. The report notes that this adoption rate is lower than other nations with a gross domestic product similar to that of the United States.

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and smart phones have become increasingly efficient, and as access to information via expanding technology networks becomes more available, students now expect immediate access to information. They are characterized by shortened attention spans and a need to multitask, a result of the nature of technology and the immediacy they have grown accustomed to (Matulich, Papp, & Haytko, 2008). Yet, one need only observe a student fully engrossed in a video game to conclude that, when engaged, these young people are readily able to given their full attention—and do so for long periods of time.

The realities of the 21st century learner are requiring schools and educators to fundamentally change their practice. These changes importantly include the integration of “21st century skills” into the core curriculum. While researchers and educators have come up with many definitions of these skills, the list typically includes creativity, innovation, communication, collaboration, critical thinking, teamwork, decision making, research fluency, and problem solving (Larson & Miller, 2011). Educators must produce college- and career-ready graduates that reflect the future these students will face. And, they must facilitate learning through means that align with the defining attributes of this generation of learners.

TURNING MAJORITY MINORITY

Schools and educators must also recognize and accommodate the diversity that 21st century learners represent. There are approximately 58 million students enrolled in K-12 schools throughout the U.S., according to the U.S. Census Bureau’s (2013) population survey. Also dubbed “Generation Z,” the oldest members are now in high school and college, and are considered to be the most technologically advanced generation in history (Fudin, 2012).

The National Center for Education Statistics (2012) projected that the 2014-15 school year will see, for the first time, a majority minority public school student population. These students will become the most ethnically and racially diverse group in American history. Educators will be challenged by more diversity than they’ve ever seen before. Planning for the academic success of this generation requires attention to the specific needs of English language learners (ELL), learners with disabilities, and low-income learners.

ENGLISH LANGUAGE LEARNERS

The National Education Association (NEA, 2006) suggests that English language learners are the fastest growing population segment in public schools. According to the National Center for Educational Statistics (2014b), in 2011-12, approximately 4.4 million students in public schools were ELL students. By 2015, it is predicted

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Getting Smart (2012) provides a diverse set of descriptors for 21st century students.

They are:

- globally connected to their peers via social media
- innately flexible, and expect flexibility from institutions they are associated with
- more accepting of diverse populations
- demanding instant contact with people and information
- always connected in a seamless, virtual world of friends, information, and entertainment
- consuming most media on mobile devices
- likely to prefer interactive media
- wired for the fast delivery of content and information from computers, videogames, and the Internet
- multi-taskers

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that ELL enrollment in U.S. schools will exceed 10 million, and by 2025, nearly one quarter of public school students will be English language learners (NEA, 2006).

ELL students come from a variety of cultural and linguistic backgrounds, and can face considerable challenges in the classroom. This includes a lack of appropriate teaching tools and assessments to diagnose their learning needs and measure their progress (NEA, 2006, p. 2). Murphy, DePasquale, and McNamara (2003) have argued that technology can be a particularly effective tool for English language learners, as long as it is accessible.

LEARNERS WITH DISABILITIES

The number of students in programs serving the disabled has decreased from 13.8% in 2004–05, to 13.0% in 2010–11 (National Center for Educational Statistics, 2014c). However, the percentage of students in programs that serve specific conditions increased during the same timeframe. The percentage of children identified as having health impairments (limited strength, vitality, or alertness due to chronic or acute health problems such as a heart condition, tuberculosis, rheumatic fever, nephritis, asthma, sickle cell anemia, hemophilia, epilepsy, lead poisoning, leukemia, or diabetes) rose from 1.1 to 1.4% of total public school enrollment. The percentage with autism rose from 0.4 to 0.8%, and the percentage with developmental delay rose from 0.7 to 0.8% (National Center for Educational Statistics, 2014c). Similarly, a 2009 study by the Center for Disease Control and Prevention (CDC) estimated that approximately one in every 110 eight-year-olds in the U.S. has autism spectrum disorder (ASD).

When 21st century students with disabilities are unable to achieve the academic and behavior goals expected of them, it is important for educational leaders to recognize the need to integrate tools and support that will allow them to successfully learn (Edyburn, 2005). Previous research suggests using both high and low-tech devices to facilitate academic and social change for 21st century students with disabilities (Brunvand & Byrd, 2011; Carnahan, Basham, & Musti-Rao, 2009). For example, Lewis and Boucher (1998) stated that children with autism have little aptitude for pretense, which severely constrains opportunities for role-play – one of the recommended 21st century learning methods. According to Chen and Bernard-Optiz (1993), individuals with autistic spectrum disorders (ASDs) enjoy computer-based tasks, and have made noteworthy learning improvements using different educational software technologies (Moore & Calvert, 2000) due to the fact that real-world interactions are minimized and thus less threatening (Moore, 1998). Similarly, Herrera, Alcantud, Jordan, Blanquer, Labajo, and De Pablo (2008) found that virtual reality environments are effective tools for teaching complex social skills—such as pretend play, or role-play—to boys with autism, ages six to 15.

LOW-INCOME STUDENTS

Despite growing up in the digital age, 21st century learners from low-income communities and underserved minority groups are still less likely to have computers and Internet access, and generally have fewer adults around them with skills to support technology-based learning at home (Warschauer, Matuchniak, Pinkard, & Gadsden, 2010). For example, according to Pew Research Center's Internet & American Life Project, only 51% of African-American adults owned a desktop computer as of 2010, compared to 65% of white Americans (Smith, 2010). While research has shown that children from low-income families come to school having been exposed to many fewer words they face a similar deficit in technology skills and understandings (Purcell, Heaps, (Hart & Risley, 1996),

Buchanan & Friedrich, 2013). This digital divide is an important shortcoming that must be addressed. One of the solutions to the access problem includes providing more opportunities to engage during school hours instead of at home (U.S. Department of Education National Center for Education Statistics, 2014). Technology providers have also acknowledged this challenge, and responded. For example, Comcast's Internet Essentials program offers low-cost Internet service and computer equipment as well as free digital literacy training to families with at least one child eligible to participate in the National School Lunch Program.

Leveraging the assets of the community—through community centers, religious organizations and analogous institutions is another effective access strategy. Yet, success in such endeavors requires intentional teaching and learning efforts, an infrastructure to support outside-of-school learning, and a leadership and culture that embraces the school's relationship with its community.

THE 21ST CENTURY LEARNER'S FUTURE

The American system of education was built for a society and an economy that no longer exists (National Education Association, 2012). As of 2007, only 75% of public high school students in the U.S. graduated on time; the 25% of students who dropped out stated that: 1) they did not believe their coursework was relevant; 2) the teaching they were subjected to did not match their learning styles; or 3) they experienced a lack of personal attention (National Center for Education Statistics, 2014a).

In this digital age, it is not enough for 21st century learners to master only the traditional core curriculum (National Association of Elementary School Principals, 2012); organizations such as the Partnership for 21st Century Learning, which is dedicated to advocating for 21st century readiness for all students, suggests fusing the traditional three R's with the four C's: creativity, critical thinking, communication, and collaboration. Employers not only agree, but are increasingly demanding that our nation's schools respond to this need (Casner-Lotto, Barrington & Wright, 2006).

These employers recognize new skills are vital in a society and workplace that has seen a rapid decline in "routine" work. At the same time, there has been a rapid increase in jobs involving interactive communication, non-routine skills (such as abstract reasoning and collaboration), and analytic skills (National Education Association, 2012). Twenty-first century students need access to a constantly evolving set of technological tools, and to engage in activities that demand problem-solving, decision-making, teamwork, and innovation (National Association of Elementary School Principals, 2012).

Building Your Roadmap to 21st Century Learning Environments responds to the needs of 21st century students. Informed by a diverse research base, and conceptualized by leading educators and educational organizations, the framework is designed to encourage rigorous conversation among all levels of education stakeholders. Wherever you, or your school, are on the journey to providing learning environments to accommodate and engage 21st century students, the framework will support your ongoing evolution to prepare students who are college- and career-ready.

INTRODUCING A TOOL TO “BUILD YOUR ROADMAP TO 21ST CENTURY LEARNING ENVIRONMENTS”

How can educators successfully address the unique and diverse needs of 21st century students? How do schools successfully prepare their students for the demands of college and career? *Building Your Roadmap to 21st Century Learning Environments* provides helpful, research-based and practice-proven guidance towards planning, improving and optimizing the entire process of teaching and learning—with the goal of college- and career-ready graduates, and ultimately, lifelong learners.

The tool also includes ideas for education professionals as they engage in dialog among peers, district leadership, technology providers, community members and legislators to plan and support more effective learning environments. It is designed to emphasize the systemic nature of learning environments, highlighting the requisite components prompting consideration of their important inter-relationships.

THE DESIGN EFFORT

This effort brought together a unique team of experts to address the challenge of describing effective 21st century learning environments. Led by the State Education Technology Directors Association (SETDA), The Partnership for 21st Century Learning (P21), and the Cable Impacts Foundation (CIF), this leadership team conceptualized five overarching components, or topics, essential to 21st century learning environments.

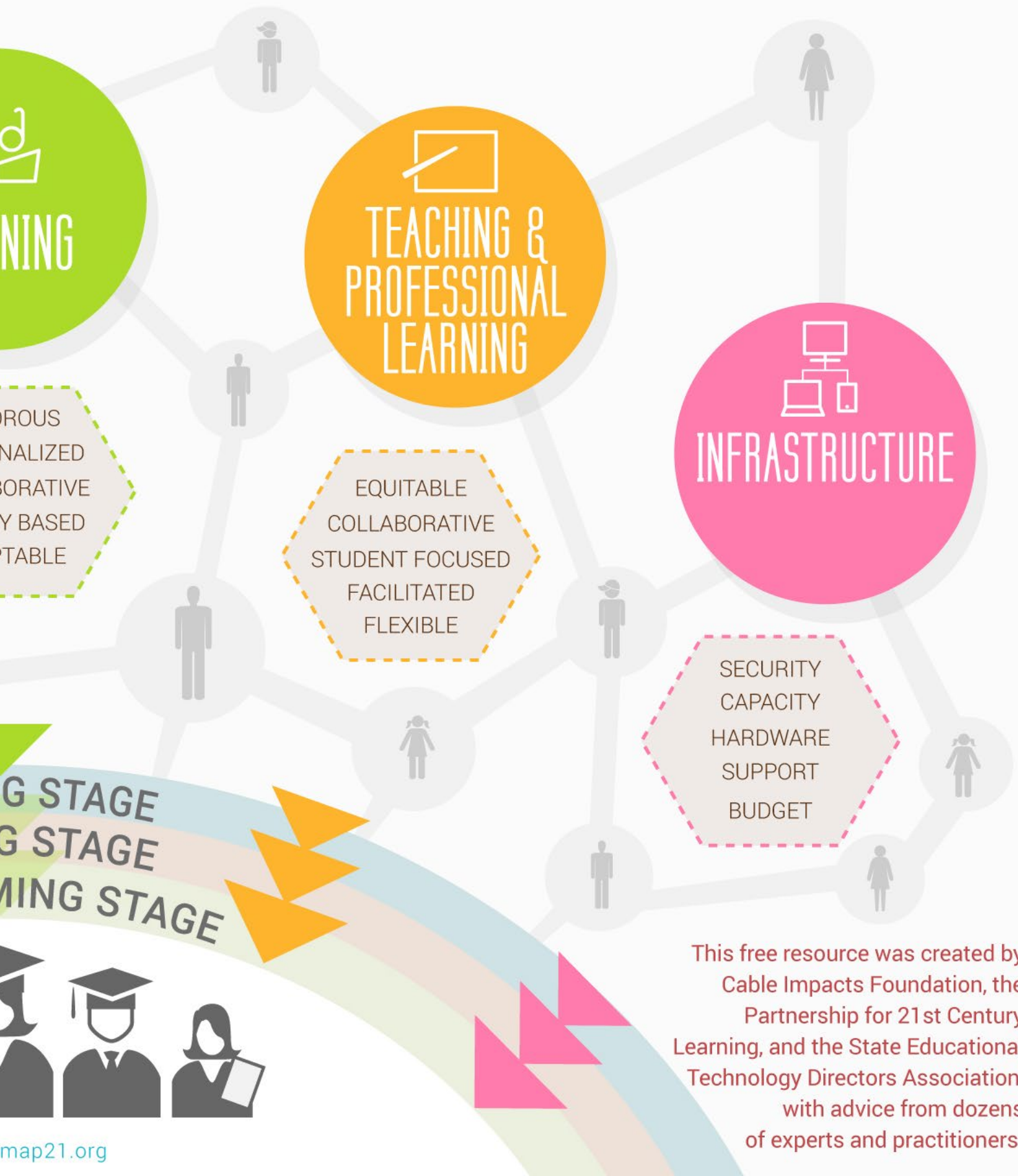
BUILDING YOUR ROADMAP FOR 21ST C

A Planning Tool for



21ST CENTURY LEARNING ENVIRONMENTS

Education Leaders



This free resource was created by Cable Impacts Foundation, the Partnership for 21st Century Learning, and the State Educational Technology Directors Association, with advice from dozens of experts and practitioners.

The five topics are:

TOPIC	DESCRIPTION
 LEARNING	Dependent upon success across the following four components, transformative learning results in college- and career-ready graduates who are lifelong learners.
 TEACHING & PROFESSIONAL LEARNING	The instructional strategies and over-arching approach to teaching, as well as the ongoing development of teaching professionals.
 ASSESSMENT & ACCOUNTABILITY	The use of valid and reliable tools to measure, monitor and optimize learning, alongside efforts to improve the effectiveness of the organization through ongoing measurement, analysis and communication.
 LEADERSHIP & CULTURE	The organization's philosophies and prevailing norms, which are influenced by its leadership and those who work for, or influence, its operation.
 INFRASTRUCTURE	The varied technical components that support effective learning environments—from physical assets, to human resources and support.

Working groups for each of these five topics were then formed, and chaired by a member of the leadership team. Group membership was designed to represent diverse perspectives. The working groups convened throughout fall of 2014—in person, via conference call and webinar, and through collaborative documents. The charge was to describe, and provide guidance about, each topic. Appendix II presents a list of each working group's members.

It is critical to note that the Roadmap tool is designed to be descriptive, rather than prescriptive. Schools and school systems are unique, living entities. They reflect the rich communities in which they reside, and the people they serve and support. They continuously strive to address the diverse needs of the people they have dedicated themselves to serve. As a result, there is no single ready-made formula that can be used to plot the path to an effective 21st century learning environment.

USING THE TOOL AND THIS REPORT

The following chapters document the findings and recommendations from the five working groups. For each of the five components, the working groups have provided the following information and guidance:

- **Description:** A description of the roadmap component
- **Background:** A short summary highlighting research and practice relevant to the model component
- **Principles:** A finite list of guiding principles that, together, describe success for the model component
- **Stages:** Descriptors that define implementation of each roadmap component across three stages—planning, building and transforming
- **Key Questions:** Open-ended questions to prompt discussion when using the roadmap for assessing and planning
- **Policy Considerations:** Policy-related elements about which roadmap users should be mindful
- **Action Steps/Recommendations:** General guidance for roadmap users as they explore and navigate a given component

Building Your Roadmap to 21st Century Learning Environments has been designed as a flexible tool that can guide and support the progression toward 21st century learning environments. Ultimately, the intent is to provide a foundation for dialog and planning.

A WORD ABOUT STAGES

In most cases, the working groups have described an organization's performance across the following three stages:

- **Planning:** An initial level of performance, typically involving discussion, priority determination and strategic planning.
- **Building:** The beginning of the change management process, as plans are put into place, results are monitored and adjustments are made.
- **Transforming:** The goal for performance, or the "ideal" toward which organizations continue to aspire.

The stages, like the tool itself, are intended to prompt discussion and scaffold thinking. It is likely that an organization will identify itself as being within multiple stages across a given topic. Within a given topic, the stages should be considered together as a continuum, where the ultimate goal is progression toward the Transforming stage.

It is also important to note that within stages, we have used color coding to identify where the topic being described overlaps with another roadmap topic. For example, while 21st century learning environments might be described in terms of requisite infrastructure and, specifically, technical support, it would be difficult to have effective technical support without strong leadership in place. While such connections are ubiquitous across the five components, we have chosen to highlight those of most significance to your planning efforts.

USING THE ROADMAP

There are many ways individuals and organizations might use the roadmap. Here are just a few ideas.

- Teachers may use the roadmap to assess teaching and learning in their classrooms, and to identify focus areas for improvement.
- Principals can use the roadmap to frame a discussion of their school's planning and investments with parents.
- Educational leaders might use the roadmap to describe the relationships among featured components when addressing staff, school boards, community members or legislators.

GUIDANCE



FROM

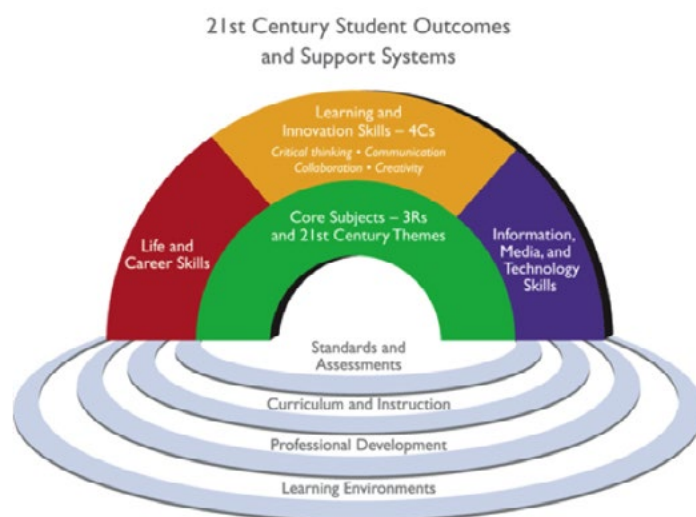
THE LEARNING WORKING GROUP

BACKGROUND

To serve today's students, whose needs and expectations extend way beyond the "three R's" of reading, writing, and arithmetic (National Education Association, 2012), schools must embrace twenty-first century learning environments and transform their vision of teaching and learning to incorporate new skills, dispositions and literacies.

NEW LITERACIES

Responding to the shift in societal expectations and requirements for education, the Partnership for 21st Century Learning (P21) was established to identify and promote the most necessary, critical skills for students entering the 21st century workforce. The first product was the Framework for 21st Century Learning, which highlighted the "Four C's": critical thinking, communication, collaboration, and creativity. The Four C's are based on core subject knowledge and are bolstered by diverse skills that include learning and innovation skills; information, media, and technology skills; and life and career skills (P21, 2011). The NEA (2012) suggests that the "Four C's", along with these new 21st century student outcomes, must be integrated district wide—from classrooms to district administration.



Similar to the "Four C's", the National Council of Teachers of English (NCTE) has identified the following four 21st century skills:

- Development of technological proficiencies and fluency
- Management, analysis, and synthesis of information
- Collaborative problem solving
- Creation, critique, and evaluation of multimedia text

The Hewlett Foundation's Deeper Learning Initiative offers a third approach that is currently being piloted and researched in schools. The foundation describes "deeper learning" as students "using their knowledge and skills in a way that prepares them for real life." Further, "they are mastering core academic content, like reading, writing, math, and science, while learning how to think critically, collaborate, communicate effectively, direct their own learning, and believe in themselves" (Deeper Learning, n.d.).

These reimagined outcomes, underscored by the skills necessary to be successful in today's society, and prompted by the new generation of students schools must serve, involve new ways of learning. Not surprisingly, these changes to the way children learn reflect some of the very outcomes themselves—including collaboration, communication and problem solving.

21ST CENTURY LEARNING APPROACHES

Collaborative and inquiry-based approaches underlie 21st century learning. These approaches reflect the skills, knowledge and strategies that make for success in the real world, and align with college- and career-ready graduates. The expansion of "learning" outside of the classroom is a critical consideration as we explore exactly what 21st century learning means. The Aspen Report offered a vivid vision of what this might mean: "Kids can attend class anytime, anywhere, in courses tailored to their own learning style, and at their own pace. We can create an education system where instead of time being the constant with learning the variable, the constant is mastery of content and the variable is time" (Aspen Institute Task Force on Learning and the Internet, 2014, p. 5). We describe three research-proven approaches that align with this vision of learning: student-centered learning, authentic learning and problem-based learning.

An *emphasis on student-centered learning* approaches provides the means to evolve from more traditional, teacher-driven learning methods to inquiry-based, technology-rich classrooms. The underlying recommendation of the Aspen Report is clear: "Students should be at the center of any networked learning environment" (2014). Student-centered learning environments emphasize the construction of personal meaning by conjoining new knowledge to existing understandings, and technology promotes access to resources and tools that foster these connections (Hannafin & Land, 1997).

Authentic learning or "learning-by-doing" can be described as "a learning environment focused on real-world, complex problems and solutions, which uses role-play exercises, problem-based activities, case studies, and participation in virtual communities of practice" (Educause, 2007, p. 2). Researchers suggest that one of the most effective ways to learn is by *doing* (Brown, Collins, & Duguid, 1989;

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Leu, Zawilinski, Castek, Banerjee, Housand, Liu, and O'Neil (2007) recognized the power of the Internet as a tool for both teaching and learning, stating "In this history of literacy, no other technology for reading, writing, and communication has been adopted by so many people, in so many places, in so short a time" (p. 39).

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Hannaford, 2005; Jensen, 2008) — and that the Internet and an ever-increasing number of broadband-enabled educational technologies now allow students to have such authentic learning experiences. In order to foster a successful authentic learning environment, educational leaders should ensure that the following technological support is available (Educause, 2007):

- High-speed Internet connectivity for multimedia purposes
- Synchronous, asynchronous, and social networking tools
- Virtual, digital feedback software that captures student performances and provides them with guidance for future situations
- Mobile devices for accessing and inputting data during field-based exploration

A project-based or inquiry-based learning approach is a natural companion to student-centered and authentic learning. According to Bell (2010), Project-Based Learning (PBL) is “a student driven, teacher-facilitated approach to learning... [where] learners pursue knowledge by asking questions that have piqued their natural curiosity” (p. 39). Simply put, it is an educational model that coordinates student learning around projects (Thomas, 2000). Outcomes of PBL include, in addition to content knowledge, independence, discipline, and learning responsibility (Bell, 2010).

The appropriate infrastructure is necessary, for as Krajcik, Blumenfeld, Marx, & Soloway (1994) state “Using technology in project-based [learning] makes the environment more authentic to students, because the computer provides access to data and information, expands interaction and collaboration with others via networks and promotes investigation” (p. 488-489).

21ST CENTURY LEARNING STANDARDS

In concert with these new skills, new literacies, and new ways of learning, it is equally important to recognize recent changes in standards and curricula. With the adoption of new college- and career-ready standards, next generation assessments and implementation of new learning approaches (such as student-centered, project-based, and inquiry-based), it is important to acknowledge that such skills are not always measurable through traditional assessments and tests (Bell, 2010). Measuring these skills most often requires more time, and innovative assessment approaches that go well beyond traditional multiple choice tests.

The Partnership for 21st Century Learning (P21) advocates integrating 21st century skills and new literacies into already existing academic standards.

Other organizations, including the International Society for Technology in Education (ISTE), have provided examples of national standards that integrate technology-related 21st century skills into curriculum alongside the traditional core subjects (2007), specifically:

- Creativity and innovation
- Communication and collaboration
- Research and information fluency
- Critical thinking, problem solving, and decision making
- Digital citizenship
- Technology operations and concepts

While the guidance available is vast, it prompts educators to carefully reflect upon their own curriculum and pedagogy. Have educators moved away from a traditional, teacher-centric model towards a more holistic approach in their classrooms? Are they preparing students in ways that ensure their success in college and career?

Learning doesn't happen in a vacuum. It affects and is affected by conditions in the other four topics in this report. Here, and throughout the report, consider the relationships between the topics and how changes to one influence, support or constrain the others.

The following planning tools are designed to help education professionals take a closer look at learning in their organizations.

PRINCIPLES

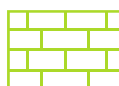
- ◆ **Learning is personalized**—it seeks to address each individual student's needs, thus providing a learning experience that is effective, efficient, possible for the student to master and, as a result, motivating. Students engage actively in their own learning at a deep and personally meaningful level.
- ◆ **Learning is rigorous**—it challenges students to meet defined, high expectations, while supporting them along the way. It has depth and breadth, encompassing content knowledge and the 21st century skills and dispositions students need to be ready for college, career, and life. Multiple methods of assessment reinforce learning and build self-awareness.
- ◆ **Learning is flexible and adaptable**—it adapts to students bringing diverse prior knowledge to any learning experience and to students learning at different rates, and can quickly refocus as students' understanding grows.
- ◆ **Learning is open-ended and inquiry-based**—it requires students to be active learners by investigating questions, solving problems and generally mirroring the kinds of inquiry that the real world requires. Students have ample opportunities to make choices and exercise control over appropriate aspects of their learning experiences. Student learning connects to the local, national or global community, and might incorporate work experiences, such as job shadowing and interning.
- ◆ **Learning is ongoing**—it involves students engaging outside the traditional classroom as much as they do within the four walls of the classroom. They make connections in the real world and benefit from the content and connectedness technology provides.



STAGES: LEARNING



PLANNING



BUILDING



TRANSFORMATIVE

STUDENT AGENCY AND VOICE

Students have few opportunities for producing student-directed work, to make choices, and exercise control over appropriate aspects of their learning experiences. The opportunities occur in only a few (less than two) classes and/or fewer than two times a year.

Students have a growing number of opportunities for producing student-directed work, to make choices, and exercise control over appropriate aspects of their learning experiences. The opportunities occur in a growing number of classes or subjects and occur at least three times a year.

Students have numerous opportunities for producing student-directed work, to make choices, and exercise control over appropriate aspects of their learning experiences. The opportunities occur in at least five classes or subjects and occur at least four times a year.

ENGAGEMENT

Most students exhibit a passive approach to learning and seldom actively engage in their own learning. Fewer than 25% are engaged in their learning process.

A growing number (25% - 75%) of students actively engage in their own learning. Yet, much of the engagement is not at a personally meaningful level.

Most students (75% or more) engage actively in their own learning at a deep and personally meaningful level.

RIGOROUS

The majority of students are not challenged to fully develop their knowledge, skills and dispositions to their greatest potential.

The majority of students are challenged to fully develop their knowledge, skills and dispositions to their greatest potential.

All students are challenged to fully develop their knowledge, skills and dispositions to their greatest potential.

DEPTH AND BREADTH

The majority of learning focuses on basic content knowledge acquisition with

An increasing amount of learning encompasses the acquisition of content

Learning encompasses not only the acquisition of content knowledge, but

little focus on the skills, dispositions or the global perspective needed for success.

knowledge at a high level of rigor; the acquisition of 21st century skills such as collaboration, communication, creativity/innovation and critical thinking; the dispositions such as persistence, responsibility, social awareness, and the global perspective students need to be college, career, and life ready.

also of 21st century skills such as collaboration, communication, creativity/innovation and critical thinking; the dispositions such as persistence, responsibility, social awareness; and the global perspective students need to be college, career, and life ready.

FLEXIBLE AND ADAPTIVE

Learning is a static experience with processes, structures and practices that are designed to meet the institution needs rather than student needs.

There is a growing number of learning opportunities in which students' needs are a priority. Some structures and processes are adjusted and adapted as a result. Some time schedules are adjusted to enable opportunities for student and teacher collaborations, flexible teaching arrangements, long term project needs etc. Staffing patterns are adjusted as needed.

Learning is adaptive and adaptable, meaning the processes, structures and practices can be and are adjusted to meet students' needs, abilities and priorities. The staffing, teaching and time structures, patterns and policies are flexible and adaptable to meet the students' learning needs.

ASSESSMENT AS/OF/FOR LEARNING

Assessments are primarily summative measures of student achievement with little use of formative or performance measures.

Student learning incorporates multiple methods of assessment designed to reinforce learning and build self-awareness rather than pass judgment. Methods include self-assessment, reflection, formative assessment, portfolio assessment, performance assessment, peer assessment and summative assessment. Many of the learning assessments are matched to goals.

Student learning incorporates multiple methods of assessment designed to reinforce learning and build self-awareness rather than pass judgment. Methods include self-assessment, reflection, formative assessment, portfolio assessment, performance assessment, peer assessment and summative assessment. All assessment methods should be matched carefully to the goal and used sparingly to maximize effect.

OPEN-ENDED & SELF-DIRECTED

Few student learning experiences incorporate open-ended, divergent, and inquiry/problem/project based activities. Learning is primarily a passive experience focused on the

Many student learning experiences incorporate open-ended, divergent, and inquiry/problem/project based activities to ensure that students develop the knowledge, 21st

Almost all student learning incorporates open-ended, divergent, and inquiry/problem/project based learning experiences to ensure that students develop the knowledge,

	acquisition of basic facts.	century skills and global expertise they need.	21st century skills and global expertise they need.
CONNECTED TO THE REAL WORLD	Few student learning experiences are relevant and connected to the local community or to the state, national and global communities. Few are afforded the opportunity for real work experiences. There are only limited partnerships with businesses for job shadowing, internships or externships.	Many of the students' learning experiences are relevant and connected to, at a minimum, the local community. A majority of the students have opportunities to experience real work environments and learn first hand about the careers and skills needed to succeed.	Students' learning experiences are relevant and connected not only to the local community, but also to the state, national and global communities. All students have real world experiences in many forms, including, but not limited to, job shadowing, internships and externships.
ANYWHERE/ ANYTIME	Learning opportunities are primarily confined to the school day, time, and setting with the exception of more traditional activities such as homework.	Many learning opportunities are available to students at varied times, dates or settings to enable students to reach their highest potential.	Learning has no beginning and ending time or date or setting. It occurs in formal settings like schools; in informal settings like clubs or camps; alone; in pairs or in groups; online and in person; at home or in libraries; in the park; at midnight or noon. The learning organization embraces this ubiquity of learning opportunities to enable students to reach their highest potential.
HYPER-CONNECTED AND MOBILE	The majority of technology use is for administrative purposes, with little student access. The primary use of technology is related to Information and Communication Technology (ICT) literacy. However there is a growing awareness that this approach is not adequate and discussion is beginning on how to plan for moving forward to use technology for learning.	Mobile learning devices are being used in a growing number of learning activities (25%-75%). Many students are using technology tools and resources to connect with the world, acquire digital literacy skills, and gain access to information.	Learning employs technology to its utmost advantage, giving students the ability to access information almost instantaneously, to network globally with a few keystrokes, and to use data for decision making. This occurs while protecting student's privacy and security. There is a seamless integration of technology such that it is available at students and teachers fingertips.

KEY QUESTIONS

The following questions are intended to prompt thinking and discussion about learning experiences with, and for, the students you serve. There are no “right” answers; your responses and decisions will reflect your current practices, local needs and aptitudes, and any learning-specific goals you set for the future.

- How can students be involved in their own learning?
- How can student voice be incorporated into the school?
- What is needed to ensure technology access is ubiquitous and is used for learning?
- What resources and technological infrastructure are needed?
- How can community leaders be engaged in connecting learning to the real world?
- What training do teachers need to leverage information from assessments to benefit learning?
- What strategies can be employed to incorporate content knowledge, skills and global literacy into learning?
- What policies should be changed, added or deleted to ensure learning is anywhere/anytime and mobile?
- How are we preparing the next generation of teachers and leaders at various levels?
- How are we thinking beyond the school day and year?
- What does school and district leadership for the next generation look like?

POLICY CONSIDERATIONS

The following list presents areas in which educational institutions typically confront policies related to learning. It is important to consider how these policies affect your plans to transform learning.

- Structure of the school day and year; classroom structure and space
- Teacher planning practices and policies
- Student voice and agency
- Graduation requirements and credit structure
- Incentives for professional learning and capacity building
- Teacher and leader licensure and evaluation; technology director credentialing
- Student assessment and accountability practices
- Community engagement policies
- Funding and purchasing policies
- Responsible Use Policies/Data Privacy Policies



EXEMPLARS

NAPA VALLEY UNIFIED SCHOOL DISTRICT, NAPA VALLEY, CA

School Website: <http://www.nvusd.k12.ca.us/21stcenturypage>

In 1991, a gathering of Napa business and education leaders, called the Business Education Partnership, voiced deep worries that graduates from Napa schools were not prepared for the challenges of the new global, high-tech economy. A year later, they formed a community planning group to reinvent learning in one public high school to hopefully provide a model for surrounding schools. In 1997, Napa New Tech High School opened its doors to its first class of 100 students, with an expanded set of education goals; a different approach to teaching and learning centered on project-based, student-centered learning; collaborative technology access for every student; and a culture of trust, respect, control, and responsibility. Napa New Tech quickly became a showcase for 21st century deeper learning, attracting visitors from all over the globe to see real education innovation in action.

In 2009, New Tech Foundation became a subsidiary of KnowledgeWorks, an educational foundation dedicated to readying all students for college and careers, adding new investments for scaling and spreading the model even further, and renaming its rapidly growing collection of schools the New Tech Network (currently there are well over 100 New Tech schools in the United States and one in Australia).

In 2008, Napa Valley Unified School District (NVUSD), encouraged by the increasing success of Napa New Tech High School, adopted NVUSD 2015—a plan to move other district schools to the New Tech approach. In 2010, 14 years after the first Napa New Tech school opened, a brand-new comprehensive high school, American Canyon High School, opened its doors with the intent of fully adopting the New Tech model. As of 2015, a total of 10 NVUSD schools—four elementary, four middle, and two high schools—are now part of the New Tech 21st Century deeper learning bandwagon, and even schools in other Napa County districts beyond Napa Valley Unified are making plans to adopt the New Tech model in the near future.

DANA ELEMENTARY SCHOOL, HENDERSONVILLE, NC

School Website: <http://www.hendersoncountypublicschoolsnc.org/dan/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/1238-dana-elementary>

Dana Elementary, a school with 80% of students on free or reduced lunch, built a school culture focused on leadership and community. Educators work to create leaders out of all students through an interdisciplinary model. Twenty-first century learning is embedded and exemplified all around the school and curriculum. The focus on developing problem-solving skills, a collaborative mindset and a goal-oriented approach ensures that Dana students become life-long learners.

WALKER ELEMENTARY SCHOOL, WEST ALIS WEST MILWAUKEE, WI

School Website: <http://www.wawm.k12.wi.us/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/1313-case-study-walker-elementary-school>

Students at Walker Elementary school are treated as unique learners. Through personalized learning environments, each student works through an individual learning plan that focuses on the student's particular interests and skills set. Learning for the 21st century is the vision that Walker educators operate under, and the goal is to prepare students for a global economy. Preparing students for this requires them to be encouraged to demonstrate not only mastery of the content, but further and deeper inquiry into the content. Walker has used technology and creative space set up to aid in this preparation process.

SPRINGFIELD RENAISSANCE SCHOOL, SPRINGFIELD MA

School Website: <http://www.springfieldrenaissanceschool.com/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/1322-case-study-springfield-renaissance-school>

An Expeditionary Learning School, Springfield Renaissance has achieved a 100% college acceptance rate for students. Renaissance achieves 21st century learning through a highly rigorous academic and extracurricular program that emphasizes real-world learning. All students are challenged to develop and show mastery of the "qualities of a Renaissance Graduate," which include inquiry, invention, communication and craftsmanship. A focus on the growth mindset approach to education allows students to learn to believe they can be successful. To offer a demanding and personalized 21st century education, Renaissance's educators must constantly collaborate within their grade level teams and engage in meaningful professional development.

OCEAN LAKES HIGH SCHOOL, VIRGINIA BEACH VA

School website: <http://www.oceanlakeshs.vbschools.com/>

Ocean Lakes High School is at once a large comprehensive public high school and a nurturing learning community focused on college and career readiness that supports all students. A STEM focused academy, vocational, PBL, and extracurricular opportunities provide a rich learning environment. Virginia Teachers for Tomorrow Program provides students a chance to teach younger students and a chance at a contract with the VA Beach City Public Schools.

WEIDNER SCHOOL OF INQUIRY, PLYMOUTH IN

School website: <http://www.plymouth.k12.in.us/wsoi/>

A unique school-within-a-school, the Weidner School of Inquiry is a New Tech Network demonstration site housed within a traditional large high school. A tight-knit community builds self-awareness and collaboration for both staff and students. The School of Inquiry represents the final foundation of the district-wide PBL pathway for students beginning in kindergarten, and serves as a project-based learning model for the high school at large as well as the state.

ACTION STEPS AND RECOMMENDATIONS

The working group has provided the following recommendations to guide in action planning:

- Involve students, teachers and the community in the development of learning experiences.
- Structure the learning transformation work such that it includes, and relies upon, student voice.
- Actively seek the advice of experts, respected leaders and others who have succeeded—from within and outside the organization.
- Progress steadily and deliberately, but at a pace that allows you to assess and reflect upon the results, and necessary adjustments.
- Listen, Communicate, Listen, Communicate, REPEAT
- Keep students at the center of the effort. Regularly question progress and plans in terms of the benefits for students.



THE TEACHING & PROFESSIONAL LEARNING GROUP

We have emphasized how today's digital society, global economy and the requirements of work demand changes to the ways schools operate. In the previous section, we introduced Learning—in particular, learning that accommodates 21st century skills and knowledge—as the centerpiece of the roadmap framework. Successful learning that produces college- and career-ready graduates results from a complement of inter-related components (each featured in the Building Your Roadmap model). In this section, we explore the basic fact that changes toward 21st learning outcomes are heavily dependent on changes in teaching. Here, teachers must facilitate learning experiences that are grounded in the real world and make effective use of technology. To encourage and enable effective teaching, school districts must also commit to ongoing, high-quality opportunities for professional learning.

BACKGROUND

Researchers, educators, and students agree that today's students are noticeably different from those being educated a century, or even 20 years, ago. Looking into today's classroom, you will often find students whose first language is not English, students with behavioral and attention challenges, students from a variety of cultural backgrounds, and students who are not reading at grade level (Association for Supervision and Curriculum Development, 2014). And yet, while today's young people are measurably different, too often the methods and means by which they are taught have not changed accordingly.

An opening section of this report described 21st century student as the most diverse and technologically-advanced generation of students to ever enter our nation's classrooms. For these students, historical "stand and deliver" teaching approaches simply ring hollow.

TRANSITIONING THE TEACHER'S ROLE

In today's digital classroom, it is often said, teachers must transition from the role of "sage on the stage" to that of "guide on the side." In contrast to a knowledge disseminator, a "guide on the side" is an instructor who helps students discover knowledge by guiding them through a vast store of information.

The Partnership for 21st Century Learning (P21) provides a vision for more robust teaching. The "4Cs" are described

in the following figure. They illustrate the intersection of teaching and “learning by doing” that is, in and of itself, a skill that aligns with success in today’s workplace. The 4 C’s are not intended to supplant core content and discipline-specific knowledge. Rather, they challenge educators to teach that content in new and novel ways.

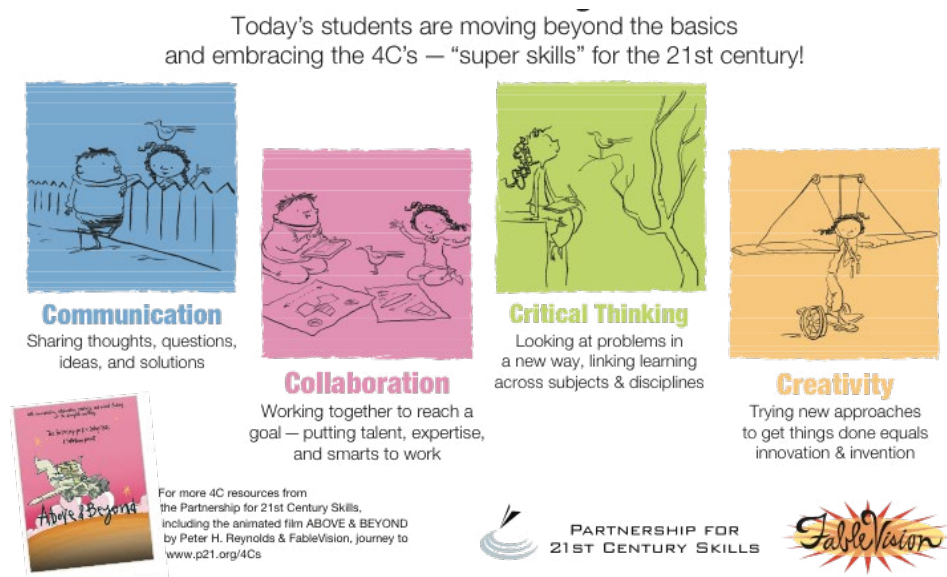


Image from the animated film, *Above and Beyond*, (c) FableVision, Paul A. Reynolds and Peter H. Reynolds, reprinted with permission.

Fundamentally, 21st century teaching revolves around a classroom culture of student-constructed knowledge (Miller, 2012). A teacher who acts as a “guide on the side” is, to a degree, a fellow learner alongside the students, as she or he models the process of uncovering knowledge and conducting critical thinking via more active learning techniques (Saulnier, 2008). This, in turn, can increase student-fostered inquiry, creativity, and content expertise. Such transformation reflects the skill set that 21st century students must master to become successful life-long learners and productive members of tomorrow’s workforce and society.

DEVELOPING EFFECTIVE EDUCATORS: THE ROLE OF PROFESSIONAL LEARNING

Schools must provide learning opportunities not just for students, but also for the educators who teach them. Certainly, any significant change to the way instruction is delivered requires careful change management.

Professional learning can no longer take the traditional form of individualized workshops or one-time training sessions. Instead, professional learning must be viewed as an ongoing, integrated part of teachers’ instructional careers.

“

The “flipped classroom” instructional model provides a contemporary example of the teacher’s changing role. In the flipped classroom, teachers deliver primary instruction online, outside of class. Teachers use their face-to-face classroom time for active learning methods, which can increase student engagement, further conceptual understanding, and, ideally, improve students’ mastery of skills (University of Southern California Instructional Technologies, 2014).

In the flipped classroom, students:

- initially receive course content before class, typically as homework;
- prepare prior to class—which counts towards their course grade, and helps the instructor evaluate student understanding

”

Effective professional development requires “careful planning, job-embedded and hands-on activities directly linked to the curriculum, plenty of follow-up, built-in evaluation using several assessment techniques, adequate time, sustained funding, and the willingness of educators to take on new and expanded roles” (Rodriguez, 2000). As a result, successfully implemented professional development relies on a significant investment of time and resources from educational leaders and teachers alike.

Such systemic requirements for successful professional learning can challenge educational organizations. Ferguson (2006) outlined five challenges that educational leaders should consider when planning and implementing professional learning for their teachers:

- Selecting and introducing ideas in ways that foster trust and interest;
- Balancing administrator leadership and control versus teacher autonomy and independence;
- Planning, initiating, and monitoring implementation of training that inspires ambition as opposed to ambivalence;
- Ongoing support of industrious implementation, even in the face of challenges or setbacks; and
- Recognizing, celebrating, and rewarding accomplishments in ways that sustain positive change.

Effective use of technology for teaching and learning is a crucial component of 21st century learning environments that is worthy of mention. As teachers are pressed to change their pedagogical approaches and rely, to a greater extent, on technology to facilitate learning, professional learning is a critical element towards realizing that vision (King, 2002).

These realities underscore the ongoing need to change teaching practices in America’s classrooms. This change can only be accomplished through professional learning opportunities that ensure currency with pedagogical approaches, including evolving technologies. The following guidance has been developed to help you consider your organization’s current and future work toward college- and career-ready graduates. Please take note of the significant interaction that occurs between Teaching and Professional Learning, and the other four components of the *Building Your Roadmap* tool. We encourage you to consider your work in this area first, but make sure to also contemplate how the other four areas will impact your efforts here.

“

Despite the fact that beginning teachers are entering classrooms with more advanced technology skills than some of their tenured colleagues, and despite increased access to educational technologies, in 2010, only 39% of teachers reported “moderate” or “frequent” use of technology as a tool to facilitate learning (Grunwald Associates & Walden University, 2010)

”

PRINCIPLES

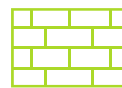
- **Teaching is student-focused**—it recognizes that the student is at the center of any learning experience, and frames the content and pedagogy accordingly.
- **Teaching is facilitated**—it requires teachers to move away from the familiar content-delivery role and orchestrate learning experiences and provide individualized support for students' learning.
- **Teaching is flexible**—it knows that any given approach to instruction may not be effective for every student, and uses multiple ways to reach mastery of any given learning outcome.
- **Teaching is equitable**—it seeks to provide effective learning experiences and learning outcomes for all students, regardless of the point at which they entered the learning experience .
- **Teaching is collaborative**—regular peer collaboration, discussion and development encourage teachers to assemble the best methods for teaching.
- **Teaching is fueled by continuous professional learning**—it provides teachers with opportunities to learn, practice and reflect in ways that meet their individual needs, and align with student learning goals.



STAGES: TEACHING & PROFESSIONAL LEARNING



PLANNING



BUILDING



TRANSFORMATIVE

LEARNING

DESCRIPTION

Teachers at this stage may be early adopters, new to the profession, content, grade level or school.

Teachers at this stage are implementing some digital learning opportunities ; however, digital learning is not seamlessly incorporated into the curriculum.

Teachers at this stage typically are able to lead others, provide professional development and are risk takers who can measure results.

CONTENT

The teacher understands most of the content and may include some technology tools as part of independent enrichment activities.

The teacher has mastered the content and includes the use of technology tools in direct instruction and encourages independent use of technology tools regularly.

The teacher has mastered the content and seamlessly integrates digital tools into the curriculum as aligned to the standards.

PEDAGOGY

The teacher focuses on the required curriculum and does not adapt the curriculum for individual students.

The teacher applies teaching and learning practices that include a variety of teaching models to accommodate most students.

The teacher applies a deep understanding of effective teaching and learning practices and consistently modifies instruction to meet the needs of individual learners.

LEARNING ENVIRONMENT

The learning environment is designed for direct instruction and individual work during the school day.

The learning environment is primarily direct instruction with some group and independent activities,

The educator cultivates a positive learning environment in which the teacher is a facilitator and

Some digital learning tools are selectively incorporated. Traditional homework models are included for reinforcement outside of school.

and includes a variety of technology tools. The teacher encourages learning in and outside of school with specific assignments.

students are able to take risks, learn at their own pace and participate in feedback loops. Technology is seamlessly embedded throughout the learning experience. Learning is encouraged both inside and outside of school.

PROFESSIONAL LEARNING

CONTENT

The educator is focused on obtaining new strategies and applying them in the classroom. He/she understands the need to plan based on data and outcomes and is learning to apply new teaching strategies to best meet the needs of students.

The educator is developing the skills to create links between student and educator learning. He/she participates in a collaborative culture that plans, implements, and provides ongoing support and structures for high quality professional learning.

The educator can articulate the link between student and educator learning and applies strategies in the classroom as appropriate. He/she facilitates and promotes a results-based, collaborative culture in which he/she plans, implements, and provides ongoing support and structures for high quality professional learning.

PEDAGOGY

The educator participates in professional learning opportunities. He/she supports processes to evaluate organizational and individual professional learning needs that are informed by (formative and summative) assessment data. The goals are monitored and adjusted over time.

The educator participates in, and at times supports others in both ongoing formal and informal professional learning opportunities, including a personalized learning network that results in educator and student success.

The educator participates in, facilitates and supports others in both ongoing formal and informal professional learning opportunities, including a personalized learning network that results in educator and student success. He/she supports processes to evaluate organizational and individual professional learning needs that are informed by (formative and summative) assessment data. The goals are monitored and adjusted over time.

CONDITIONS

The educator participates in professional learning opportunities as assigned.

The educator strives to leverage all professional learning opportunities to best meet the needs of his/her students.

The educator is committed to continuous improvement and shares collective responsibility for all students.

He/she contributes to and promotes a results-based, collaborative culture to support high quality professional learning for themselves and fellow educators.

KEY QUESTIONS

The following questions are intended to prompt thinking and discussion about teaching and professional learning in your organization. There are no “right” answers; your responses and decisions will reflect your current practices, local needs and aptitudes, and any teaching-specific goals you set for the future.

QUESTIONS ABOUT TEACHING:

- Do teachers use a variety of instructional strategies?
- How do educators create positive and engaging learning environments for all students?
- Do the educators seamlessly integrate digital learning tools as appropriate?
- Are teachers prepared to help students become good digital citizens, by using digital tools safely, effectively and ethically?
- How do students engage with the teacher? How does the teacher engage with the students? policies should be changed, added or deleted to ensure learning is anywhere/anytime and mobile?
- How do schools address the competing requirements to cover the necessary content while making sure that which is covered connects with purpose?

QUESTIONS ABOUT PROFESSIONAL LEARNING:

- Does the school/district have a comprehensive plan for professional development that is informed by data and addresses the needs of all staff members?
- Has the school/district created a collaborative environment for planning and implementing professional learning opportunities?
- Are the educators adequately prepared and trained to launch and maintain digital learning environments?
- Are professional learning opportunities on-going?

- Are educators recognized for implementing content provided during professional learning opportunities?
- Does the administration assess the quality of professional learning opportunities?

POLICY CONSIDERATIONS

As you contemplate teaching and professional learning, it is important to also consider the impact of existing policies on current and envisioned, future practice. The following is a list of often-encountered policies that may influence teaching and professional learning in your organization.

- Student data safety and security
- Accountability and teacher evaluation policies
- Pre-service minimum requirements for teachers
- Minimum in-service (professional development) requirements for teachers

POLICY EXAMPLES

The following resources are available to provide guidance on policies related to teaching and learning.

- Teacher Evaluation Policies: State Education Policy Center: <http://sepc.setda.org/topic/professional-learning/teacher-evaluations/>
- SETDA's description of, and links to, Family Educational Rights and Privacy Act (FERPA), Children's Online Privacy Protection (COPPA), Children's Internet Privacy Act (CIPA):
<http://digitallearning.setda.org/broadband/#!/policies>
- Data Quality Campaign: State Analysis of Data Policies:
<http://dataqualitycampaign.org/your-states-progress/by-state/overview/>



EXEMPLARS

J.O. KELLY MIDDLE SCHOOL, SPRINGDALE, ARKANSAS

School Website: <http://www.eastinitiative.org>

Susan Tillery has created a vibrant classroom culture that promotes student agency. Leveraging the robust offering of technology in her EAST classroom, students are empowered to direct their own learning. Promoting student choice and voice in the selection and direction of their chosen community service projects, project teams work collaboratively to solve real world problems. Using online tools, students are connected in ways that remove the traditional barriers of walls, location, and time restraints. Utilizing professional grade software and hardware, students are inspired and expected to take their projects to a sophisticated level not typically observed in a regular classroom. Partnering with local, national, and international experts and professionals helps connect the students to the local and global community and gives them the extra support necessary for tackling challenging problems. Ms. Tillery embraces the role of facilitator and encourages her students to own the learning process. She provides support and resources along the way to help students bring their projects to successful fruition. Her students have created a [website](#) and blog where they showcase their work and reflect upon their learning journey. Ms. Tillery's classroom also has a student social media team that manages the EAST classroom Facebook page: The Knights of EAST at J.O. Kelly Middle School.

REEDS SPRING SCHOOL DISTRICT, MISSOURI PROFESSIONAL LEARNING

School Website: <http://www.k12blueprint.com/content/planning-pd-one-one-success-mo-district>

Michael Mason, Superintendent of Reeds Spring School District had a vision for a 1:1 tablet program. In order to best prepare, the administrators and teachers went on site visits to observe other 1:1 programs. The teachers received their tablets first and had nine months of professional learning before the students' devices arrived. The training focused on transforming their teaching to best implement 1:1.

NORTHAMPTON HIGH SCHOOL, EASTVILLE VA.

School Website: <http://www.ncpsk12.com/webpages/karenleffel/>

Karen W. Leffel teaches 10th grade biology and 12th grade anatomy and marine biology in Northampton County Public Schools in Virginia. Students have netbooks and her room has a Promethean Board. She has learned to leverage the technology tools to support multiple learning styles by including visuals and video clips in her notes, and providing interactive reviews for students to complete individually or as a class. Lessons vary based on the topics and include virtual labs, web cams, virtual museum tours and web quests as learning tools. Evaluations are online to streamline the instruction and the assessments. This also helps prep the students for the standardized assessments.

GREENWOOD ELEMENTARY, LEE COUNTY, NORTH CAROLINA

School Website: <http://collazocove.weebly.com/>

Kim Collazo believes in student centers and has designed her classroom so that students are able to self-monitor and cycle through the day's experiences while the teacher facilitates their discussions and discoveries. Students utilize devices to record their thoughts and dig deeper into the concepts surrounding the lesson. The weebly URL includes videos, teacher blogs, pictures and student work.

RALEIGH HILLS K-8 SCHOOL, BEAVERTON, OREGON

School Website: <https://www.beaverton.k12.or.us/schools/raleigh-hills>

Classroom instructor G. Douglas Bundy, in collaboration with the school's principal, John Peplinski, flipped learning for students at Raleigh Hills K-8 School in suburban Beaverton, Oregon, by providing opportunities for students to vet and share educational technology tools and resources with other students via [StudentSource](#). StudentSource is a games-based program that provides elementary students in technology classes an environment of autonomy with the opportunity for mastery at their own pace. Students choose a state standard and then review and evaluate tech-based games that teach or reinforce the standards. They also develop their own games to support learning the required standards. The Student Source site is open to all educators and students.

ADVENTURE STEM PROGRAM AT LEONARD HERMAN INTERMEDIATE SCHOOL, SAN JOSE, CALIFORNIA

Program Website: <http://istemwithmsstlawrence.weebly.com/>

Ashley St. Lawrence began her teaching career by acquiring her BA in Education with an emphasis in Language and Literacy. After seeing the need for technology and digital literacy to increase opportunities for her students, she transformed her classrooms and career to focus on Education Technology & Innovation. She presently teaches 4 classes: Computer Science for 5th graders, Engineering for 6th graders, Globaloria Video Game Design Course 2 for 7th graders, and Mobile App Design for 8th graders, providing a connected and focused STEM and technology curriculum for her students.

ALLEN INDEPENDENT SCHOOL DISTRICT, ALLEN TEXAS

School Website: <http://learningforward.org/who-we-are/professional-learning-definition>

Professional learning in Allen ISD is ongoing, data driven, results-focused and research and standards-based. Professional development focuses on adult learning that results in student learning. In planning, implementation, and evaluation of staff development, they ask:

- What do students need to know and be able to do?
- What do educators need to know and be able to do?
- What staff development ensures that educators acquire the necessary skills and knowledge for implementation?
- How will we know the impact on student learning?

All learning is planned, implemented, facilitated, and evaluated based district, campus, team and individual goals. Ongoing professional development is team-based, occurring in learning communities or groups of faculty who meet regularly to study data, curriculum and effective learning and teaching practices. Ongoing follow up strategic and substantive support is provided for all through resources such as instructional videos, face-to-face follow up learning events that engage adults, as well as opportunities for co-teaching and modeling instructional strategies.

MATH, SCIENCE, & TECHNOLOGY MAGNET ACADEMY, LOS ANGELES, CALIFORNIA

Presentation from the 2013 Esri International Conference: <http://video.esri.com/iframe/2539/000000/width/960/0/00:06:55>

The Math, Science, & Technology Magnet Academy is part of Roosevelt High School, in the Los Angeles Unified School District. 11th/12th grade Social Studies teacher Mariana Ramirez and 11th/12th grade English teacher Alice Im occupy two halves of an aged “portable,” with a door in between. Each year the teachers team up on a full-scale research project. After doing this for several years, they added a web-based geographic information systems (GIS), and, what was a strong research project has become even stronger. Students learn how their data creation, analysis, interpretation, and presentation has value beyond school. Integrating resources across device types, platforms, and data formats to present powerful analyses has impressed college recruiters, community organizers, government agency leaders, and business people from across the country.

THE YOUNG WOMEN’S LEADERSHIP SCHOOL OF ASTORIA (TYWLSA) ASTORIA, QUEENS, NEW YORK

School website developed by Andrea Chaves and TYWLSA Tech Crew: <http://www.tywls-astoria.org/>
Tech Awards video: <https://www.youtube.com/watch?v=HIT446XCF9E>

Andrea Chaves is an educator who has truly transformed the face of education at TYWLSA, where she has found a way to blend her two areas of expertise, Spanish and Technology, to create an innovative learning experience for the entire TYWLS community. Andrea encouraged TYWLS to participate in many STEM-related opportunities,

such as Globaloria, as a way to inspire the young women at TYWLS to take interest in the male-dominated field of computer engineering. She has turned her classrooms into a paper-free zone. Her students present all of their work in online portfolios consisting of videos, GIFs, interactive presentations, Photoshop projects, blogs, student designed websites and video games. This technological movement has easily become infectious among the TYWLS community, and many teachers have adopted her methods in their own classrooms.

ACTION STEPS AND RECOMMENDATIONS

Working group members have provided the following recommendations to guide your action planning as you explore teaching and professional learning in your organization:

- Provide adequate funding and time for educators to participate in professional learning opportunities.
- Focus on high quality, sustainable professional learning opportunities for all educators.
- Ensure that new teachers have participated in digital learning opportunities and that they have the pedagogy needed to integrate technology tools and resources, as well as the knowledge and skills to teach digital citizenship to their students, prior to entering the classroom.
- Communicate to all stakeholders the critical need for ongoing sustainable professional learning.
- Dedicate administrative and instructional staff to provide coaching and mentoring for educators.



THE ASSESSMENT & ACCOUNTABILITY WORKING GROUP

Assessment and accountability systems are complementary components that enable schools to monitor, adapt, improve and communicate their progress in educating students who are college- and career-ready, lifelong learners. The United States is slowly moving towards a student centered, competency-based system of assessment and accountability that will support this goal. Ideally, schools will develop and implement a balanced system of summative, formative and interim assessments, both formal and informal, that promotes growth and improvement.

BACKGROUND

There is a saying: that which is tested, is taught. If teaching and learning are to adapt to the needs of the 21st century learner and better reflect the world which will be their future, then assessments must be aligned to what students must know and be able to do to be successful. Where we once wanted students to graduate with brains filled with facts, we now need them to be flexible, thoughtful, creative members of society and the economy. True-False and multiple choice tests will no longer suffice.

Accountability systems must also be aligned to accurately measure the key indicators of progress. To successfully incorporate 21st century teaching methods into today's classrooms, educators must also update their means of assessing learning (Jacobs, 2010) and use the resulting data not just to assign grades, but to customize and personalize instruction to meet individual student needs. According to Bain (2004), "outstanding teachers [use] assessment to help students learn, not just to rate and rank their efforts" (p. 151).

The influx of technology provides the means for teachers to create differentiated assessment options (Eddy & Lawrence, 2012; Scalise & Wilson, 2011). Digital textbooks, simulations and learning objects provide instant assessment opportunities and tools for teachers; virtual media can also provide new, innovative ways for students to collaborate with others and showcase their work (Eddy & Lawrence, 2012). Another exciting aspect of technology for assessment is the potential for educators to better understand student thinking as students go about solving a problem. Diagnostic tools in digital curricula and carefully designed digital assessments can help identify where a student goes "off track" or needs help. These opportunities illustrate the important roles for assessment and accountability in 21st century learning environments.

Historically, the emphasis has been placed on annual standardized testing. Such "high stakes" testing has been used

to monitor progress and hold schools accountable. However, yearly standardized testing, with its focus on how many students are at or above proficiency, poses a number of challenges to educators—including the basic fact that once-a-year, “summative” testing does little measure student achievement or growth during the school year, and thus does not afford the opportunity to inform instructional decisions. New assessments, and the technologies that enable their use, provide formative opportunities to assess and compare student performance over time. Whereas typical standardized test results aren’t made available until weeks or even months later, digital tools allow a rapid turnaround of results to schools and teachers, providing timely data that can inform teaching. As the use of formative assessment increases, and the tools for assessing student performance become more robust, we must reconsider our definition, and uses, of assessment.

EXPANDING OUR CONCEPT OF ASSESSMENT

Assessments in our schools have traditionally focused on discipline-specific knowledge. Twenty-first century learning environments challenge educators to go beyond the assessment of discipline-based knowledge, and assess the ability to apply knowledge to novel situations and solve complex problems. According to Darling-Hammond (2014), the United States has trailed other nations in investing in assessments that measure higher-order learning, such as the skills to analyze, synthesize, compare, connect, critique, and explain their ideas with the help of technology. Researchers and academic leaders observe that moving from measurement of isolated knowledge, to assessing students’ abilities to think critically, gather information, and make informed, reasoned decisions with that knowledge is critical to student success in college and careers (Partnership for 21st Century Skills, 2007)..

To incorporate these necessary skills of 21st century learners while maintaining reliability and relevance, it is important to reference appropriate quality indicators. The National Council of Teachers of English (NCTE) (2013) provided the following examples for assessing 21st century students’ work:

- Relevance and reliability of information used
- Significance of new information or understandings communicated throughout the process and in the final product
- Creativity, initiative, and effectiveness demonstrated in solving problems
- Efficiency and effectiveness of the student’s process
- Student’s legal and ethical processes and behaviors

While these examples highlight criteria for measuring student work, the following list assembled by Stanford’s Center for Opportunity Policy in Education (SCOPE), The National Center for Research on Evaluation, Standards, & Students, and the Learning Sciences Research Institute establishes criteria for the assessment tools:

- Assessment of higher-order cognitive skills
- High-fidelity assessment of critical abilities
- Standards that are Internationally Benchmarked
- Items that are instructionally sensitive and educationally valuable
- Assessments that are valid, reliable, and fair

If new, innovative assessment methods are to be implemented in today's K-12 classrooms, it is important that academic leaders and teachers alike agree upon the assessment criteria and make sure they are aligned with the curriculum, learning standards and teaching methods.

Compared to traditional teacher designed and implemented tests, when students are involved in evaluating their academic strengths and weaknesses, the core of educational experiences shifts from teacher-centered to student-centered, which is well-matched to the intent of 21st century skills and learning (Nunes, 2004; Price, Pierson, & Light, 2011). Such shifts can increase student engagement, and foster deeper student commitment to the learning process (Price, Pierson, & Light, 2011). According to McMillan and Hearn (2008), such student involvement fosters higher-level thinking, encourages active participation, and ultimately creates a student-centered learning environment. But ultimately, does self-evaluation lead to better, deeper learning for the student? Research suggests that it does, particularly for narrative writing (Ross, Hogaboam-Gray & Rolheiser, 2002) and when assessment results are understandable to and actionable for the student. The adjacent sidebar provides additional evidence of academic impact.

21ST CENTURY ASSESSMENT METHOD EXAMPLES

Traditional forms of “selected-response” assessment such as multiple-choice, true/false, and fill in the blank test questions emphasize recall and memorization skills, which typically require lower levels of cognitive effort from students (Dikli, 2003; Shepard, Flexer, Hiebert, Mario, Mayfield & Weston, 1995). “Constructed-response” questions, such as essays, require the student to create an answer and emphasize problem solving and critical thinking. In addition to these more traditional assessment practices, Price, Pierson & Light (2011) outline the following assessment strategies that align with the attributes today's students (Generation Z) and the 21st century skills they must master.

PERFORMANCE-BASED ASSESSMENTS (PBA) AND PORTFOLIOS

Performance-based assessments and student portfolios rely on multiple sources of evidence and accommodate various measures of achievement, which moves student assessment beyond the most common standardized examinations used for academic accountability (Shepard et al., 1995; Wood, Darling-Hammond, Neill, & Roschewski, 2007).



Self-Assessment: A Strategy for 21st Century Learning

In a summary of self-assessment practices and benefits, the Literacy and Numeracy Secretariat, Ontario Ministry of Education, summarized the following benefits of regular self-assessment:

- development of metacognitive skills—students become more skilled at adjusting what they are doing to improve the quality of their work (Cooper, 2006)
- development and refinement of critical thinking capacity (Cooper, 2006)
- increased responsibility for students' own learning as a result of more opportunities for self-reflection (Cyboran, 2006)



SELF-ASSESSMENT AND PEER-ASSESSMENT

Examples of students engaging in self- and peer-assessment include: reflecting on improvements they or their peers could make; commenting on drafts of essays and projects; group discussion before collectively providing feedback; and proposals for their own grades accompanied by supporting rationale (Royal Melbourne Institute of Technology [RMIT] University, 2008).

STUDENT RESPONSE SYSTEMS

Student response systems (SRS), also known as “click-ers,” refer to technology-based assessment tools used to gather instant student feedback in classrooms (Price, Pierson & Light, 2011).

RUBRICS

Rubrics allow teachers to assess multiple dimensions of learning, rather than just content knowledge, and also provide more detailed evaluations of individual student’s abilities, as opposed to just a percent correct (Price, Pierson, & Light, 2011).

MAKING 21ST CENTURY ASSESSMENTS AND ACCOUNTABILITY A REALITY

Though the benefits of 21st century assessment approaches are clear, it is also important to recognize challenges to implementing these more robust assessment methods. These challenges include:

- Increased planning and grading time—as teachers may provide more holistic, formative feedback
- Inter-rater reliability—finding ways to “calibrate” teacher judgments about student performance
- Delivery of assessments—delivering assessments requires attention to logistics, including necessary information-technology capabilities
- Support for teachers—availability of various supports to educators, including relevant professional development and access to high quality resources for assessing students and interpreting results

(Education Development Center; NCTE, 2013; Portfolio Assessment; Pros and Cons of Performance-based Assessment, 2010; RAND Corporation, 2012; Rotherham & Willingham, 2009).

Over the past decade assessment has become one of the most emphasized components of classroom teaching. Yet, teachers have rarely been provided meaningful opportunities to increase their knowledge about assessment and develop their skills for authoring assessments and making effective use of the results.

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“States currently spend only about a quarter of 1 percent of total K-12 educational expenditures (about \$25 per pupil for NCLB required reading and math tests) on assessments that have been found to be of relatively low quality, yet they base many decision on these tests... Ironically, local districts spend even more on test preparation, plus interim and benchmark tests aimed at improving performance on the state tests, bringing total spending to over \$50 per pupil.” The PARCC and Smarter Balanced assessment are both considerably less than that and less than most textbooks. Thus, we have to rethink whether new assessments are “too expensive.”

Parsi & Darling-Hammond, 2015

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This lack of knowledge can, in some instances, be traced to the foundational preparation teachers receive. A 2012 study by the nonpartisan National Council for Teacher Quality examined 180 schools of education to determine the extent to which they teach the skills associated with using test data to improve student learning. The results suggest a lack of preparedness in three areas: (1) only 21% of programs were found to be adequate in “assessment literacy,” or familiarity with the terms associated with different tests; (2) only 2% adequately taught “instructional decision-making,” or deriving instructional guidance from test data; and (3) less than 1% of programs adequately addressed “analytical skills”—which covers how to dissect, describe and display assessment data “ (Greenberg & Walsh, 2012).

These challenges to reforming assessment can be overcome with directed attention, cooperation, and effort from educational leaders, policymakers, teachers, and 21st century skills advocates alike (Rotherham & Willingham, 2009). However, assessment is only one component of the transformation towards 21st century learning environments. For assessment systems to fulfill their key role, educational systems must also invest in the necessary technologies, infrastructure, and accessibility for administrators, teachers, and students alike (Assessment & Teaching of 21st Century Skills, 2010).

TOWARDS A NEW VISION FOR ACCOUNTABILITY WITH BIG DATA

There is a widespread public misunderstanding of assessment and accountability. Laws have been passed and policies and regulations adopted without clear understanding of what assessment instruments can and cannot provide. For example, annual end-of-year standardized tests do not provide evidence of student growth or teacher effectiveness; rather, they are “snapshot” of system performance at a given point in time.

The No Child Left Behind (NCLB) Act of 2001 requirement to disaggregate data has placed a spotlight on the wide variances in achievement among various subgroups (e.g., English learners, special education, etc.). But a variety of factors have incentivized schools to focus on test-taking skills at expense of content and higher order thinking skills/21st century skills. The focus on math and reading has led many schools to deemphasize other subjects such as social studies and the arts (Ushomirsky, Hall & Haycock, 2011; Popham, 2001; Johnson, 2011).

NCLB also overemphasizes proficiency on a single test, failing to account for student growth. It does not differentiate consequences for schools that do not meet expectations. For example, a school that barely misses expectations for one subgroup of students, or shows strong growth in achievement but hasn't yet reached widespread proficiency and a school that consistently underperforms

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The purpose of accountability isn't to label schools or districts as good or bad. It's to send a clear signal about what we expect of our education system; to provide information to parents, educators, and community members about how their schools are doing; and to prompt improvement where improvement is needed.

Ushomirsky, Hall & Haycock, 2011, p. 2

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across all student populations can both be rated as failing, whereas a high-performing school with no growth is rated as succeeding.

We recognize that teacher quality is the single most important factor in student achievement, but the traditional inputs used to measure teacher quality (Master's Degree, hours of in-service training, screens for tenure, etc.) are only weakly linked to effectiveness as measured by student achievement (Buddin and Zamarro, 2009). Although many states have recently implemented new teacher evaluation and accountability systems, they, while an improvement in that they directly connect to student learning, are not perfect. Unfortunately, much of the current conversation about teacher evaluation is fraught with political and ideological overtones that get in the way of constructive dialogue. Because the intent of this report is to focus on system-level accountability, and because the topic of teacher evaluation is so contentious, we did not address teacher accountability in detail.

Many current accountability policies and measures reflect a mind set of “data poverty.” This is symptomatic of an era where high-stakes, year-end tests were the primary sources of data, and one of the few data points that could be compared between schools and systems. This is symptomatic of an era where high-stakes, year-end tests were the primary sources of data, and one of the few data points that could be compared between schools and systems. In today's world of “big data,” teachers and schools are collecting information through a variety of metrics and assessments throughout the entire school year. In fact, longitudinal collection of anonymous data holds promise of revealing patterns and useful, actionable information for schools.

Castro (2014) suggests that “Data is poised to have a disruptive impact on education. Data can help government leaders create more effective education policy, schools operate more efficiently, families find the best schools, teachers discover the most effective lessons, and students learn better” (p. 4). These expanded data sets can not only fulfill accountability needs, but also let us examine who learns what, where, when, how and under what conditions.

The following guidance has been provided to support a review your organization's assessment and accountability practices. Remember that assessment and accountability is closely tied to teaching and professional learning, as well as leadership and culture. Keep these interconnections in mind as you contemplate your current and future efforts.

PRINCIPLES

- ◆ **Assessments are personalized and adaptive**—Technology in classrooms and digital curricula provide differentiated assessment options. They are personalized and designed to ensure accurate information is provided for students across the performance spectrum.
- ◆ **Assessments involve multiple measures, over the course of school year**—Learning outcomes are assessed throughout the year through multiple measures that are naturally embedded in the curriculum.
- ◆ **Assessments promote student growth**—By providing information about past, current and near future skills and knowledge, assessments are diagnostic and supportive of student learning and achievement. Assessments recognize and reinforce growth, rather than serving as punitive measures based on a single test.
- ◆ **Assessments are authentic and contextual**—Assessments target knowledge and higher order thinking skills. Assessed outcomes encompass content knowledge as well as habits of mind (i.e., persistence), and do so in ways that align with how the content was taught and learned.

Accountability systems begin with clearly articulated, measurable, ambitious but attainable goals. The goals should be aligned to the state's college and career ready standards, provide a framework that allows schools and districts to develop strategies for improvement, and lead to measuring what's important.

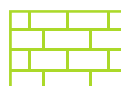
- **Accountability promotes growth and improvement**—The ultimate purpose of an accountability system is to foster growth and improvement, not to punish. Rich data, diagnostic tools and meaningful dialog among all stakeholders supports ongoing monitoring and continuous improvement and innovation.
- **Accountability incorporates diverse measures**— Student test scores derived from assessments reflecting the principles described here are important data points, but serve as one component of a range of indicators. A variety of measures, taken over time, provide a better picture of strengths and weaknesses.
- **Accountability provides for flexibility and innovation**—Accountability systems build or improve school capacity, identify locations or approaches that are seeing unusually high growth rates, and enable thoughtful risk taking. They give school leaders flexibility to innovate, replicate, experiment and solve problems.
- **Accountability is transparent**—The system provides timely, easy to find, easy to understand and actionable data to educators, parents and policymakers.



STAGES: ASSESSMENT & ACCOUNTABILITY



PLANNING



BUILDING



TRANSFORMATIVE

ASSESSMENT TOOLS

Assessments are inventoried and reviewed to determine:

- Alignment with standards
- Alignment with curriculum and teaching
- Accuracy of content
- Inclusion of higher order thinking skills
- Usefulness of results
- Redundancy, where content is unnecessarily tested multiple times

Unneeded or outdated assessments are dropped. Existing and/or new assessments are mapped to the curriculum to ensure they measure desired outcomes, and are part of a balanced system of formal and informal, formative, interim and summative assessments.

A balanced system of formal and informal, formative, interim and summative assessments is in place.

All assessments are confirmed to reflect the principles described above.

The assessment system is continuously evaluated to ensure it is aligned to the curriculum, and delivers timely, useful and actionable data.

STAFF KNOWLEDGE AND READINESS

Staff knowledge and skills are assessed to determine levels of ability specific to:

- Interpreting assessment results
- Using assessment results to improve instruction and learning
- Creating and selecting effective assessments—formative, interim and summative

Staff receives training on: understanding and interpreting assessment data; creating or selecting appropriate items from test banks and open education resources; and ensuring that students will use the same technologies and procedures when learning the material as they will when being assessed.

Staff leverages skills and knowledge through collaborative working groups. Coaching is provided to help staff implement and enhance current assessment efforts.

PURPOSES AND BELIEFS

The prevailing attitudes and beliefs specific to assessment and accountability are determined for students, teachers, partners, policymakers and the community.

Outreach to students, staff, parents, community members and policymakers is used to help them understand and support new assessment systems.

Parents, policymakers and the press are educated about the reasons for and advantages of the new assessment system, as well as what assessment data means—and doesn't mean.

PLANNING & IMPLEMENTATION

A planning group with diverse membership is established to develop a comprehensive plan addressing the guiding principles of successful assessment and accountability.

The planning group monitors initial implementation of the assessment and accountability plan.

Adaptations, based on findings, are made as necessary.

Successes are celebrated. Areas and individuals needing improvement are promptly addressed with supports, expertise, resources and training. Locations and approaches achieving high growth rates are identified and studied for replication.

Plans are in place to reevaluate assessment systems at regular intervals to ensure they remain useful and reflect current assessment practices.

COMPLIANCE

Existing assessment and accountability practices are compared to relevant policies, laws and regulations to determine current levels of compliance.

Where necessary, assessment systems are brought into compliance with federal, state and local requirements. Unneeded or outdated accountability structures are removed. Where possible, assessments and accountability systems are aligned with curriculum and instruction.

A balanced and functioning system of accountability is in place and meets all requirements.

KEY QUESTIONS

The following questions are intended to prompt thinking and discussion about assessment and accountability in your organization. There are no “right” answers; your responses and decisions will reflect your current practices, local needs and aptitudes, and any assessment- and accountability-related goals you set for the future.

Assessment Strategy and Content

- Are our tests matched to the standards we’re teaching and useful for the purposes for which they were designed and implemented?
- Is each assessment given primarily for growth, or for compliance with a legal or bureaucratic mandate?
- Are the assessments organic to teaching and learning, or do we have to stop teaching to the assessment?
- Do these assessments accurately measure higher order thinking skills?
- How do we teach and measure metacognitive skills?
- How do we teach and measure desired attitudes and dispositions such as persistence?
- Are there important topics/subjects we are not assessing (digital citizenship, civic education, etc.)?
- How can we account for learning taking place outside of schools, family background, life experiences, etc.
- Are we cognizant of any assessment items that may be culturally, economically, geographically, or socially biased?
- Are the assessment items good enough/accurate enough to measure whether a student is adequately prepared for college or career?

Assessment Aptitude of Teachers and Administrators

- Are teachers and administrators trained to interpret and act on data from assessments?
- Are teachers trained to create solid assessments? To effectively select tasks from item banks or Open Educational Resources?
- Can we afford the best assessments and the necessary technology and training?
- Are all the assessment instruments interoperable with other data systems?
- Can we use the data from assessments to see who learns what, where, how and under what conditions?
- Can we use the data from assessments to see what parts of the curriculum, teaching materials (textbook chapters, digital learning modules, etc.), and teaching methods are most successful in helping kids learn and master content and skills?
- Can we prevent misuse of assessment data and misinterpretation of results? Can we prevent bad policy decisions based on misunderstanding of results?

Accountability

- What are we holding schools and teachers accountable for and how do we measure that?
- How do we avoid unintended consequences that have a detrimental impact on student learning from accountability measures?
- How do we account for all the things happening inside and outside of classroom? For the year-to-year variability of students in a teacher's class? For schools in the midst of changing curriculum, textbooks, or testing? For the differences in student populations (SES, ELL, etc.) between schools and districts?
- Does the accountability system drive continuous improvement in all schools (not just low performing schools)?
- How do we get the needed/mandated data to schools and state and federal governments in a timely fashion and in an understandable format without being unduly burdensome?
- How do we coordinate federal, state, and local demands?
- How do we motivate students to do their best on high-stakes assessments?
- How do we educate parents, press, policymakers and others about what the accountability measures mean, and the rationale for using them and the intended effects?

POLICY CONSIDERATIONS

The following is a list of often-encountered policies that may influence assessment and accountability in your organization.

- Federal and state mandates may require certain assessments at certain times and may require a defined accountability system for schools and/or educators.
- Beyond the requirements of No Child Left Behind (NCLB), some states have made commitments through Race to the Top applications and NCLB waivers.
- Many states have adopted college and career ready standards and/or next generation assessments, such as those from Partnership for Assessment of Readiness for College and Career (PARCC) or SmarterBalance Consortia.
- Within federal and state requirements, policy wording can sometimes provide schools and districts with flexibility in building their own system of assessments and accountability, or adjusting and adapting state systems to match local needs.
- Any accountability system should set clear goals for raising student achievement and for closing gaps between groups of students while giving districts and schools the ability to develop strategies to meet those goals. The goals should be aligned with the state's challenging and rigorous college- and career-ready standards.
- Accountability systems should provide a regular stream of clear, useful and actionable information to stakeholders that can be used for continuous improvement.

- Accountability systems should prompt action through meaningful incentives (positive and negative) for meeting, exceeding or failing to meet expectations. The incentives should be differentiated based on the characteristics of the school/district and the ways in which the school/district is succeeding or failing. Further, the incentives must be adequately resourced.
- Where assessment and accountability systems are under discussion, it is important to point out what the various measures are designed to tell you, and what they're not designed to do. Standardized tests, for example, were never designed to provide evidence of student growth or teacher effectiveness.
- Single assessments—such as those required under Elementary and Secondary Education Act (ESEA)/No Child Left Behind (NCLB); those being developed by Partnership for Assessment of Readiness for College and Career (PARCC) and SmarterBalanced; the National Assessment of Education Progress (NAEP); Program for International Student Assessment (PISA); and Trends in International Mathematics and Sciences Study (TIMMS)—provide information on what students are learning and are useful in determining how a school or system is doing. They provide useful trend data and may be good for comparisons between different schools, districts or states. They have less value, and were not designed, to measure teacher effectiveness.
- Researchers, test developers and psychometricians have decades of experience in developing test questions that can accurately measure learning outcomes. The knowledge base on measuring teacher effectiveness through test data is much more shallow.
- Big data offers the possibility of a much richer and more detailed set of measures that can be used to better identify problems and target interventions, if laws and policies about accountability are appropriately structured.



EXEMPLARS

ASSESSMENT

PARCC AND SMARTER BALANCED

[PARC Website: http://www.parcconline.org/](http://www.parcconline.org/)

[Smarter Balanced Website: http://www.smarterbalanced.org/](http://www.smarterbalanced.org/)

Regardless of whether your state is participating in the PARCC or Smarter Balanced consortia, their work is worth reviewing. Drawing upon some of the best minds in assessment, their sample items and practice tests are excellent examples of the state-of-the-art tools for assessing more than just discrete knowledge.

PISA AND NAEP

[PISA Website: http://www.oecd.org/pisa/](http://www.oecd.org/pisa/)

[NAEP Website: http://nces.ed.gov/nationsreportcard/](http://nces.ed.gov/nationsreportcard/)

Also worth reviewing for assessment items are the Program for International Student Assessment (PISA) of the OECD and the United States' National Assessment of Educational Progress (NAEP).

NEW HAMPSHIRE'S PERFORMANCE ASSESSMENT FOR COMPETENCY EDUCATION

[Website: http://www.education.nh.gov/assessment-systems/](http://www.education.nh.gov/assessment-systems/)

New Hampshire was one of the first states to invest in changing to competency-based assessment. Learn about the foundational principles and plans behind this state's student assessment system.

THE RHODE ISLAND DIPLOMA SYSTEM

Website: <http://www.ride.ri.gov/StudentsFamilies/RIPublicSchools/DiplomaSystem.aspx>

Emphasizes personalized learning opportunities and pathways, multiple forms of assessment and opportunities to demonstrate proficiency.

MAINE LEARNING RESULTS AND GUIDING PRINCIPLES

Website: <http://www.maine.gov/doe/proficiency/index.html>

Maine's "Getting to Proficiency" website provides technical assistance, resources and guidance for school districts to implement proficiency-based education and the proficiency-based diploma, and to do so in a way that promotes student learning and achievement.

ACCOUNTABILITY

WISCONSIN ESEA WAIVER REQUEST

Waiver Request: <https://www2.ed.gov/policy/eseaflex/approved-requests/wi.pdf>

Notable for work proposed on accountability, especially the resulting On Track to Graduation and Postsecondary Readiness Index (<http://oea.dpi.wi.gov/accountability>).

CALIFORNIA'S LCAP (LOCAL CONTROL AND ACCOUNTABILITY PLAN)

Website: <http://www.lcapca.com/index.cfm>

Under a 2013 law, funding was tied to school districts developing a LCAP, which would engage parents, employers, educators and the community to create their own vision and goals for accountability, along with specific actions to meet those goals. The website provides a tool for creating a step-by-step strategic plan for local control and accountability systems.

OREGON REPORT CARD FOR SCHOOLS AND DISTRICTS

Website: <http://www.ode.state.or.us/search/page/?id=1786>

Mandated by the legislature in 1999, the Oregon Department of Education produces report cards for schools and districts designed to "accurately reflect student learning and growth; incorporate key measures of college and career readiness; align with districts' achievement compacts; and, make the Report Cards more user friendly and accessible."

ACTION STEPS AND RECOMMENDATIONS

As you explore and navigate assessment and accountability in your organization, working group members have provided the following recommendations to guide your action planning.

- Create a plan to review and improve assessment and accountability systems. Involve policymakers, parents, educators, school leaders and others, as appropriate, to create consensus and widespread support.
- Seek the advice of experts, the results of research, and the voice of experience from the examples contained in this report and other sources, but adapt it to suit the unique needs and culture of your community.
- Articulate a clear and challenging set of goals for the educational system and outline the key principles that will guide everything else.
- Make sure the goals and the policies that accompany them are not overly prescriptive and allow school leaders the flexibility to choose from among options and to experiment with potential solutions.
- Make sure that sufficient resources are available for every aspect of your plan, from teacher training to technology, to supports for improving troubled schools.
- Design a process to periodically review progress on your plan and adapt or revise as necessary.



THE LEADERSHIP AND CULTURE WORKING GROUP

Leadership and Culture are key levers in the development of transformational learning environments. Changes to teaching and professional learning, assessment and accountability, and infrastructure cannot happen, nor happen as easily, without leadership and a supportive culture. Transformation goes beyond the one-shot “reform” or “improvement,” becoming a process of continuous evolution as organizations mature.

BACKGROUND

If there is one factor that distinguishes successful 21st century schools and districts from others, it is strong leadership. Research demonstrates that, as an aspect of school culture, leadership is imperative for innovation in schools. While individual teachers may adopt 21st century learning practices in the classroom, the ultimate impact for students is achieved when the entire school (or district) embraces and works toward that vision (Kay, 2011).

21ST CENTURY EDUCATIONAL LEADERS

In order for 21st century learning to flourish, leadership must be present at all levels of the education system (Schleicher, 2012). Successful educational institutions depend on effective leaders within the organization—including district leaders, principals, teachers, and strong support systems alongside the organization—local businesses and the school community. To realize this vision may require redistribution of leadership, new training and development for school leaders, and appropriate support and incentives (Schleicher, 2012).

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Leadership could be considered the single most important aspect of effective school reform.

- Robert Marzano, Educational Consultant (Instructional Leadership and Professional Development, 2015)

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The following characteristics describe the actions of the 21st century educational leader:

- Cultivates “grassroot” efforts to integrate technology into instruction (i.e. \ teacher exploration of new tools)
- Encourages students to take leadership roles in working with technology
- Helps teachers become comfortable with technology (i.e. professional development)
- Regularly visits classrooms to observe real changes in the pedagogy where technology is used (Henke, 2007)

Educational leaders have a significant role to play in building capacity for change towards a 21st century learning environments. They must work with administrators and lead instructors to create an environment of “differentiated professional learning, risk taking, and collaborative relationships.” (Partnership for 21st Century Skills, 2009a, p. 4). Along the way, they focus on fostering a school-wide culture of lifelong learning (Henke, 2007). It is not difficult to envision how leadership is essential in the transformation toward 21st century learning environments, with goals of:

- closing skill gaps
- working with businesses to create curricula that incorporates 21st century skills and academic subjects
- supporting and maintaining professional development opportunities
- creating and sustaining personalized, tailored learning plans for students and
- collaborating with businesses to ensure that academic assessments reflect mastery of 21st century skills.

THE IMPACT OF SCHOOL CULTURE

School culture is developed through interactions of staff members, students, and community members. It becomes the behavioral guide for all members of the school: students, parents, teachers, and administrators (Hinde & West, 2004). School culture, as a construct, consists of the following components:

- philosophies
- ideologies
- rituals
- values
- shared norms, including task innovation, social relationship, and task support norms (Connor & Lake, 1988; Rousseau, 1990; Schein, 1985)

“

When School Culture and Technology Intersect

A report from the Education Development Center (EDC) and the Nellie Mae Education Foundation (2011) illustrates just how critical leadership and culture is to establishing and growing 21st century schools:

Using technology to support student-centered learning requires leadership, administration and the community to collaborate and set an agenda for technology that reflects local needs, focuses on a common set of learning standards, and connects students to real-world audiences (p. 7).

”

Culture is at the core of all school reform and transformation (Hinde & West, 2004). The existing research on school culture is bountiful (Covey, 2006; Fullan, Hill & Crevola, 2006; Hargreaves & Fink, 2006; Hord, 1992). Schools that support innovation and teamwork are likely to be successful at change implementation processes (Fishman et al., 2004; Furman-Shaharabani & Tal, 2008).

Finnan (2000) asserts that school culture is never stagnant; it constantly evolves as a reflection of societal changes and innovations. School culture affects members' attitudes towards teaching and learning (Zhu, in press). According to research, general cultural values as well as the specific organizational features of a particular school play crucial roles in shaping the manners in which school members adapt to innovation and change (Chan, Tan, & Khoo, 2007; Vatrappu & Suthers, 2007).

STUDENT AGENCY & RISK TAKING

Student agency and risk taking are two key elements of school culture that can support 21st century learning environments.

Meeting the challenges of the 21st century requires deeper thinking (see, among other efforts, the Hewlett Foundation's Deeper Learning initiative). Students will need to question, pursue, and create knowledge by taking agency and ownership of their learning (Briceño, 2013). According to Martin (2004), agency can be defined as "the capability of individual human beings to make choices and act on these choices in a way that makes a difference in their lives" (p. 135). In relation to education, student agency can shape the process and outcomes of student learning (Lindgren & McDaniel, 2012).

In the classroom, agency allows learners to acquire deeper understanding and skills, thus molding more competent learners in and out of the classroom (Briceño, 2013). Creating a culture of student agency better prepares to succeed not only academically, but also in the 21st century workplace.

A culture that supports risk taking and innovation is equally important. According to the National Association of Independent Schools (2010), adaptability, initiative, and risk-taking are three essential capacities for 21st century school climates. Leaders at all levels should encourage their students and colleagues to explore and experiment, to view failure as an opportunity to learn, and to learn to work in a climate of uncertainty and change.

Education leaders have discussed the need to provide a safe environment where learners feel encouraged to take risks, and where risk-taking leads to creativity (District 39 Community Review Committee, 2009). Thought leaders, such as Resa Steindl Brown (2006), state that encouraging children to take risks and not to fear failure empowers them to rely on themselves for solutions to problems. Educators, too, need a safe place to take risks, to experiment, and sometimes to fail. However, encouraging appropriate risk taking requires rethinking many aspects of our education process, including the impact of assessment and accountability. Without administrative support to take chances classroom practice will not change.

COMMUNITY INVOLVEMENT

Educational leaders are also pivotal when it comes to engaging the community in the school. One of the greatest challenges to education reform is maintaining the support of parents who feel “out of the loop” or distanced from the changes within the school (Hargreaves, 1997; Hinde & West, 2004). This challenge can be more significant for parents whose own educational journey was less than successful. It is important for educational leaders and other agents of change to incorporate the full school community in the process of transforming schools and implementing innovation.

The following guidance is provided to support your reflection upon the leadership and culture within your organization. As you go about that effort, be mindful of that fact that this component of the model—perhaps more than any other—impacts each of the other four components. Without effective leadership, and a supportive culture, change in any area will be difficult, if not impossible, to accomplish.

PRINCIPLES

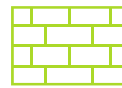
- **Leadership is distributed**—It reflects the idea that everyone in a school shares the responsibility of leadership and establishing culture, and seeks to give voice to all constituencies, including teacher, student, parent and community.
- **Leadership and culture are open and tolerant**—They embrace all stakeholders, give attention to differing perspectives, and benefit from the diversity that is present.
- **Leadership is visionary**—It focuses on the future, the world in which students will live and work, and seeks to continuously improve the learning experience in an effort to better prepare students for their future.
- **Leadership advocates**—It involves leaders serving as advocates for both teachers and students to ensure that they have what they need to successfully in prepare today's students for tomorrow.



STAGES: LEADERSHIP AND CULTURE



PLANNING



BUILDING



TRANSFORMATIVE

DISTRIBUTED LEADERSHIP

There is awareness that leadership is a shared responsibility requiring commitment among staff, from top to bottom, to the vision and mission. Teachers and education leaders play important roles in developing the vision, mission and planned implementation.

There is a developing consensus of shared responsibility for and commitment among staff, from top to bottom, for a 21st century vision and mission that can be embedded into planning and implementation documents and actions.

There is shared responsibility for and commitment among staff, from top to bottom, to the vision and mission, widely visible in strategic planning documents and improvement plans as well as in school activities, signage, slogans and other artifacts.

ENGAGED SUPPORTIVE COMMUNITY

Some community and business leaders express interest in partnering with districts and other educational organizations to support transformation. They voice support for the efforts and collaboratively share resources and expertise on a sporadic basis.

There is a growing number of community and business leaders who actively assist the district in building a new vision, providing needed expertise on community and workforce needs and assets more than once a year. Many parents as well as community leaders regularly participate with the district on projects, and are integral to the transformation process.

The communities of teachers, students, families, civic and community organizations, as well as leaders, businesses, other schools and colleges are engaged in deep and meaningful ways. The community's unique needs, assets and support are powerful drivers in the district.

FOCUS ON STUDENTS

The leadership begins to discuss what students need for the future and

The majority of education leaders demonstrate their commitment to meeting

Ensuring that students acquire not only the content knowledge they need, but also 21st century skills

incorporate those needs into a broader vision and mission. Plans are developed that place a high priority on students' needs.

student needs for college, career and life readiness. District strategic plans, policies, and processes show a shift in focus to student learning that includes both content and skills.

such as collaboration communication, creativity/innovation and critical thinking, and dispositions such as persistence, responsibility, social awareness.

BUILDS A TRUSTING, SAFE AND SUPPORTIVE ENVIRONMENT

Education leaders begin to voice support for creating a more trusting and supportive environment. Some policies and/or practices are put in place to allow for innovative practices or pilot projects. Compliance plans and policies are examined for potential changes to allow for more risk-taking and for the shift to a learning organization.

Many education leaders voice support for risk taking and trust. Plans, strategies and tactics that encourage innovation rather than compliance become more prevalent. A growing consensus develops on the value of being a learning organization.

Allows for risk taking and relies less on compliance and more on becoming a learning organization.

BUILDS A COLLECTIVE VISION

Efforts to build a collective vision begin with a structured process for planning. First steps often include a series of stakeholder meetings that discuss future student and community needs.

As the process for developing the collective vision continues, adoption grows as parents, community and education leaders incorporate it into their language. Initial policies and plans develop, and pilot projects emerge that assist in building a community specific vision to which all can commit.

Allows the organization to grow, evolve and adapt in an inclusive, forward thinking and open cultural environment. The vision is evident throughout the organization in the work, in policies, in plans, and in the everyday language.

CREATES POLICIES AND PRACTICES STRUCTURE

The creation and alignment of policies and practices begins with a full analysis of current practice and policies. A small amount (< 25%) of the current policies and practices are aligned to the collective vision and mission.

Approximately 25-75% of the policies and practices are being put into place to empower administrators and teachers to grow and develop as leaders and professionals in a continuous learning environment, and to fulfill the collective vision and mission.

Administrators and teachers are empowered to grow and develop as leaders and professionals in a continuous learning environment that aligns with the collective vision and mission.

ESTABLISHES AN ENVIRONMENT OF STUDENT AGENCY

Students are empowered, excited and actively engaged in their own learning and in their community. A few learning environments

Students are empowered, excited and actively engaged in their own learning and in their community. Many of the learning

Students are empowered, excited and actively engaged in their own learning and in their community. Almost all learning

support 21st century learning that emphasizes student engagement, global literacy, and mastery of content and skills, and encourages innovation and risk taking.

environments support 21st century learning that emphasizes global literacy, mastery of content and skills, and encourages innovation and risk taking.

learning environments support the mastery of content and skills, as well as encourage global literacy, innovation and risk taking.

GUIDES, ADVOCATES FOR, AND MANAGES THE CYCLE OF TRANSFORMATION, INCLUDING LARGE SCALE PROJECTS

A few education leaders have capacity, including project management skills, to guide, advocate for and manage large scale projects. There is a growing awareness of the importance of the skills needed to manage large projects and there are beginning efforts to build a plan to strengthen these skills in district leaders. Few large scale projects are being guided and managed by leaders with appropriate skills.

A plan to strengthen large scale project management skills of education leaders is being implemented throughout the district or educational organization. There is a growing number of district leaders who have expertise in effectively managing large scale projects.

All large scale projects are managed by leaders with the appropriate skills and are successfully implemented.

ACTIVELY EM- PLOYS 21ST CENTURY TOOLS AND RESOURCES

Fewer than 25% of students and educators use technology to the greatest advantage for learning. There is growing awareness that the systemic application of the digital tools used in our hyper-connected world is important, and initial steps are taken to increase access and professional capacity to use technological tools and resources for maximum learning.

Approximately 25-75% of students and teachers employ the systemic application of digital tools. There is increased emphasis on developing, planning and implementing systems to intentionally incorporate technology into the learning environment while building professional capacity.

Students and teachers have access to technology and the capacity to systemically apply digital tools.

KEY QUESTIONS

The following questions are intended to prompt thinking and discussion about your organization's leadership and culture. There are no "right" answers; your responses and decisions will reflect your current practices, local needs and aptitudes, and the leadership- and culture-related goals you set for the future.

- Is there a shared vision for the school or district among stakeholders?
- How are the business, higher education, and parent communities involved with the school or district?
- What are the ways in which the school or district focuses on the students?
- How does the school or district create an environment that supports risk taking and innovation while remaining accountable ?
- In what ways, are Communication, Collaboration, Critical Thinking and Creativity (the 4C's) embedded into learning?
- What is the collective vision and plan for implementing the initiative for the school or district?
- What key policies and practices need to change in order to transform the school or district?
- What tools and resources are needed to transform learning?
- What are the plans for building educator capacity to implement 21st century learning pedagogy and practices?
- How can the district employ a cycle of transformation to ensure continued empowerment?

POLICY CONSIDERATIONS

When contemplating the school or district's leadership and culture, the overarching considerations are: (1) What policies get in the way? (2) What policies should be deleted? (3) What policies need to be added to create a more desirable environment?

The following is a list of often-encountered policies that may influence leadership and culture in your organization. Make sure to consider and accommodate how these policies will intersect, and ultimately support, your change initiatives.

- Structure of the day/school year/requirements for classes
- Educator/administrator evaluation
- Accountability system requirements
- Graduation requirements (or any other curricular requirements)
- Educator/administrator licensure
- Professional development or learning structure/policies
- Assessment policies/requirements
- Textbook/technology policies
- Purchasing policies



EXEMPLARS

KATHERINE SMITH ELEMENTARY SCHOOL, SAN JOSE, CA

School Website: <http://krs.schoolloop.com/>

The first elementary school in the PBL-driven New Tech Network, Katherine Smith School is a neighborhood school with a majority Hispanic population, generational poverty, and numerous challenges. In spite of these challenges, dedicated leadership and a committed staff have transformed the school into a vibrant and sought-after exemplar for 21st century learning.

A.L. STANBACK MIDDLE SCHOOL, HILLSBOROUGH, NC

School Website: <https://sites.google.com/a/orange.k12.nc.us/a-l-stanback-middle-school/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/1262-case-study-al-stanback-middle-school-part-1>

A.L. Stanback Middle School prides itself in providing students intentional instruction on 21st century skills. The success in developing college and career ready students is largely attributed to a thriving professional learning community within AL Stanback. Teachers are treated as professionals and given the freedom to guide their own professional development. Through team work and peer collaboration, educators, with the help of parents and community members, have created a culture of 21st century learning centered on literacies, including global, health, and tech literacy.

SPIRIT LAKE HIGH SCHOOL, SPIRIT LAKE, IA

School Website: <http://www.spirit-lake.k12.ia.us/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/1273-case-study-spirit-lake-high-school>

Students at Spirit Lake High School develop critical thinking, collaboration, and problem solving skills in a highly interdisciplinary environment. The administrators and instructors at Spirit Lake have instituted approaches such as the CORE Academy, where multiple core subjects such as science and English are taught and assessed simultaneously, and J term, a Project Based Learning opportunity for all students to explore an area they are passionate about, or complete an internship.

MANOR NEW TECH HIGH SCHOOL, MANOR TEXAS

School Website: <http://mnths.manorisd.net/>

This New Tech Network school has a strong commitment to project based learning, engaged learning approaches, and effective use of technology. With 8 years of PBL experience, Manor New Tech has developed its own professional development institute, Think Forward, and has consistently shown great student outcomes and achievement. The school has received national recognition, with over 1,000 visitors a year, including President Obama.

BEN FRANKLIN ELEMENTARY SCHOOL, GLEN ELLYN SCHOOL DISTRICT 41, ILLINOIS

School Website: <http://www.d41.dupage.k12.il.us/schools/franklin/>

Case Study: <http://www.p21.org/exemplar-program-case-studies/list-of-exemplar-schools>

At the realization of a need for a new approach for 21st century learning, a committee made up of District 41 school leaders and administrators, dubbed “The Think Tank,” created new structures for project-based-learning, student-centered learning and multiage student grouping. In addition, new opportunities for professional growth and collaboration were adopted. The implementation of the new learning structures called for new formal and informal structures for professional collaboration. Professional Learning Communities, PLC’s, enable different groupings of teachers across multiple schools to collaborate and share best practices.

MINNETONKA PUBLIC SCHOOLS, MINNETONKA, MN

School Website: www.minnetonka.k12.mn.us

The leadership team in the Minnetonka Public Schools (MN) has institutionalized the processes that created and support an inclusive culture of innovation among its education community. As a long-time leader in the use of technology, the district’s embrace of these new processes have transformed district culture by increasing the focus on the desired learning outcomes, while appropriately addressing the essential conditions needed for a quality professional development, a robust infrastructure, and selection of the right tools.

ANAHEIM UNION HIGH SCHOOL DISTRICT, ANAHEIM, CA

District Website: <http://new.auhsd.us/district/>

“Our Future Now” Website: <http://our-future-now.org/anaheim-high-school-support-p21-learning/>

Case Study (Savannah High School) <http://www.p21.org/exemplar-program-case-studies/1295-case-study-savannah-high-school>

Anaheim Union High School District students demonstrated their knowledge and mastery of the 21st century skills by successfully petitioning their mayor, Tom Tait, to officially declare Anaheim the first “P21 City.” As part of an innovative civic project, the high school students created an online petition, and spoke at city hall to advocate for Anaheim to endorse the P21 Framework for 21st Century Learning. Now, local businesses and community organizations are better equipped to collaborate with schools in internships and other partnerships aligned to the Framework.

ACTION STEPS AND RECOMMENDATIONS

Working group members have provided the following recommendations to guide your action planning as you explore and consider leadership and culture in your organization:

- Build a plan to manage the transformation.
- Create a consensus with internal and external communities.
- Seek advice from experts and respected leaders (internal and external at all levels).
- Progress steadily and deliberately—not too fast.
- Listen, communicate, listen communicate, REPEAT.
- Manage expectations—allow for risk taking and mistakes, learn from them, and move forward.
- Keep students and learning at the center.

GUIDANCE



FROM

THE INFRASTRUCTURE WORKING GROUP

School districts should focus on making resources and funds available to support the newly aligned teaching and learning goals and methodologies, including funding the appropriate professional learning and educational technologies. A rush into technology without full consideration of all components of “Building Your Roadmap” is not a thoughtful approach.

BACKGROUND

As states and school districts become acclimated to teaching and learning in new ways, they must also look at how students are different from those of past decades. Twenty-first century students learn in different ways, in part because technology pervades their lives. As the shift from print to digital accelerates throughout all aspects of the educational enterprise, from content to assessments to professional learning to school operations, a high-quality, reliable technological infrastructure is crucial. As plans are made, education leaders must remember that technology is a tool that should support teaching and learning rather than drive them.

TRANSFORMATIVE POTENTIAL OF BROADBAND

“Among the many technologies that have been heralded as a transformative solution for education in the United States – e.g., radio, television, and the computer – broadband has perhaps the greatest potential” (U.S. Chamber of Commerce, 2010, p. 1). According to the Ontario Association of School Business Officials (OASBO), “The same tools and resources that have transformed our personal, civic, and professional lives have become part of the learning experiences intended to prepare today’s students for all pathways to success” (2013, p. 2). Technological innovations in communication and information technologies provide for an education that is no longer confined to just the classroom space.

“

In America, everyone needs affordable access to sufficiently robust networks and the opportunities they offer. The system needs to be interoperable so that learners can seamlessly move among learning platforms, providers and networks, and have credentials that follow them.

Aspen Institute Task Force on Learning and the Internet, 2014, p. 4

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To realize that potential, high speed Internet is now considered a vital learning support for all levels of education, from kindergarten through college (Communications Workers of America, 2009). Certainly, if our goal is to prepare students who are college- and career-ready, educators must embrace the technologies of the workplace in their classrooms.

Broadband provides students, parents, teachers, and educational leaders with the tools to enable technological innovations, services, applications, and integrated approaches to education. This innovation is also a vital factor in the educational shift from the more static, teacher-centered instructional methods toward more interactive, individualized, and more openly accessible learner-centered methods.

The U.S. Chamber of Commerce (2010) offers the following list to represent the educational, administrative, and instructional enrichments enabled through broadband:

- Improves effective instruction (MIT, 2010)
- Increases learning outcomes via more engaging, interactive activities (MIT, 2010)
- Encourages innovations in instructional delivery (i.e. blended learning)
- Provides increased options for teacher professional development
- Enhances access to quality education via online learning elements
- Tailors learning by allowing students to engage in activities—such as educational modules and video games—that are targeted at refining specific skills (Federal Communications Commission, 2010)
- Enables a larger range of administrative efficiencies
- Facilitates efficient analysis of student data
- More accurately tracks student performance

School districts across the country are already transitioning to digital resources and digital textbooks. Many districts are also employing high-speed broadband, Wi-Fi networks, and one-to one or 'Bring Your Own Device' (BYOD) educational services. As the number of devices is likely to exceed the number of students in a given school environment, it will become crucial to provide adequate broadband access to allow for the successful use of all student devices (OASBO, 2013).

The State Education Technology Directors Association study, *Broadband Imperative*, established the case for vastly increased bandwidth for 21st Century Learning (Fox, Waters, Fletcher & Levin, 2012). While schools have been historically challenged in funding their infrastructure investments, times are changing.

“

“Given that bandwidth availability determines which online content, applications, and functionality students and educators will be able to use effectively in the classroom, additional bandwidth will be required in many, if not most, K-12 districts in this country in the coming years. If we are serious as a nation about preparing all students for college and careers, a concerted national effort will be required to address both school- based bandwidth needs and out-of-school access for students and educators.”

Fox, Waters, Fletcher & Levin
(2012, p. 2)

”

PARCC, Smarter Balanced or new state assessments, along with new college and career ready standards, have prompted many states and districts to improve their infrastructures. The Federal Communications Commission's e-Rate reform provides additional funding for such technology upgrades. Among the barriers for U.S. schools to make the necessary upgrades to effective, learning-ready connections are limited information about their current networks, a lack of networking expertise, and minimal school and district budget funds for upgrades are ("Why K-12 Networks Fail"). Educational leaders are challenged to carefully monitor the gap between their school and district goals, and the available infrastructure, and systematically plan how their schools will supply the necessary infrastructure support for 21st century learners.

INTEROPERABILITY

Interoperability is another infrastructure-related element that is critical for 21st century schools, their teachers and their learners. Olmedilla, Saito & Simon (2006) define interoperability as "the capability of different systems to share functionalities or data" (p. 1).

The following are examples of functions enabled by interoperability:

- Collaborative content development (stored in multiple systems)
- Content accessibility across various systems (re-use)
- Cross-organizational, collaborative teaching and learning
- Sharing of assessment data for the purpose of tailored learning environments

In an age of global connectivity, the benefits of interoperability in education are abundant. For example, interoperability allows data to seamlessly flow from a digital textbook to the school's learning management system, and from assessments to student management systems. Interoperability also allows schools and teachers to more efficiently exchange data with each other regarding new and transferring students. And, instead of limiting students to working from identical textbooks, teachers can purchase specific content appropriate to each learner (United States Department of Education, n.d.). For districts to maintain and promote interoperability among schools, it is essential for them to have the necessary broadband access to support such complex systems of information management and exchange.

INFRASTRUCTURE-RELATED CHALLENGES

Implementing effective infrastructure in U.S. schools comes with its challenges. According to Richardson (2005), current customers of broadband technologies—such as learning management systems—argue that the commercially available technologies are too costly, unreliable, and inflexible for most teachers to learn, master, and effectively implement. However, there has recently been an explosion of easy-to-use tools and apps that ameliorate this problem.

Similarly, lack of instructor training (professional learning) is another obstacle to technology implementation and effective use in schools. For example, a 2008 study reported that even when technology training was made available by school districts, teachers believed that the training was more focused on administrative tasks, leaving them feeling ill-equipped for instructional uses of the technologies (National Education Association, 2008). Thus, “a lack of proper educator training may be discouraging further adoption and integration of broadband-enabled technologies and tools in the classroom” (U.S. Chamber of Commerce, 2010, p. 28).

Lack of technical support (U.S. Chamber of Commerce, 2010), lack of supportive software (Sandholtz & Reilly, 2004), and other organizational barriers (CDW Government, 2008) each further challenge infrastructures that effectively support 21st century learning environments.

MOVING TOWARD INFRASTRUCTURES THAT SUPPORT 21ST CENTURY LEARNING ENVIRONMENTS

The transformative process should start with a clearly defined vision for the initiative in context of the school's, district's, or state's needs and resources. Such vision-building is best done after a school researches other technology models, as well as current global and economic trends in technology and infrastructure (21 Steps to 21st Century Learning).

From there, measurable goals that allow the school to gauge its process along the way need to be explicitly defined. The following questions may be used to help clarify such goals and expectations:

- Twenty-first century learners are expected to become skilled communicators, analytic learners, and creative experimenters. What are the measures of success in achieving such learning outcomes?
- Research shows that 21st century learners experience the most educational benefits when they can focus on hands-on learning and participate in team-based approaches: thus, to what extent does the school's infrastructure contribute to these goals?

These strategies must inform a sustainable initiative that all stakeholders understand and support, and in which educators at all levels are not only eager to participate in, but also have the support they need to assist in achieving the initiative's goals (21 Steps to 21st Century Learning). Such strategies should take into account infrastructure related to change management, funding, communication, and professional learning and development.

“

North Carolina's Impact Model (2005) accurately addresses the different technical infrastructure components necessary for schools to transform into 21st century learning environments. The following points illustrate such necessary infrastructure elements:

Standardization of technology resources: system-wide guidelines for standardizing technology resources are in place

Technology, equipment, & connectivity: system-wide technology infrastructure, equipment, and connectivity exceed state technology plan standards

Equity of access: equitable access to resources and facilities that meet requirements of federal ADA and special education laws is provided for all schools.

”

INFRASTRUCTURE AND POLICY

If an infrastructure is to fully support transformative learning, it is important to recognize the policy implications involved. One study outlined the need for attention to the following policies specific to 21st century learning environment infrastructure changes (Kong, Chan, Griffin, Hoppe, Huang, Skinshuk, Looi, Milrad, Norris, Nussbaum, Sharples, Winnie So, Soloway & Yu, 2014):

- Developing curriculum goals for delivering 21st century skills
- Bridging the gap between school and society by linking curriculum content to the real world
- Availability of personally-owned computing devices and free wireless connectivity for the purpose of developing 21st century skills
- Addressing privacy and legal issues in the e-learning process regarding the tracking of learner data
- Teacher development for both pre- and in-service educators

A summary of fourteen white papers published throughout 2012 in the UNESCO Working Paper Series on Mobile Learning addressed additional infrastructure-related policy considerations. They included choosing technology appropriate to educational goals and contexts (even if it is 'low-tech') and taking equity issues into consideration (Mobile Learning for Teachers and 8 Policy Considerations, 2013). Likewise, a study done for the Nellie Mae Education Foundation (2011) posed the following question for policy consideration: "What kinds of technology-use policies need to be in place (e.g., cell phone access, use of Internet filters) to support effective uses of technology?"

Finally, Kennedy (2011) outlined several action steps from the United States Office of Educational Technology that educational institutions must take to provide their students and educators with access to an ample infrastructure for 21st century learning:

- Provide students and educators with broadband access to the Internet and adequate wireless connectivity both in and out of school.
- Make sure that every student and educator has at least one Internet access device and appropriate resources for research, communication, multimedia content creation, and collaboration.
- Support the use of educational resources to promote innovative opportunities for all learners and to further the adoption of new open learning technologies.
- Supply state and local education institutions with the capacity to create an infrastructure for learning.
- Develop interoperability standards for content and student-learning data to enable collecting and sharing resources

As you consider your organization's infrastructure of, we encourage you to do so from a "big picture" perspective. Often, infrastructure is initially envisioned as the technology—the devices or hardware, and perhaps the wires that serve to connect that hardware. The working group provides the following guidance to encourage a more systemic view of infrastructure, with the goal of promoting an infrastructure that successfully supports the transformation of learning.

PRINCIPLES

- **Infrastructure ensures connections**—Provides broadband for the school district, which includes connections among buildings, and copper and fiber infrastructure and Wi-Fi within buildings.
- **Infrastructure accommodates devices**—Embraces any device that allows students to create content, consume content and/or connect and collaborate with others in the community or across the world.
- **Infrastructure provides technical support**—Encompasses fixing broken devices and connections, maintaining all technology, planning for future problems and asset management.
- **Infrastructure attends to professional learning**—Recognizes that the infrastructure will only be successful when those who use it are appropriately skilled, and therefore ensures adequate training and preparation.
- **Infrastructure protects privacy and data security**—Addresses (1) the technical side, where filters, approaches to secure networks, logically dividing devices for kids from core business and other approaches to technical security of the infrastructure are considered; and (2) the human side, where policies around safety, what data can be used by whom for what purposes, and general digital citizenship are crucial.
- **Infrastructure attends to environmental and physical needs**—Coordinates and confirms the efficacy of the underlying infrastructure of schools, from the physical buildings to the electrical system.



STAGES: INFRASTRUCTURE

The infrastructure working group felt strongly that it is inappropriate to try to define the planning, building and transforming stages for the infrastructure absent a clear vision for teaching, learning and assessment. To do so would convey the impression that technology is driving the education rather than education driving the use of technology. However, the group has defined infrastructure-related conditions it feels necessary to support learning.



TRANSFORMATIVE

CONNECTIONS

Ample bandwidth and Wi-Fi connections to ensure full access to all kinds of content and connections to others, no matter how bandwidth-intensive it is, to optimize learning.

DEVICES

Sufficient devices of various kinds to ensure that students can access or create content or connect to each other at any time. This is at least 1:1, but may be even more, as most professionals work with 2 or 3 devices (smartphone, tablet and laptop and possibly other devices currently being created).

TECHNICAL SUPPORT

All the technology works all the time and there is sufficient back-up and extra devices so that when a device breaks down, there is another at hand immediately.

PROFESSIONAL LEARNING

All teachers are able and willing to use all aspects of the infrastructure effectively and efficiently all the time, evaluate when approaches are effective and modify them when they are not.

SECURITY AND DATA PRIVACY

All data is secure and students are safe from bullying, online predators and other dangers, while still ensuring that there is easy access to the tools and services necessary to optimize learning.

ENVIRONMENTAL/PHYSICAL

The physical buildings, electrical system and other components are aligned with the vision for learning and teaching.

KEY QUESTIONS

The following questions are intended to prompt thinking and discussion about your organization's infrastructure, and how it supports 21st Century Learning Environments. There are no "right" answers; your responses and decisions will reflect your current practices, local needs and aptitudes, and any infrastructure-related goals you set for the future.

- ◆ How can technology support your teaching and learning?
- ◆ Have you considered that schools, like learners, are different, with varying kinds of leadership, facility engagement and curricular expectations. One set of goals or approaches will not work for every school in a district, or for all districts in a state.
- ◆ Have you asked all stakeholders—including leadership, faculty and students—to assess and comment on the technology infrastructure available in each school.
- ◆ Have you honestly evaluated the current and desired stages of technology engagement at each school.
- ◆ Do you have capable, on-site tech support to facilitate a large scale computing environment?
- ◆ Do you have enough bandwidth to support a massive influx of devices?
- ◆ Do your parents understand the value of a technology rich school environment?
- ◆ How will the safety of the students be ensured both technologically and educationally?
- ◆ Have you developed solutions with sustainability in mind?



EXEMPLARS

KINGSPORT CITY SCHOOLS (KCS), KINGSPORT, TENNESSEE

School Website: www.k12k.com

Infrastructure and professional learning are two key areas where Kingsport City Schools (KCS) has focused its attention. To support its district-wide BYOD initiative and burgeoning one-to-one program (through which laptop devices will be deployed to every KCS student in grades six through twelve by the fall of 2015, with elementary grades to follow), the school system installed a wireless network covering the entire district. KCS also installed a new web filter to provide content filtering on all student devices, and it upgraded its Internet access to an impressive one gigabyte. Additionally, KCS deployed Wi-Fi on five of its school buses, providing additional learning opportunities to its students who have longer bus routes.

KCS also places great emphasis on professional learning. Designated teacher leaders work collaboratively to develop and share online lesson content and curriculum maps, common assessments, and coordinate professional learning workshops. Technical support for the district's technology vision is provided through personnel at the district and school level, as well as via students who are trained and capable of providing such support.

BALDWIN COUNTY SCHOOL DISTRICT, BALDWIN, ALABAMA

District Website: <http://et.bcbe.org/what-is-digital-renaissance.html>

In 2011, the Baldwin County School District launched the Digital Renaissance 1:1 program, an ambitious journey to provide students with the skills and tools necessary to be college and career ready. As part of this project, the district completed an infrastructure overhaul to boost broadband access throughout the district. The district's upgrade provided 2.5 gigabits (GBs) of Internet pipe into the broadband system and connected the main office and the schools. It also included 1-gigabit switches that provide 1 gigabit to each wireless access point in every classroom. This new broadband backbone permits the seamless download of multimedia content into the classroom and students to create and share content via web 2.0 tools.

HAWAII 1:1 DEPLOYMENT & CHANGE MANAGEMENT GUIDE, HI

Program Website: <http://goo.gl/7VFbyg>

This guide provides technology coordinators with a step-by-step approach to deploying, maintaining, and supporting a vibrant and safe 1:1 learning environment. While most guides focus on the technical side of 1:1 deployments, this guide attempts to provide local administrators and faculty with best practices geared towards developing stakeholder buy-in, student accountability, and faculty awareness.

HAWAII: 1:1 ACCESS PROGRAM, HI

Program Website: <http://www.hawaiipublicschools.org/TeachingAndLearning/StudentLearning/CommonCoreStateStandards/Pages/Access-Learning.aspx>

The Hawaii State Department of Education's (HIDOE) Access Learning pilot project focuses on providing schools with support and resources to use technology as a tool to transform teaching and learning beyond the four walls of the classroom. Schools applied and were selected based on their network capacity, readiness to implement large scale school-wide change, ability to participate in professional development, identification of a school level project team, sufficient on-site technology coordinator support, and capacity to participate in the project evaluation. Schools received one device per student and teacher, and a spare pool of equipment equivalent to six percent of their total device count.

LAMOILLE UNION MIDDLE/HIGH SCHOOL, LAMOILLE, VT

School Website: <http://lancerone.wix.com/lancer1>

The goals of the Lancer One Project—Universal Access, Spontaneous Learning, Equity, and Personalized Learning, were established to help meet the needs of students in rural Vermont, where 48% of the population qualifies for free and reduced lunch and changes in teaching and learning were needed to increase student success. The district upgraded the school's broadband infrastructure and provided each student with a tablet to help meet these goals. The students played an important role in the development and implementation of the Lancer One project, advocating for the project to the school board, guiding the decision-making, logistics and support of the devices. In the classroom and at home, students describe their opportunities as transformative. Students have increased access to teacher and classroom materials, they have taken ownership over learning, data and grades are shared more frequently and students find easier access to opportunities and connections outside their school community. In A February 2014 survey, 85.4% of students responded that they could, "find information, and learn new skills anytime, anywhere". Only 40% of our students responded that they could do this prior to the Lancer One program.

POLICY CONSIDERATIONS

As you contemplate infrastructure, it is important to consider the impact of existing policies on current and envisioned future plans. The following is a list of often-encountered policies that may influence infrastructure in your organization.

- Acceptable/Responsible Use Policies
- Policies for security and data privacy that address, and go beyond:
 - Family Educational Rights and Privacy Act (FERPA)
 - Children’s Internet Protection Act (CIPA)
 - Children’s Online Privacy Protection Act (COPPA)
- Policies for technology use out of school, including technical support
- Harassment, intimidation and bullying policies
- Social media policies
- Policies for electronic communication between students, staff and parents

ACTION STEPS AND RECOMMENDATIONS

As you explore and review the technology infrastructure in your organization, working group members have provided the following recommendations to guide your action planning..

- Develop a comprehensive, integrated plan for infrastructure driven by the learning, teaching, professional learning, assessment, accountability, leadership and community needs and desires of your school/system.
- Specific aspects of the infrastructure plan, especially connections and tech support, should be monitored frequently (at least bi-weekly), while others can be monitored less frequently.
- Invest in and provide substantial professional learning to all users, especially tech support staff, prior to implementating any device, learning application, administrative application or other technology.



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APPENDIX I: ANNOTATED RESOURCE MATRIX

RESOURCE & DESCRIPTION	LEARNING	TEACHING & PROF LEARNING	ASSESSMENT & ACCOUNTABILITY	LEADERSHIP & CULTURE	INFRASTRUCTURE
<p>Accountability for College and Career Readiness: Developing a new paradigm</p> <p>https://edpolicy.stanford.edu/sites/default/files/publications/accountability-college-and-career-readiness-developing-new-paradigm.pdf</p> <p>Advocacy piece and report laying out several conditions and principles for accountability. Includes several state examples.</p>	●	●	●	●	●
<p>Accountability for Educational Results</p> <p>http://www.edtrust.org/sites/edtrust.org/files/Accountability%20for%20Educational%20Results_0.pdf</p> <p>A short report with an outline of some useful principles for assessment systems from The Education Trust.</p>			●		
<p>Advancing High-Quality Professional Learning through Collective Bargaining and State Policy</p> <p>http://learningforward.org/docs/pdf/advancinghighqualityprofessionallearning.pdf</p> <p>The National Staff Development Council's 2010 review of, and recommendations for, professional learning to support student learning.</p>		●		●	

RESOURCE & DESCRIPTION



Aspen Institute Report: Learner at the Center of a Networked World

<http://csreports.aspeninstitute.org/Task-Force-on-Learning-and-the-Internet/2014/report/details/0054/Task-Force-Download-PDF>

A cross-sector, cross-partisan report of the Aspen Institute Task Force on Learning and the Internet that highlights twenty-six actions for optimizing learning and innovation within a trusted environment.



CCSSO Roadmap for Competency-based Systems

<http://www.nxgentechroadmap.com/>

Resources and guidance for competency-based education.



CCSSO Roadmap for Next Generation State Accountability Systems

http://www.ccsso.org/Documents/2011/Roadmap_for_Next-Generation_Accountability_2011.pdf

Comprehensive look at what might be needed for accountability systems with numerous examples from states.



Data Quality Campaign

<http://dataqualitycampaign.org/your-states-progress/by-state/overview/>

State-by-state analysis of data policies specific to ensure effective use of student data.



Department of Education, Office of Educational Technology Resources for Teachers

<http://tech.ed.gov/teachers/>

Best practices for innovative technology integration to support teaching and learning.



RESOURCE & DESCRIPTION



Deeper Learning

<http://www.hewlett.org/programs/education/deeper-learning>

The William and Flora Hewlett Foundation's effort to work with states and districts to improve learning and promote best practices specific to using knowledge and skills in a way that prepares students for real life.



Florida Technology Integration Matrix

<http://fcit.usf.edu/matrix/>

A framework for defining and evaluating technology integration.



Genuine Progress, Greater Challenges: A decade of teacher effectiveness reforms

http://bellwethereducation.org/sites/default/files/JOYCE_Teacher%20Effectiveness_web.pdf

Examines teacher evaluation reforms, their accomplishments and limitations, and examples from a variety of states.



Getting it Right: Crafting federal accountability for higher student performance and a stronger America

http://www.edtrust.org/sites/edtrust.org/files/publications/files/Getting_It_Right.pdf

Overview of what NCLB got right and wrong and how to create a more effective federal role in accountability, with applications to states.



RESOURCE & DESCRIPTION



The Guide to Implementing Digital Learning (GIDL)

<http://digitallearning.setda.org>

The Guide to Implementing Digital Learning (GIDL) is a free web-based resource to support school and district leaders as they work to ensure that investments in digital learning spark positive results. GIDL includes six topic areas: planning, professional learning, content and software, broadband, devices and tech support. Each topic's section includes background information, key considerations for implementation, resources and exemplars of digital learning in action. Hosted by State Educational Technology Directors Association.



International Association for K-12 Online Learning (iNACOL) New Learning Models Vision

<http://www.inacol.org/cms/wp-content/uploads/2013/11/iNACOL-New-Learning-Models-Vision-October-2013.pdf>

New models for blended and online learning that emphasize personalized, engaging learning experiences.



International Society for Technology in Education (ISTE) Lead and Transform Diagnostic Tool

<https://www.iste.org/standards/lead-transform-movement/diagnostic-tool>

Diagnostic tool that produces a snapshot of your school or district's alignment to the 14 Essential Conditions for learning and teaching with technology.



Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards and Learning Progressions for Teachers

http://www.ccsso.org/Documents/2013/2013_INTASC_Learning_Progressions_for_Teachers.pdf

A set of resources, supported by the Council of Chief State School Officers (CCSSO), that define and support ongoing teacher effectiveness to ensure students reach college and career ready standards.



RESOURCE & DESCRIPTION



Knowledge Works Foundation: K-12 Teaching Scenarios

<http://www.knowledgeworks.org/forecasting-future-k-12-teaching-four-scenarios-decade-disruption>

Examines how disruptive changes shaping education might effect teaching over the next 10 years.



Leading Education by Advancing Digital (LEAD) Commission Report: Having a Path Forward for Digital Learning in the United States

http://leadcommission.org/sites/default/files/LEADComm_PavingPath_Report_091013a_highres%281%29.pdf

Explores the questions, "Why is the adoption of technology in education happening so slowly in the U.S.?" and more importantly, "What can we as a country do about it?"



Learning Forward Standards for Professional Learning

<http://learningforward.org/standards-for-professional-learning#.VDgOevldXqM>

Characteristics of professional learning that leads to effective teaching practices, supportive leadership, and improved student results.



Oregon's Ed Tech ProProfessional Learning Community

<http://teach.oetc.org/>

Best practices for innovative technology integration to support teaching and learning.



Performance Assessments: How state policy can advance assessments for 21st century learning

http://www.nasbe.org/wp-content/uploads/Parsi-LDH-Performance-Assessment_Jan2015.pdf

Detailed look at how and why states should include performance assessments in their assessment systems.



RESOURCE & DESCRIPTION



Project 24

<http://all4ed.org/issues/project-24/>

A call to action for systemic planning around the effective use of technology and digital learning to achieve the goal of college and career readiness for all students.



Safety & Security Policy Examples from SETDA

<http://digitallearning.setda.org/broadband/#!/policies>

Summaries of, and links to additional resources, regarding acceptable use and federal policies on student data privacy.



State Educational Technology Directors Association (SETDA) Resources

<http://www.setda.org/priorities/>

A host of relevant resources, including equity of access (broadband), digital content, online assessment, interoperability, and digital learning.



Substitution Augmentation Modification Redefinition Model (SAMR)

<https://sites.google.com/a/msad60.org/technology-is-learning/samr-model>

Technology integration model that defines increasing levels of technology use.



Technological Pedagogical Content Knowledge Model (TPACK)

<http://www.tpack.org/>

A framework that represents the knowledge teachers need to effectively integrate technology in their classrooms.



RESOURCE & DESCRIPTION



Texas School Technology and Readiness (STAR) Chart

<http://www.tea.state.tx.us/starchart/>

A tool for determining progress toward the state's long-range plan for technology recommendations.



U.S. Department of Education National Educational Technology Plan (NETP)

<http://tech.ed.gov/netp/>

The NETP presents a model of learning powered by technology, with goals and recommendations in five essential areas: learning, assessment, teaching, infrastructure, and productiity.





APPENDIX II: WORKING GROUP MEMBERSHIP

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While each of the working group participants offered valuable input and insights, the opinions and recommendations found in this report are the result of extensive deliberations and should not be taken to represent the views of any of these individuals nor of the organizations at which they work.