Preparing for the Common Core State Standards

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The Challenge and Promise of Common Core Assessments

In the world of K-12 education, the push toward compliance with Common Core State Standards (CCSS) assessments is just around the corner. So far, 46 states and the District of Columbia have adopted the CCSS and vowed to build assessments around them.[1] These standards — combined with the Framework for 21ST-Century Learning developed by the Partnership for 21ST-Century Skills[2] — will frame the conversation around educational outcomes for the foreseeable future. The upside of all this change: School districts in all of these states will be testing students on similar (if not the same) curriculum. The downside: Significant changes in assessments will need to occur between now and the 2014-2015 school year.

Many of these changes are already underway. In response to a recent Center for Digital Education (CDE) survey, 72 percent of 152 responding education technology professionals said their district's adoption plan was either in the works or in the early stages, and would be completed no later than the spring of 2014.

However, the biggest change will be the way in which assessments are delivered. States that comply with the CCSS are strongly encouraged to administer assessments online, and those states that are adopting their own standards have vowed to deliver assessments electronically as well. The guidelines stipulate that once online assessments are in place, all students in a grade must take the tests simultaneously — meaning school districts must provide and support the bandwidth infrastructure necessary to administer the exams. Bandwidth challenges won't be confined to local area networks (LANs); participating districts must ensure that wide area networks (WANs) are able to administer assessments as well. Once the bandwidth issue is resolved, network administrators likely will grapple with other challenges such as device access, network redundancy, resiliency and technical support.

In short, adherence to Common Core guidelines will force school districts across the nation to rethink the way they handle networking and computing in a number of mission-critical areas.

For more information about the Common Core State Standards, visit **www.corestandards.org.**

This CDE white paper will provide a roadmap for meeting some of those challenges, give more information about the significance of the CCSS, and help school districts identify issues and concerns these new requirements can create. It will spotlight solutions such as LAN and WAN support, backup services and others that can help online assessments run smoothly. Backed by data from the recent CDE research survey, the goal of this paper is to outline how the CCSS juggernaut provides school districts with a golden opportunity to reinvest in infrastructure, and offer suggestions for how to make it all happen.

A Closer Look at the Common Core

Taken as a whole, the CCSS is a common set of goals and objectives designed to unify key minimum requirements of what American students are learning in the K-12 environment. The state-led effort is being coordinated by the National Governors Association Center for Best Practices and the Council of Chief State School Officers. According to the Common Core State Standards Initiative, a nonprofit charged with spearheading the effort across the board, the formal mission is to "provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them."[3]

Standards in the K-12 environment are nothing new. An advisory panel under President George H.W. Bush recommended national standards and tests, but the idea collapsed in the aftermath of controversy over history content. President Bill Clinton proposed national tests in 4th-grade reading and 8th-grade mathematics, but Congress rejected the idea. Since then, states have crafted their own standards — often incorporating pieces of the voluntary national standards — but the results of the National Assessment of Educational Progress and state tests administered for the No Child Left Behind Act called the quality of many states' standards into question.[4]

The CCSS requires students to go into much more depth in order to prove comprehension. A look at some of the pilot programs indicates that the assessments will rely on simulations and multiple-choice questions to test higher-order thinking skills and problem-solving. They also will require students to engage in thoughtful analysis, build strong arguments based on evidence and submit written replies.

At first, the CCSS will apply only to English/language arts (ELA), reading and math; down the road the standards likely will expand to include science and other subjects. Currently, there are a number of consortia helping school districts develop assessments that comply with the CCSS; the two main organizations are the Smarter Balanced Assessment Consortium (SBAC) and the Partnership for Assessment of Readiness for College and Careers (PARCC). The main difference between the consortia is that the assessments created by SBAC will be adaptive, meaning the level of difficulty changes based on how well students are answering questions.[5] Another point worth noting: No one, including the federal government, is forcing compliance. For school districts, participation in the CCSS program is completely voluntary, and no funding is (directly) tied to compliance with the new set of guidelines.

Regardless of whether or not a state plans to adopt CCSS requirements specifically, almost every school district in the nation will need to write new rubrics to drive curriculum, and new assessments on these rubrics are sure to follow. For the CCSS states, the deadline for these assessments is the 2014-2015 school year. For those states proceeding on their own, the de facto deadlines are more rolling, which, in practice, means they're even sooner than that.
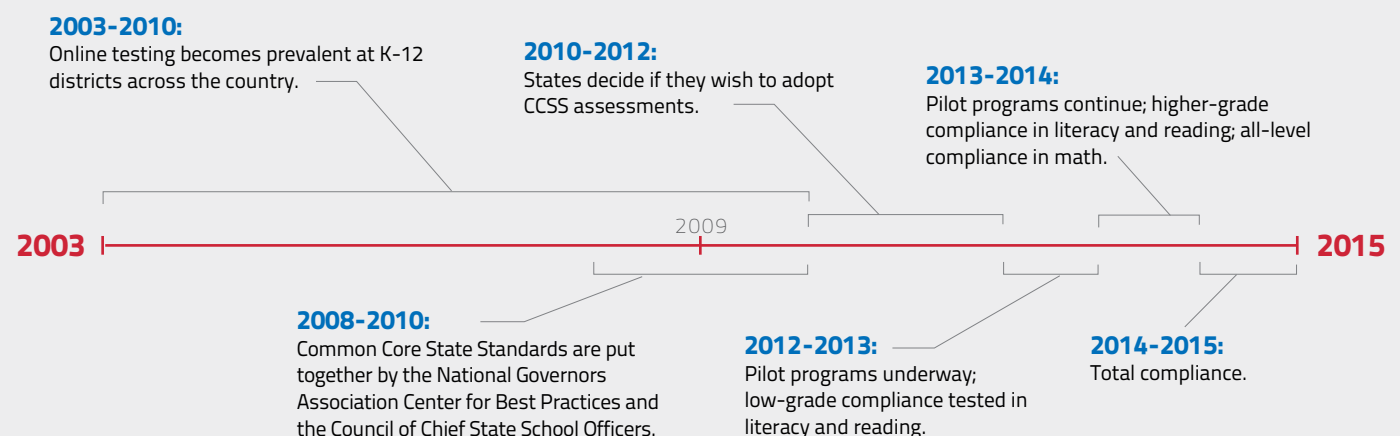
The Compliance Challenges and Concerns

Technological Challenges

Complying with CCSS assessments will require school districts to make a number of broad-sweeping changes. First on the list: Delivering assessments online. Because every student in each grade must take the test simultaneously — and assessments may incorporate high-definition videos and/or sound files — the effort will likely require districts to invest in some sort of digital content delivery system. To operate properly, these systems rely on a robust infrastructure, necessitating districts to increase network capacity, and both wireline and wireless access via WiFi and cellular networks.
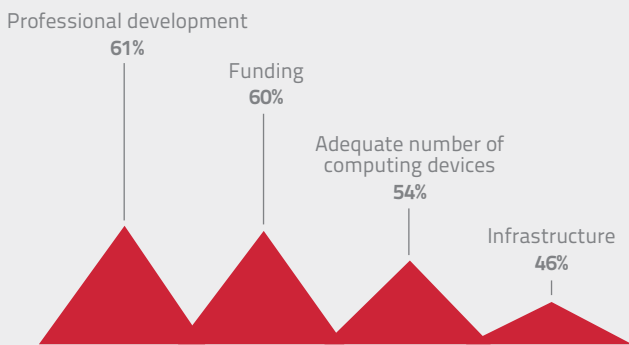
In terms of bandwidth, requirements hinge on the number of users and density of the applications. The Kansas

The Common Core Compliance Timeline

2003-2010:
Online testing becomes prevalent at K-12 districts across the country.

2010-2012:
States decide if they wish to adopt CCSS assessments.

2013-2014:
Pilot programs continue; higher-grade compliance in literacy and reading; all-level compliance in math.

2003   2009   **2015**

2008-2010:
Common Core State Standards are put together by the National Governors Association Center for Best Practices and the Council of Chief State School Officers.

2012-2013:
Pilot programs underway; low-grade compliance tested in literacy and reading.

2014-2015:
Total compliance.

Four Top CCSS Concerns

As the 2015 deadline for adopting the Common Core State Standards draws closer, academic technologists say they're still trying to wrap their heads around the breadth and depth of technology challenges that lay ahead. To gauge these concerns, the Center for Digital Education conducted a survey of 152 education technologists about a number of issues relating to the CCSS. Here are their top four concerns:

Professional development
61%

Funding
60%

Adequate number of computing devices
54%

Infrastructure
46%

Department of Education, for example, reports that a T1 connection to the Internet is sufficient for simultaneous test administration involving at least 64 users. Idaho's education department encourages schools to consider the installation of a local cache server (LCS), which would reduce bandwidth requirements dramatically, enabling up to 1,500 simultaneous users.[6] Other states have devised different requirements. Even in those cases where a district has delivered assessments online for years, most of the new requirements mean that districts need to invest in increasing Internet bandwidth.

Unlike in the corporate world, bandwidth in most parts of the K-12 landscape isn't exactly easy to come by; because bandwidth is expensive, and because many districts are located in neighborhoods and rural areas instead of where the fiber is, many school districts have struggled for years to get the bandwidth they need. Add online assessments to the mix and every district — even those sitting right on top of a carrier's fiber run — will need to increase the amount of bits and bytes upon which it can draw when demand spikes. With this in mind, adding the bandwidth necessary to achieve CCSS assessment compliance is not a change that can be made overnight; instead, it requires a multi-phased approach.

Phase 1: Taking inventory

This multi-phased approach should begin with an audit, a basic inventory of the digital tools districts have and the digital tools districts will need to deploy online testing for all students on common academic standards. Some districts are hiring third-party integrators and/or auditors to perform this task; others are going at it themselves. SBAC and PARCC teamed up to create a tool intended to aid states and districts in taking a snapshot of their mobile device environment, as well as their overall technological bandwidth. The tool, dubbed the Technology Readiness Tool, went out to states in March 2012 and hit districts later in the summer. The bottom line here is two-fold.

First, according to the research recently conducted by CDE, districts will likely have to upgrade existing resources.

Secondly, most districts will likely find they need more tools. The CDE survey indicated that 57 percent of respondents said their district does not have enough computing devices to handle online assessments, and 28 percent of respondents said their district would have to add between 100 and 499 devices to comply.

Networking Upgrades Needed for Online Assessments

Increase WiFi	54%
Increase bandwidth	50%
Increase access points	47%
Increase management capabilities	42%
Servers and storage solutions	35%
Switches and routers	32%
Increase security	31%
Data lines (wires and connections)	24%
Other	24%
Add redundancy	20%

Source: Center for Digital Education Research Survey, 2012

Phase 2: Expanding the device base

There's more than one way to add devices; in order to provide every student with a computer on which to take the new assessments, school districts will need to adopt one of a number of different strategies. As indicated in the following chart, some districts will be forced to get creative by virtualizing desktops and reactivating old computers with new hard drives.

District Devices for Online Assessments

Laptops/notebooks	84%
Desktops	74%
Tablets	49%
Virtual desktops	13%
Other	8%

Source: Center for Digital Education Research Survey, 2012

Some districts will also embrace bring-your-own-device (BYOD) strategies that enable students to bring laptops, netbooks, tablets and even smartphones from home and take assessments on those devices (provided the devices fulfill certain processing requirements).

BYO Devices Districts Plan to Support

Tablets	90%
Laptops	85%
Netbooks	65%
Smartphones	45%
Other	5%

Source: Center for Digital Education Research Survey, 2012

Phase 3: Increasing network capacity

At the same time network administrators are figuring out how to expand the device base, bandwidth must increase. Generally speaking, there are four types of bandwidth that may need to be addressed: Internet, LAN, WAN and wireless.

There are a number of ways to do this. For starters, districts can work with network service providers (Internet service providers, telecommunications companies and cable companies) to expand capacity and throughput to district buildings and schools as districts require, creating flexible WANs that scale very quickly, if not on demand. They can also partner with municipal governments and local corporations, through a shared services agreement, to expand WiFi coverage in and around the district. Finally, academic technologists can work with cellular providers to improve 4G access — in many cases, districts actually can lease real estate upon which providers can build new towers to send signals farther. Of course in parts of the country where hard-wired access is a problem, partnering with satellite providers is also an option. (It's important to note that one cannot add more wireless access points without

seeing an impact on the wireline network; whether it's a coaxial fiber cable in the LAN or a fiber line outside the LAN, all wireless traffic has to traverse a cable at some point.)

How much Internet bandwidth will districts ultimately need? That depends on whom you ask. According to a 2012 report from the State Educational Technology Directors Association (SETDA), the base numbers should be at least 1 gigabyte for every 1,000 students, faculty members and staff by the 2014-2015 school year, and at least 10 gigabytes for every 1,000 users by 2017-2018.[7]

Logistical Concerns

Of course at this point, states are still trying to figure out what actual testing requirements will be. If districts have weeks to test an entire grade, the need for hundreds or thousands of devices to administer assessments suddenly shrinks precipitously. What's more, if test sessions are short — say, two hours apiece — IT officials can schedule two or three sessions each day; yet another way to minimize expenditures and get the most out of the computing infrastructure already in place. Geoff Fletcher, deputy executive director of SETDA, says answers to these questions should become clearer by no later than the end of 2013.

"If the testing window is short and I've got a middle school of sixth, seventh and eighth graders where all my kids are going to be tested in a week, then I better have a whole bunch of devices — close to a 1:1 situation," he said. "But, if I've got four weeks in the testing window, then I need a lot fewer devices because I can run classes and kids through on different days and have plenty of room to do that."[8]

Security Concerns

School districts must also focus on security, making sure their networks are robust enough to meet federal privacy standards. Furthermore, particularly in districts that turn to BYOD to solve computing challenges, it could be difficult — not to mention expensive — to manage devices and minimize threats such as viruses and malware. In some cases, CCSS compliance plans include specific requirements for securing remote devices. In other cases, districts' general security policies and protocols will have to apply. As data becomes more important to education, it must be treated as a valued asset. Therefore, practices to protect data must be observed. These include ongoing data backup, secure storage practices, storage redundancy, and effective data retrieval practices to ensure data is protected and available at all times.

Practical Challenges

While districts respond to some of the technological challenges the CCSS may present, they also must grapple with more practical challenges — specifically those that pertain to training and professional development. Seventy-nine percent of respondents from the CDE research survey said they would like to see more support and information for professional development from their states.

One big problem: Educators don't grasp how fundamental some of the changes will be. William H. Schmidt, a Michigan State University professor widely known for his studies of mathematics curricula, explained that most current teachers have read the standards for their grade level, think highly of them and are willing to teach them, but few understand the profound changes in teaching that they will require.[9]

If the CCSS assessments truly are this much of a departure, if they test high-order thinking and problem-solving in the manner that many expect they will, it will behoove educators to teach in such a way that students will be successful on the tests. For some teachers — those who can incorporate problem-solving into day-to-day lesson plans, this should come easily. But for others — especially those who have taught off the same lesson plans for years — the challenge will require more of an extreme makeover.

Funding for the professional development needed might be tough to find; with shrinking budgets and a need to spend available resources on technology, districts may struggle to set aside enough money to support professional development programs the right way. According to a recent study, the most expensive option for training is to provide in-person professional development for all teachers, while the least expensive is to deliver the instruction online, via webinar or on-demand video like the "Common Core 360" series, put together by the School Improvement Network. The same study indicated that a hybrid system revolving around a train-the-trainer approach might be the most cost effective of the bunch.[10]

Seizing the Opportunity: Some Solutions

With all the challenges of the CCSS, a number of general solutions stand out as opportunities for school districts to achieve assessment compliance.

Given the periodic nature of assessments, it would be wise to invest in scalable bandwidth that can ebb and flow as usage dictates. These arrangements can range from hosted infrastructure to having an Internet service provider

Assess4ed.net is a clearinghouse of information for CCSS best practices and features webinars, resources, discussions, synchronous and asynchronous chats, and other opportunities for communication and collaboration.

that is constantly monitoring bandwidth supply as it relates to bandwidth demand. Particularly in virtualized environments, just-in-time delivery of technology is a strong strategy, since this approach enables districts to pay only for what they need and use.

Considering the sheer number of students that ultimately must be tested, multi-faceted computing environments have the highest chance of success. These can take many forms, from BYOD programs to virtualized environments, 1:1 programs and classroom PCs. A number of school districts are aiming to bring back computer labs — designated classrooms with 20 to 30 computers that are connected to the Internet via Ethernet or WiFi. Perhaps the biggest threat to this movement is the proposed discontinuation of Windows XP in 2014; many current K-12 desktops run that particular operating system, and districts already short on cash might not have the resources to pay for an upgrade to Windows 7 or Windows 8 (though many cloud service providers might be willing to step up and help).

In the face of shrinking budgets and skyrocketing costs for technology, partnering with vendors and/or solution providers could save districts big bucks by reducing overhead. This relationship can be limited to specific functions (such as accounts payable), or it can be as broad-sweeping as total outsourced network management. ISPs and solution providers can become trusted confidantes, skilled sounding boards for technology ideas that might need a little extra expert opinion along the way. What's more, ongoing maintenance and monitoring contracts are becoming increasingly popular; for districts with LANs and WANs, allowing third parties to come in and support these

arrangements is a good strategy to jumpstart growth without hiring any new employees.

Forsyth County School District in Georgia, for example, uses Ethernet as its WAN technology to connect school buildings, administrative offices and operations centers. That scalable communications platform allows the district to administer its BYOT (bring-your-own-technology) program, and efficiently distribute centrally stored documents and Internet traffic.[11]

Another way to achieve CCSS assessment compliance is to follow in the footsteps of those who have been there and done it before. There are a handful of CCSS best practices sites on the Web today; one is the SETDA-backed Assess4ed.net. Currently, this particular site is a clearinghouse of information, featuring webinars, resources, discussions, synchronous and asynchronous chats, and other opportunities for communication and collaboration among assessment, curriculum and technology staff at the state and district levels. Sites like Assess4ed are great community builders, and they present opportunities for human networking as well. The best part: Participation is free.

Conclusion

There's no question that the push for the CCSS will transform the IT landscape in the K-12 market. The need to deliver assessments online will force education technologists at school districts across the country to earmark special funds for new projects, and carry those projects to fruition. At many districts, pilot programs are already underway. For many others, the real wave of evolution will start in the beginning of 2013.

Transitioning to these online assessments won't be easy. Keys to navigating this transition will include ample network capacity, resilient and available delivery infrastructures, institutional policies that can adapt to necessary changes, and effective professional development for faculty and administrators. With all of this in mind, it's never too early to start preparing a strategy for implementing CCSS assessments.

With the right formula, implementing CCSS assessments doesn't have to drive K-12 technologists crazy; preparation is half the battle. Once the assessments are in place — once testing is administered online exclusively — districts will be able to guarantee that students in specific grade levels know all of the same data as their same-age counterparts at neighboring schools. It is a distinction that education leaders have wanted to make for years. It is the Holy Grail of standards-based learning. And it's almost here.

Resources

- Common Core State Standards Initiative, www.corestandards.org
- "Five Challenges States Face with Common Core Assessments," Center for Digital Education, www.centerdigitaled.com/classtech/5-Challenges-Common-Core-Assessments.html
- Technology Readiness Tool, http://techreadiness.org/t/TechnologyReadinessTool/launch.html
- "Trimming the Cost of Common Core Implementation," *Education Week*, www.edweek.org/ew/articles/2012/08/29/02murphy.h32.html
- "The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs," State Educational Technology Directors Association, 2012.
- Assess4ed, http://Assess4ed.net
- "Comcast Metro Ethernet Supports a National Leader in Digital Education," Comcast, http://business.comcast.com/docs/ent-solutions-docs/Enterprise-Case-Study-Forsyth-County.pdf?sfvrsn=0

Endnotes

1. The four states that have not adopted CCSS – Alaska, Nebraska, Virginia and Texas – have created their own standards.
2. Partnership for 21st-Century Skills, Framework for 21st-Century Learning, www.p21.org/overview
3. Common Core State Standards Initiative, www.corestandards.org/
4. "Advocates Worry Implementation Could Derail Common Core," *Education Week*, www.edweek.org/ew/articles/2012/04/25/29cs-overview.h31.html
5. "New Tool to Provide Tech Inventory for Common Core," *Education Week*, www.edweek.org/dd/articles/2012/06/13/03readiness.h05.html
6. "Technology Requirements for Large-Scale Computer-Based and Online Assessment: Current Status and Issues," State Educational Technology Directors Association, www.setda.org/c/document_library/get_file?folderId=344&name=DLFE-1336.pdf
7. "The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs," State Educational Technology Directors Association, 2012, www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1515.pdf
8. Center for Digital Education interview with Geoff Fletcher, July 9, 2012
9. "Advocates Worry Implementation Could Derail Common Core," *Education Week*, www.edweek.org/ew/articles/2012/04/25/29cs-overview.h31.html
10. "Putting a Price Tag on the Common Core: How Much Will Smart Implementation Cost?" Thomas B. Fordham Institute, www.edexcellence.net/publications/putting-a-price-tag-on-the-common-core.html
11. "Comcast Metro Ethernet Supports a National Leader in Digital Education," Comcast, 2012, http://business.comcast.com/docs/ent-solutions-docs/Enterprise-Case-Study-Forsyth-County.pdf?sfvrsn=0

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