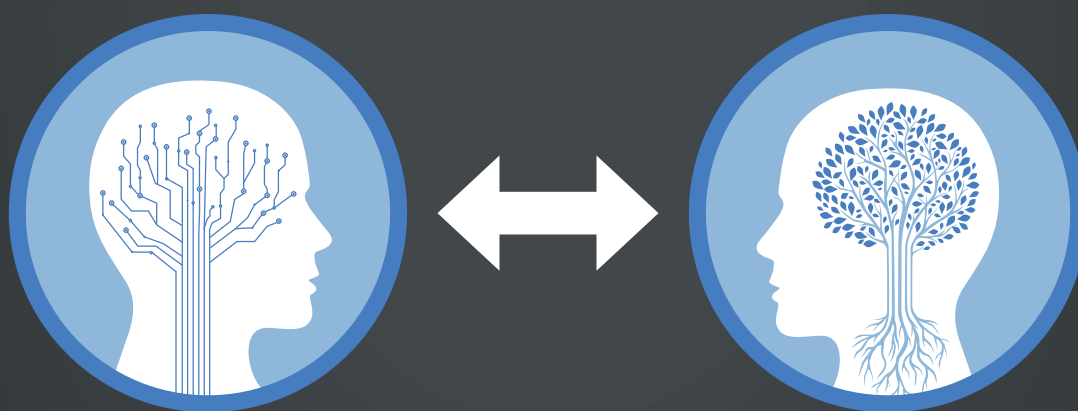


# How Digital Learning Contributes to Deeper Learning

by Tom VanderArk & Carri Schneider





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## Executive Summary

We believe that over the next five years there is an opportunity to significantly improve the preparation of American students. The implementation of college- and career-ready standards, the shift to next-generation assessments, the rise of blended learning and the prevalence of affordable devices has laid the foundation for a national shift to personal digital learning.

These shifts have the potential to engage young people as scientists, writers, producers, inventors, collaborators and problem solvers in ways that provoke deeper learning. The William and Flora Hewlett Foundation suggests that deeper learning prepares students to master core academic content, think critically and solve complex problems, work collaboratively, communicate effectively and learn how to learn.<sup>1</sup>

We agree with the Hewlett Foundation's assertion that all students must have access to educational opportunities that foster deeper learning in order to be successful in college and their careers. Creating these opportunities for every student in every classroom can be achieved by using personal digital learning tools that customize the educational experience and serve the individual needs of each student on his/her own unique learning path.

This paper identifies three primary ways that digital learning promotes deeper learning:

- **Personalized skill building** in preparation for deeper learning (e.g., adaptive learning in the Learning Lab at Rocketship Elementary);
- **Schools and tools** that foster deeper learning (e.g., project-based learning networks like New Tech); and
- **Extended access** (e.g., access to quality courses and teachers online).

To meet these deeper learning objectives, there are 10 recommended next steps for state, district, network and philanthropic leaders:

1. **Write the Common Core:** encourage more writing and explicit writing instruction
2. **Do science:** model instruction to match next-generation science standards
3. **Good tests:** support quality PARCC and Smarter Balanced tests and sound implementation
4. **Coherent state policy:** build upon frameworks such as Digital Learning Now! 10 elements for high-quality digital learning
5. **Intellectual mission:** support statewide authorization of deeper learning networks
6. **Extended reach:** support school models that use technology to leverage great teaching
7. **Deep, not shallow, blends:** provide incentives for school models that promote deeper learning
8. **Deeper learning platforms:** sponsor the development and adoption of platforms that promote deeper learning
9. **Leadership development:** support individual and cohort learning experiences for leaders
10. **Convene:** collaborate in person and online to share resources and form networks

Great teachers and innovative schools are finding ways to foster deeper learning for their students. However, without the necessary technology, it will not be possible to bring these opportunities to scale. The adoption of college- and career-ready standards—and the coordination of next-generation assessments—create an unprecedented national opportunity to advance readiness that can be realized by linking digital learning and deeper learning.

## What is Deeper Learning?

In describing its commitment to Deeper Learning, The Hewlett Foundation “envisions a new generation of U.S. schools and community colleges designed to give all students—especially those from underserved communities—the knowledge and abilities necessary to succeed in this new environment. These schools would harness the deeper learning skills of critical thinking, problem solving, effective communication, collaboration, and learning how to learn to help students develop a strong foundation in traditional academic subject.”<sup>2</sup>

The adoption of internationally benchmarked college- and career-ready standards in literacy and numeracy ([Common Core](#) or equivalent) and the move to online next-generation assessments are two key indicators that a national movement is building. This movement is fueled by a growing consensus that students graduating into our increasingly global, technology-rich knowledge economy will need an expanded skill set to succeed.

According to the [Organisation for Economic Cooperation and Development’s \(OECD\) 2012 Indicators](#), the United States ranks ninth in the world in post-secondary enrollment but last among industrialized nations in college completion rates.<sup>3</sup> American students are clearly not graduating from high school with the skills and experiences they need to be successful in college. At a minimum, college readiness is the ability to pass a college placement exam and begin earning credits. But real college and career preparation implies more. “We think of it as readiness across multiple dimensions, with an alignment of student skills, interests, aspirations and their post-secondary objectives,” said David Conley, CEO of the Educational Policy Improvement Center ([EPIC](#)) and a professor at the University of Oregon. Conley, author of [College Knowledge](#) and [College and Career Ready](#), outlines readiness in [four categories](#):<sup>4</sup>

- **Think:** Key cognitive strategies include problem solving, conducting research, interpreting results and constructing quality work products;
- **Know:** Key content knowledge includes the structure of knowledge in core subjects, the value of career-related knowledge and the willingness to expend effort to acquire knowledge;
- **Act:** Key learning skills and techniques include ownership of learning and learning techniques such as time management, note taking, memorizing, strategic reading and collaborative learning; and
- **Go:** Key transition knowledge and skills include post-secondary aspirations and norms, awareness of post-secondary costs and aid opportunities, knowledge of eligibility and admissions criteria, career awareness, role and identity, and self-advocacy.

Portions of the first two—think and know—are incorporated into the Common Core State Standards (CCSS), but this list is clearly a broader set of expectations. Science, history and civics are added as areas of “key content knowledge” to the CCSS. The “Act” category implies informed and skilled student agency. The “Go” category is specific to navigating the post-secondary landscape and making informed decisions. Conley’s list of desired outcomes recognizes the importance of a different set of experiences than is common in American secondary schools.

The National Research Council (NRC) recently released a study, [Education for Life and Work: Developing Transferable Knowledge and Skills](#)

[in the 21st Century](#), which outlines three broad domains of competence:<sup>5</sup>

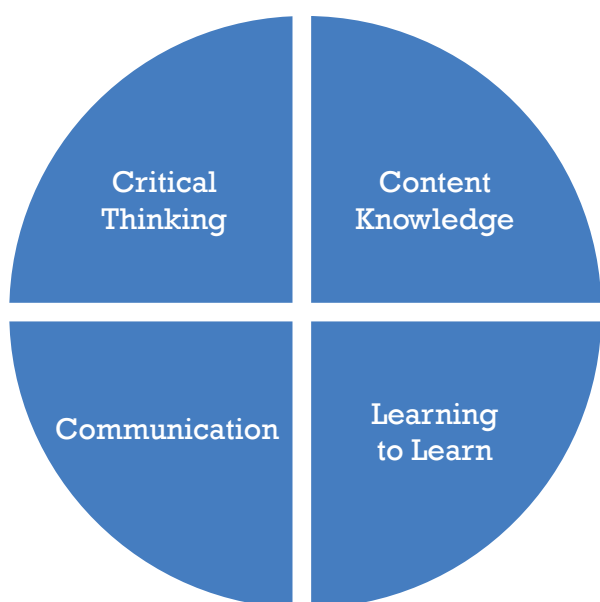
- Cognitive domain, which includes thinking, reasoning and related skills;
- Intrapersonal domain, which involves self-management, including the ability to regulate one’s behavior and emotions to reach goals; and
- Interpersonal domain, which involves expressing information to others, as well as interpreting information from others.

The NRC study largely echoes the “Think, Know, Act” competencies and adds some interpersonal skills as well. As an alternative to an academically thin “Trivial Pursuit” curriculum, the paper describes deeper learning as “the process through which a person becomes capable of taking what was learned in one situation and applying it to new situations—in other words, learning for ‘transfer.’” While that definition shifts from “21st century skills” to broader “21st century competencies” including skills, knowledge and expertise, the definition seems a bit narrow.

The Hewlett Foundation suggests that [deeper learning prepares students](#) to master core academic content, think critically and solve complex problems, work collaboratively, communicate effectively and learn how to learn (e.g., self-directed learning).<sup>6</sup>

A 2011 EPIC analysis found that the CCSS “describe content expectations, particularly in mathematics, and contain implied performance expectations, particularly in English/Language

### Deeper Learning Components from the Hewlett Foundation



Arts,” noting that the deeper learning skills (DLS) are “informative of the teaching methods and learning strategies that could be used to ensure students retain each of the CCSS.”<sup>7</sup> In other words, knitting DLS to CCSS provides insight into “ways in which the DLS can support and enhance learning and retention of the CCSS by a wide range of students.” Overall, the findings indicated that the CCSS provide a strong foundation for deeper learning environments, since “[DLS] were consistently identified as being essential contributors to student mastery of the CCSS.”<sup>8</sup>

The adoption of Common Core or equivalent standards is a step in the right direction—they represent a subset of broader objectives that will prepare young people “to succeed in a world that is changing at an unprecedented pace,” as the Hewlett Foundation suggests.<sup>9</sup> In order to meet college- and career-readiness expectations, schools must commit to dramatic shifts in the nature of teaching and learning that incorporate new methods for customizing the educational experience of all students. While CCSS or equivalent standards and next-generation assessments demonstrate an increasing national commitment to the future of schooling, new standards and new assessments alone won’t get us there. With these complementary elements on the horizon, schools have the unprecedented opportunity to redesign instruction to match the expectations of internationally benchmarked standards and to couple these new instruction methods with assessments that can measure the deeper learning skills represented by the new standards. New school models, which leverage technology to extend the reach of effective educators and extend learning time, will be necessary to achieve this evolution at scale.

The shifts—from print to digital materials, seat-time measures to demonstrated competency, and age-based cohorts to individually paced progress—will redesign learning for students. Shifts from a reliance on annual evaluations to instant feedback, and from individual teaching roles to shared and distributed teaching, will redesign teaching for educators. Traditional boundaries of teaching and learning will continue to stretch and break as increasingly mobile, untethered environments facilitate the shift from a place-based to a service-based education system.

The [Alliance for Excellent Education](#) (AEE) describes this as a “culture shift” from a “teacher-centric culture to one that supports learner-centered instruction with an intense focus on the student, whether in face-to-face, blended or virtual environments.”<sup>10</sup>

The International Association for K-12 Online Learning ([iNACOL](#)) agrees that technology can deliver the personalization and customization of instruction and content that characterizes a competency-based learning system, because “[it] is inherently personalized as students progress upon their learning trajectory in a way that is unique to them” and adds that “deeper learning—the development and application of knowledge—requires real-world experiences or project-based learning.”<sup>11</sup> We agree that digital learning is necessary to create a system that contributes to deeper learning and produces a new generation of students equipped to thrive in college and their careers. However, converting today’s current system into a fully individualized, competency-based model will be nearly impossible without technology. Technology-enabled instruction must be the linchpin of this evolution, and not just casually layered on top of an outdated, industrial-era system.

**The November 2012 AEE report, *The Nation’s Schools Are Stepping Up to Higher Standards*, identifies four key challenges that school district leaders must systematically address in the next two years:**

- [1] Graduating all students college and career ready;
- [2] Managing shrinking budgets;
- [3] Training and supporting teachers; and
- [4] Addressing the growing technology needs of society and individual students.

**The authors contend that by using effective strategies that link and improve the “three Ts”—teaching, technology and use of time—leaders will help build a strong foundation for the next generation of teaching and learning represented by the shift to CCSS and the new assessments.<sup>12</sup>**



## What Experiences Promote Deeper Learning?

The NRC suggests that pedagogy is a key element of deeper learning:

Emerging evidence indicates that cognitive, intrapersonal, and interpersonal competencies can be taught and learned in ways that support transfer. Teaching that emphasizes not only content knowledge, but also how, when, and why to apply this knowledge is essential to transfer.<sup>13</sup>

Specifically, the NRC suggests the following strategies to facilitate deeper learning:

- Use multiple and varied representations of concepts and tasks;
- Encourage elaboration, questioning and explanation;
- Engage learners in challenging tasks;
- Teach with examples and cases;
- Prime student motivation; and
- Use formative assessments.

Technology (technological literacy, digital citizenship, etc.) is mentioned within the report in the context of competencies, but there is not a full discussion of how technology can facilitate deeper learning opportunities. A couple of studies are cited that start to make this point. For example, “In structured after-school settings, as in the

“[Time for Deeper Learning](#)” from the AEE provides evidence that deeper learning works, citing evidence from international studies and assessments such as those conducted by the OECD.<sup>14</sup> AEE notes that the best example is the Programme for International Student Assessment (PISA)—a test given every three years in 70 countries that measures fifteen year olds’ knowledge and their ability to apply that knowledge to real-world situations to determine their overall preparation to be successful adults. PISA provides evidence that deeper learning works, because the nations that consistently perform the highest on the assessments are those in which students have the most opportunities to practice skills, such as the inquiry-based learning environments in China. The U.S. ranked 17th on the most recent PISA assessments.<sup>15</sup>

in-school environment, a few examples illustrate the potential of technology- and game-based approaches to develop transferable knowledge and skills.” We think this is both a shortcoming of the study and a lack of research in an emerging area of practice.

The concluding NRC recommendations suggest, “The states and the federal government should establish policies and programs—in the areas of assessment, accountability, curriculum and materials, and teacher education—to support students’ acquisition of transferable competencies.” We would go a step further and suggest that states and districts should support plans for expanded student access to technology and the adoption of blended learning school models. We don’t think it would be practical to advance the paper’s recommendations without an accompanying digital learning agenda. There is a fair amount of evidence on how [digital learning is boosting achievement](#) and promoting deeper learning.<sup>16</sup> In fact, our position is that it’s not really possible to promote deeper learning at scale without a high-access environment that powers the instructional strategies outlined in the paper: social media tools for collaboration, supporting project-based learning, simulations, adaptive assessments, etc.

If we want to foster deeper learning, then it is important to determine what kinds of experiences are most likely to promote it. Current definitions of deeper learning imply that changes in instruction,

content and assessment will be necessary to facilitate more student engagement with lessons that stimulate collaboration, communication, investigation and critical thinking.

These are the types of experiences that we know work, and the types of experiences good teachers want to create; however they lack the time, energy and resources to do so. The best and brightest teachers may find ways to deepen learning in their individual classrooms, but there is no way to expand to scale in a way that can serve all students equally without technology. New strategies and forms of delivery—such as blended learning, competency-based learning, online and anywhere/anytime learning, customized learning and social learning—have the potential to produce the types of teaching and learning experiences that can contribute to deeper learning for every student, in every classroom.

The CCSS prioritize these deeper learning opportunities with the intent of creating more rigorous and engaging lessons that allow increased critical thinking and knowledge application. The widespread implementation of the CCSS reveals a better match between content, instruction and deeper learning than in the past. The shift to next-generation assessments, slated to launch at the start of the 2014-15 school year from the PARCC and Smarter Balanced consortia, provides additional evidence of the movement toward teaching and measuring deeper learning skills.

## Exhibit [ New Student Roles ]

Across the country, students are taking on roles that are pushing the traditional boundaries of learning. Through these opportunities, students can connect to their future with authentic and meaningful learning.

In these settings, students are...

**Journalists:** Every student should have the opportunity to publish high-quality products on a deadline the way they do in Esther Wojcicki's Palo Alto High School journalism program;

**Producers:** At [High Tech High's](#) 9th grade film festival, students compare/contrast cities now and 400 years ago;

**Scientists:** Chris Dede's team at Harvard created [EcoMUVE](#)—an augmented-reality science field trip;

**Historians:** Students should have project-based learning opportunities to become history experts like [12-year-old Civil War expert Andrew Druart](#);

**Inventors:** Students should be engineers, designers and inventors in a [FIRST Robotics](#) competition;

**Entrepreneurs:** Students should learn the basics of starting a business like they do in [Network For Teaching Entrepreneurship \(NFTE\)](#);

**Problem-solvers:** Students should learn to take on complex challenges, work with a client and produce high-quality work products the way they do at [NYC iSchool](#);

**Project-managers:** Students at [Avalon Charter School](#), [Minnesota New Country School](#) and the [New Tech Network](#) of schools conduct rigorous projects in authentic, project-based learning classrooms;

**Collaborators:** Teachers can encourage students to collaborate using tools like [Google Drive](#), [Conceptboard](#), [Animoto](#), [Edmodo](#) and [TitanPad](#);

**Debaters:** Students should be given opportunities to practice discourse as exhibited on [StudySync](#) and gain practice as in the [Boston Debate League](#);

**Apprentices:** Students should have the chance to learn by doing something they love the way [Big Picture](#) students do;


**Gamers:** Students should develop games like they do in [Globaloria](#) and [E-Line](#) and at New York City's [Quest to Learn](#) secondary school;

**Makers:** [Every school should be a maker faire](#) with a focus on producing and sharing high-quality products;

**Coders:** Students should learn to write code in high school, like they do at [CodeHS](#), [hackathons](#) and [Girls Who Code](#); and

**Learning coaches/peer tutoring:** At [Acton Academy](#), using a school model that employs many elements of Montessori education, students work across traditional grade-level bands to engage with peers and classmates as a natural part of their learning environment.



 **Watch the Video**  
Project-Based Learning at  
High-Tech High

*Video available publicly on YouTube*

## How Does Digital Learning Contribute to Deeper Learning?

According to the Alliance for Excellent Education:

Digital learning is any instructional practice that effectively uses technology to strengthen a student’s learning experience. Digital learning encompasses a wide spectrum of tools and practices, including, among others, online and formative assessment; an increase in the focus and quality of teaching resources and time; online content and courses; applications of technology in the classroom and school building; adaptive software for students with special needs; learning platforms; participation in professional communities of practice; and access to high-level and challenging content and instruction. In particular, blended learning occurs any time a student learns, at least in part, at a supervised brick-and-mortar location away from home and, at least in part, through online delivery with some element of student control over time, place, path, and/or pace.<sup>17</sup>

Digital learning enables new strategies and formats, such as online and blended learning and competency-based learning, which have the potential to contribute to deeper learning. Providing every student with the opportunities for deeper learning is not possible without a technology-enabled network of tools and strategies to customize and extend learning. Technology helps teachers do more by creating

new learning environments that leverage teacher talent and allow students to go deeper. It generates more personalization for students, and thus more motivation and persistence. [“Educators, Technology and 21st Century Skills: Dispelling Five Myths”](#) was based on a survey of more than 1,000 K-12 educators and school administrators in the United States. It found evidence that supports the connection between technology and deeper learning. Specifically, the authors concluded that:

Frequent technology users place considerably more emphasis on developing students’ 21st century skills—specifically, skills in accountability, collaboration, communication, creativity, critical thinking, ethics, global awareness, innovation, leadership, problem solving, productivity and self-direction. Frequent users also have more positive perceptions about technology’s effects on student learning of these skills—and on student behaviors associated with these skills.<sup>18</sup>

Digital learning promotes deeper learning in three main ways: personalized skill building in preparation for deeper learning; schools and tools that foster deeper learning; and extended access and expanded options (see Exhibit on page 12). These three elements represent complementary theories of change, important lines of evidence and research, and three distinct rationales for investment.

## Exhibit [ 9 Ways Digital Learning Promotes Deeper Learning ]



## Personalized Skill Building

The [Rocketship Education](#) school model provides a powerful example of reimagining education in a way that creates space for new teacher and student roles. After winning the [McNulty Prize](#) in 2010, [Rocketship Education CEO John Danner explained](#), “Learning Lab uses tutors and technology to go deep on each child’s individual needs and is the primary driver of basic skills mastery at Rocketship. This frees up teachers’ classroom time to do project-based learning, and teaching critical thinking skills that are so essential for college and the workplace.”<sup>19</sup> Rocketship employs tools like [Dreambox](#), [ST Math](#) and [i-Ready](#) in the Learning Lab to personalize K-5 math instruction. Reed Hastings, a Rocketship board member and Netflix CEO, echoes Danner’s

strategy and believes we will soon “rely on technology to teach the corpus of knowledge—the stuff with right and wrong answers.” For younger students, Hastings says, “this will often include games... [and] will always include constant feedback. New learning technology will free up teachers to teach humanity including the ability to create and collaborate.” The Rocketship model has improved student achievement because of its deliberate integration of skills practice and project-based learning. Deeper learning occurs when students are able to merge their Learning Lab skills with opportunities to practice them in the context of meaningful projects that foster critical thinking, problem solving, collaboration and other deeper learning skills.



### Watch the Video

Rocketship Education  
Learning Lab

*Video available publicly on YouTube*



Constant feedback and improved methods of tracking and reporting student achievement of deeper learning skills are important elements of an overall shift to more personalized learning. Students are motivated by content that matches their interests, and are more likely to keep moving through content that pushes them “just enough” according to their abilities. Tools that employ adaptive technology allow this type of content customization for every student. A recent report from Digital Learning Now! (DLN), [Data Backpacks: Portable Records & Learner Profiles](#), expands on the potential of technology to produce new and varied types of data that will together form a comprehensive, portable student record so that every student will have access to personalized learning from day one and through every transition from pre-K through college and career. As data collection becomes easier, we’ll be able to build deeper learning dashboards that give some indication of the quality of the experiences that most American students engage in. Looking forward, it will soon be possible to send every student home with customized playlists of learning experiences that target their learning level, tap their interests and are in a modality likely to encourage persistence and performance. These targeted experiences will prepare them for more science fairs, team-based projects, and work- and community-based learning experiences.

### **Tools that Power Personalized Learning**

Reaching higher standards and promoting deeper learning require a sophisticated level of personalization that may be possible without technology, but not without dedicating lots of individual attention to each student. The tools highlighted here enable personalized learning pathways at scale.

Adaptive learning	<p><a href="#">Dreambox</a> is adaptive game-based math for grades K-5</p> <p><a href="#">i-Ready</a> from Curriculum Associates is adaptive assessment and instruction in reading and math for grades K-6</p> <p>With NWEA assessments, <a href="#">Compass Learning</a> provides adaptive learning for K-12</p>
Blended platforms	<p>Platforms that serve up multiple sources of content with single sign-on and unified reporting include <a href="#">Education Elements</a>, <a href="#">Agilix</a> and <a href="#">Desire2Learn</a></p>
Math games	<p>Games like Mangahigh and MotionMath build automaticity and understanding</p>



## Schools and Tools that Foster Deeper Learning

Schools that promote deeper learning share a common intellectual mission, high expectations for all students, and a coherent curriculum that is supported by an aligned structure, schedule and support system. As the Big Picture network says, schools that promote deeper learning combine “rigor, relevance and relationships” in a small, personalized environment. When schools employ smart technology, more (and better) information about student ability is collected and measured. These tools provide teachers with access to student data that can inform instruction in real time. What’s more, these tools can capture student information related to what the NRC report refers to as the “intrapersonal domain.” The results of the recently released NAEP writing assessment prove that the move from paper and pencil tests to online writing assessments can generate useful information about student behavior during testing that can guide instruction—including document revision history, use of tools like spell check and the dictionary/thesaurus, the amount of time students spent reading and re-reading the prompts, etc.<sup>20</sup>

### **Schools that Foster Deeper Learning**

Deeper learning schools are performance based: they expect students to show what they know. [Hewlett’s Deeper Learning Network](#) consists of 10 school networks that include more than 400 schools serving urban, suburban and rural students across 36 states. Exemplars, including the Hewlett Foundation’s deeper learning grantees featured below, have roots in the Coalition of Essential Schools, which made common the practice of progress based on demonstrated mastery. Deeper learning schools value student

work—they exhibit it and talk about it, and they help students internalize rubrics of quality. They embrace priorities that give students the time to go deep—often including big blocks of time and secondary teachers with smaller loads.

Envision Schools	San Francisco-based network of four high schools
Edvisions Schools	Network of 100 individualized project-based schools
Big Picture Learning	Network of more than 100 individualized schools featuring internships
High Tech High	Network of 10 San Diego K-12 project-based schools
New Tech Network	Project-based learning network supported by the Echo platform
<ol style="list-style-type: none"> <li>1. Alief Early College High School</li> <li>2. Bronx International High School</li> <li>3. The Dayton Early College Academy</li> <li>4. MetWest</li> <li>5. NYC iSchool</li> <li>6. Noble High School</li> </ol>	<p>These six schools were the focus on a recent report by Jobs for the Future (JFF). The JFF <a href="#">“Students at the Center”</a> schools represent six exemplars of student-centered teaching and learning.</p>

**Hewlett Deeper Learning Network:**

**Asia Society**

[www.asiasociety.org](http://www.asiasociety.org)

**Big Picture Learning**

[www.bigpicture.org](http://www.bigpicture.org)

**ConnectEd California**

[www.connectedcalifornia.org](http://www.connectedcalifornia.org)

**EdVisions Schools**

[www.edvisions.com](http://www.edvisions.com)

**Envision Schools**

[www.envisionschools.org](http://www.envisionschools.org)

**Expeditionary Learning**

[www.elschools.org](http://www.elschools.org)

**High Tech High**

[www.hightechhigh.org](http://www.hightechhigh.org)

**Internationals Network for Public Schools**

[www.internationalsnps.org](http://www.internationalsnps.org)

**New Tech Network**

[www.newtechnetwork.org](http://www.newtechnetwork.org)

**New Visions for Public Schools**

[www.newvisions.org](http://www.newvisions.org)

### **Tools that Foster Critical Thinking**

The explosion of mobile learning apps and game-based learning has greatly expanded the possibilities for regular student application of critical thinking and problem solving skills. Coupled with more affordable devices and funding strategies that can boost student access to technology, we are just beginning to see the potential of games and simulations to push deeper learning. Here are a few examples of these tech tools that can foster critical thinking.

Visual Math Games	ST Math from <a href="#">MIND Research Institute</a> is a game-based visual approach to math that promotes conceptual understanding.
Simulations	<a href="#">Phet</a> science simulations and game-based history course Conspiracy Code from <a href="#">Florida Virtual School</a> (FLVS) engage students in simulations.
Programming	<a href="#">Globaloria</a> and <a href="#">Gamestar Mechanic</a> encourage kids to code.
Projects	<a href="#">Edvisions</a> schools use <a href="#">ProjectFoundry</a> to build projects and track competencies.
Mobile Apps	Apps like <a href="#">ShowMe</a> , <a href="#">NearPod</a> and <a href="#">ConceptBoard</a> boost the personalization potential of mobile learning by allowing students to collaborate seamlessly with peers and teachers for ongoing feedback.

### **Schools that Foster Communication**

Central to deeper learning is encouraging more writing. Students in Jeff Pence’s seventh grade class at Dean Rusk Middle School in Canton, Georgia use [online scoring](#) to get feedback on drafts of the 28 essays they write during the year. Georgia high school teacher John Hardison uses the [Dragon Dictation](#) App to help students get started with writing assignments. Susan Lucille Davis teaches middle school in Houston and [uses social media strategies](#)—blogs, Twitter, texts, email, photo captions and storyboards—to get her students writing. Ohio special education students became [digital storytellers](#) and published a children’s e-book example. Communication tools that foster deeper learning are featured below.

Collaboration	Social learning platforms like <a href="#">Edmodo</a> facilitate dynamic groups and team communication.
Auto essay scoring	Products like <a href="#">WriteToLearn</a> , <a href="#">Writing Roadmap</a> and <a href="#">Criterion</a> allow teachers to assign more writing, and students receive more structured feedback.
Publishing	Blogging platforms, portfolio tools and video publishing resources like <a href="#">SchoolTube</a> and <a href="#">Animoto</a> allow students to produce and share in new ways.



## Enhanced Access

In addition to personalized skill building, tools and schools that promote deeper learning, a third set of emerging benefits of technology is the freedom to learn anything; anywhere, anytime. Improved access to quality content and great teachers is making a difference.

As states, districts and schools improve student access to the internet with broadband and devices, students gain 24/7 access to learning resources. A few states will follow Maine's lead and provide access devices, but most will advance mixed models as outlined in ["Funding the Shift to Digital Learning"](#) including state and district contributions, a user fee and encouragement to bring your own device (BYOD).<sup>22</sup>

Digital learning is redefining the calcified school choice debate by powering virtual options. FLVS is a picture of the future: lots of options with rolling enrollment and reimbursement that is partially based on successful completion. Traditional districts are expanding full- and part-time online learning options, and there's no reason not to offer every Advance Placement course, dual-enrollment opportunities and foreign language option to every student. States including Florida, Louisiana and Utah have provided choice down to the individual course level.

Online learning has been around for 15 years, but it's been characterized by flat and sequential content that offers little more than textbooks



### Watch the Video

Conspiracy Code from  
Florida Virtual School (FLVS)

Video available on FLVS website  
and used with permission from FLVS



**CONSPIRACY  
CODE**



moved online with multiple choice unit quizzes. This flat form of online learning may have allowed learners to vary rate, time and location, but too often it was a one-way slog through boring content. That is beginning to change as content improves, as evidenced by game-based, research-backed courses like FLVS' celebrated history course Conspiracy Code.<sup>23</sup>

[A study by the National Survey of Student Engagement](#) reported that online-learning experiences yield a deeper use of “higher-order thinking, integrative learning, and reflective learning.”<sup>24</sup> [Curricular Opportunities in the Digital Age](#) explores how new technologies can be used to design curricula that can be readily adapted to individual differences and provide a foundation for student-centered, rather than curriculum-centered, approaches to teaching and learning—and these student-centered approaches to teaching are working. In their quest to discover common practices that are consistent among student-centered schools that have raised student achievement, Barbara Cervone and Kathleen Cushman found that, “Student-centered teachers support each student in developing a new relationship to learning—defined by ever more complex challenges, increasing autonomy, and expanding awareness of connections of one’s own work to the larger world.”<sup>25</sup>

The majority of U.S. students will soon learn in blended, student-centered environments that combine the best of online and onsite learning. Blended learning refers to shifting (for at least

a portion of the student day) to an online environment designed to improve learning and operating productivity. Blended learning is a team sport—new school models improve working conditions and career options by enabling new teachers to join a supportive team, personalizing teacher learning with just-in-time online resources and leveraging the experience of master teachers.

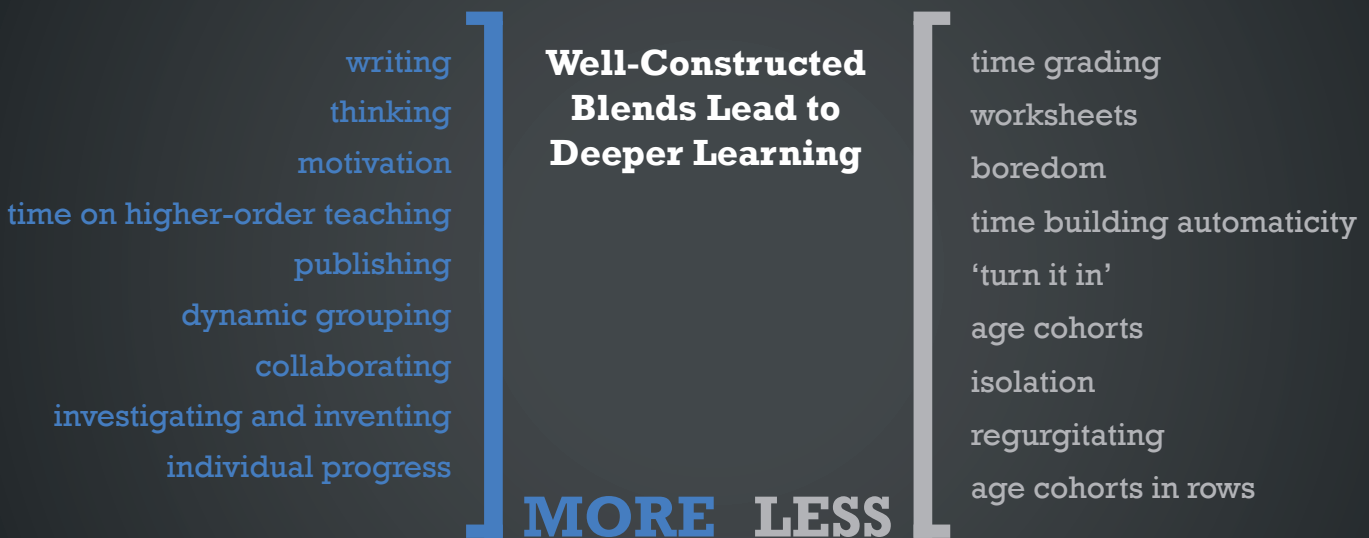
### **Enhanced Access, Expanded Options, & Extended Reach**

The [Opportunity Culture](#) website from [Public Impact](#) outlines 10 school models that leverage teacher talent with technology—they call them ‘extended reach’ strategies. Taken together, enhanced access, expanded options and extended reach create the ideal conditions for deeper learning to flourish.

Enhanced access	Providing students with full-time access to technology and learning resources narrows the digital divide and extends learning time.
Expanded options	States and districts are beginning to expand student access to advanced courses and effective teachers.
Extended reach	<a href="#">Opportunity Culture</a> outlines 10 school staffing strategies that leverage technology to extend the reach of effective teachers.

Blended environments will increasingly be competency based (used here synonymously with performance based), and students will show what they know and demonstrate mastery to progress to the next level. Like Khan Academy, schools will use knowledge maps to help students see what they need to learn, customized playlists to help students learn, and unit assessments and badges to show what they know.

With a clear path, an achievement recognition system and no time barriers, more students will accelerate their learning and graduate early or graduate from high school with one or two years of college credit. Students will be able to combine academic and vocational areas of interest in interesting ways. The adoption of common standards—when combined with personal digital learning—will create many new pathways to mastery.



## [ Conclusion ]

According to the Hewlett Foundation:

The benefits are clear at every level. Students need deeper learning to succeed in college and prepare for careers. The United States must cultivate its talent and raise its overall educational attainment in order to lead in the global economy. And the world needs these capabilities to solve critical problems through teamwork and international collaboration.<sup>26</sup>

A combination of complementary factors—the implementation of CCSS, the shift to next-generation assessments, the rise of blended learning, the prevalence of affordable devices and the growth of digital learning awareness—has laid the foundation for a national shift to personal digital learning.

Groups on the frontlines of education policy are charting various courses to approach this educational future, and we are excited to see the overlaps among these strategies. By analyzing the

connections among these various approaches, we can build a vision of the future of education that is informed by the best and brightest across all sectors of K-12, higher education and education policy.

The adoption of CCSS and shifts to next-generation online assessments create an unprecedented national opportunity to advance college and career readiness. We believe this can be accomplished by linking deeper learning and digital learning by employing technologies that can bring opportunities for deeper learning to scale.

These shifts mean that students will be researching, writing, problem solving and presenting. That means teachers will be thinking more about work product than test scores. These practices are common in some classrooms and some schools, but that begs the question of what combination of advocacy, organizing, capacity building and investment will result in deeper learning broadly, especially for low-income students.

## Next Steps

We recommend 10 strategies that offer state, district, network and philanthropic leaders some leverage in their efforts to encourage deeper learning.<sup>27</sup>

**[1] Writing the Core.** [CCSS](#) (and equivalent expectations) are a big step forward toward deeper learning, particularly the emphasis on text complexity and using evidence in writing. As the University of Virginia’s [Daniel Willingham says](#), “Explicit teaching of writing makes kids better writers.” Districts and schools should make writing a priority. As every student gains access to a connected production device, it becomes easier than ever for them to write across the curriculum, to benefit from structured feedback and to publish professional-quality products. The Alliance for Excellent Education’s [Writing To Read](#) report also shows that writing instruction improves reading achievement.<sup>28</sup>

**[2] Do science.** Beyond the Common Core, states should set graduation requirements that reflect college- and career-ready standards, including attention to boosting STEM-readiness. The NRC, the National Science Teachers Association, the American Association for the Advancement of Science and Achieve are currently working to develop [Next Generation Science Standards](#) based on the [Framework for K-12 Science Education](#). We recommend that states adopt these standards and harness the potential of new tools that make it easier to build and assess standards-based projects that incorporate researching, problem solving, writing and presenting. Project-based assessments can be augmented by simulation-based assessments, as demonstrated by [Cisco Networking Academies](#).

**[3] Good tests.** Some deeper learning advocates want to “get rid of standardized testing.” We appreciate the unintended consequences of poor measurement instruments, but can’t imagine how to build a system that better serves all students, particularly low-income youth, without measurement. Fortunately, the tests that the state consortia—[PARCC](#) and [Smarter Balanced](#)—are building will be a big advance, alongside a growing field of tools that can assess a broader range of competencies. We should help them launch the best tests possible in 2014-15 and then innovate from there a series of high-leverage opportunities that will influence classroom assessment for a decade. For that reason, the Hewlett Foundation is funding the Automated Student Assessment Prize—a series of prizes designed to demonstrate the potential of online assessment and accelerate innovation.

**[4] Coherent state policy.** State policy can promote deeper learning. [Digital Learning Now!](#) (DLN) includes a 10-point plan to expand quality options for all students. In particular, DLN recommends policies that promote competency-based learning where students progress as they show what they know. DLN also recommends funding that is weighted and that means more quality options for low-income students.

**[5] Intellectual mission.** Good schools sustain a common focus on an intellectual mission that includes clear academic priorities and productive [habits of mind](#). States should allow space to create innovative schools and models that can emanate from a deeper learning mission by authorizing and supporting statewide networks.



**[6] Extended reach.** [Opportunity Culture](#) identifies 10 ways to extend the reach of great teachers. New adaptive technologies can extend the reach of all teachers by targeting learning levels and building basic skills, which prepares students to engage in higher-order learning experiences and gives teachers time to focus on deeper learning. [Comprehensive learner profiles](#) will help teachers (and other providers) personalize learning, and expanded profiles will power a rich dashboard of progress indicators, rather than just basic skills.

**[7] Deep not shallow blends.** With the shift to digital learning, it's clear that some blended learning models promote thin learning—basic facts checked by multiple choice tests—and some promote deeper learning by encouraging students to take responsibility for their own learning, to make work and community connections, to produce quality work and to demonstrate their learning to a broader community. Supporting new blended school models that combine personalized learning and project-based learning (PBL) is a great way to promote deeper learning. Many of the applicants to [Next Generation Learning Challenges](#) are deeper learning models. Some school networks from the alternative tradition get the authentic, student-centered side of the equation, but could use help getting more systematic about math. Accelerated progress for over-aged, under-credited kids is great, but schools really need to avoid brain-dead credit recovery. The more risk factors a young person brings to school, the more schools should engage, connect and support.

**[8] Deeper learning platforms.** The most scalable way to promote deeper learning may be to support the development of next-generation platforms that make it much easier to develop customized skill building playlists and standards-based projects.<sup>29</sup> [New Tech's Echo](#), a PBL learning management system (LMS), is heading in the right direction. With the soon-to-be-released Buck Institute PBL app, social learning platform [Edmodo](#) will be even better at supporting deeper learning. By leveraging open resources, it will soon be possible to deliver deeper learning experiences and support for what we used to pay for old-fashioned textbooks, tests and professional development.

**[9] Leadership development.** Personalized learning is not just for students; new tools enable a [new approach to leadership development](#). Hybrid courses like [Udemy](#), individual learning plans like [Bloomboard](#) and a professional learning network on [Edmodo](#) would be a good start. It would be easy to customize tracks for advocacy leaders, school leaders and system heads. Add knowledge maps (based on job requirements), show-what-you-know opportunities and an achievement recognition system (e.g., badges), and you'll have a certificate program that's better and cheaper than any current master's program.

**[10] Convening.** It is getting easier to stay connected, and stakeholders should connect with peers across district and state lines to share successes and failures. Both physical and virtual collaboration can accelerate change by creating opportunities to share experiences and resources.

**A recent report from the Institute for Public Policy Research concludes:**

**“What is clear, though, is that education—deeper, broader and more universal—has a significant part to play in enabling humanity to succeed in the next half century. We need to ensure that students everywhere leave school ready to continue to learn and adapt, ready to take responsibility for their own future learning and careers, ready to innovate with and for others, and to live in turbulent, diverse cities. We need perhaps the first truly global generation; a generation of individuals rooted in their own cultures but open to the world and confident of their ability to shape it.”<sup>30</sup>**

## **Victory**

Deeper learning isn't a separate agenda from Common Core implementation or the shift to digital learning; it's the outcome of these things done well. We won't be able to declare victory for deeper learning five years from now. While the scoreboard is hard to invent, it's easy to spot when you visit a school. You can usually sense within the first minute if a place is about curiosity or compulsory activity, real challenges or contrivances.

As a nation, we are very early into the process of creating a next-generation education system that can promote deeper learning and college and career readiness at scale. We know that digital learning can contribute to deeper learning by increasing student success factors such as engagement, motivation and persistence. Digital learning affords more opportunities for personalized learning and extends student access to deeper learning. When technology is used as the conduit for customization, schools can evolve to serve students individually. Schools like Rocketship and Carpe Diem are proving that blended learning environments work both differently and better for students and teachers, as evidenced by significant gains in student achievement. However, simply layering technology on top of a broken system, without undertaking the broader work to create a personalized, student-centric system, will not contribute to deeper learning or improve college and career readiness.

New standards, new tools and new school models make it easier to engage all students in deeper learning—and it's never been more important.

## [ Authors Bios ]

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Tom is the author of *Getting Smart: How Digital Learning is Changing the World* and the Executive Editor of *GettingSmart.com*. He is also a Partner in Learn Capital, a venture capital firm that invests in learning content, platforms, and services with the goal of transforming educational engagement, access, and effectiveness. Previously he served as President of the X PRIZE Foundation and was the Executive Director of Education for the Bill and Melinda Gates Foundation. Tom was also the first business executive to serve as a public school superintendent in Washington State. Tom is a Director of the International Association for K-12 Online Learning (iNACOL) and several other nonprofits.

### **Carri Schneider** Director of Policy & Research, *Getting Smart*

Carri is the Director of Policy and Research at *Getting Smart*. With a background in both policy and practice, she has taught in classrooms from elementary schools to college campuses. Carri has served as an online educator since 2005 in a fully online master's program in Educational Leadership and has authored several pieces on the future of education. She co-edited the book *Building a 21st Century U.S. Education System* with Bob Wehling, published by NCTAF. Carri has been actively involved in supporting education policy efforts to advance digital and blended learning opportunities as a consultant to state and national organizations, including KnowledgeWorks. She holds an M.Ed. in Educational Administration and an Ed.D. in Urban Educational Leadership.

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