Funding and Professional Development
Special Report Supplement

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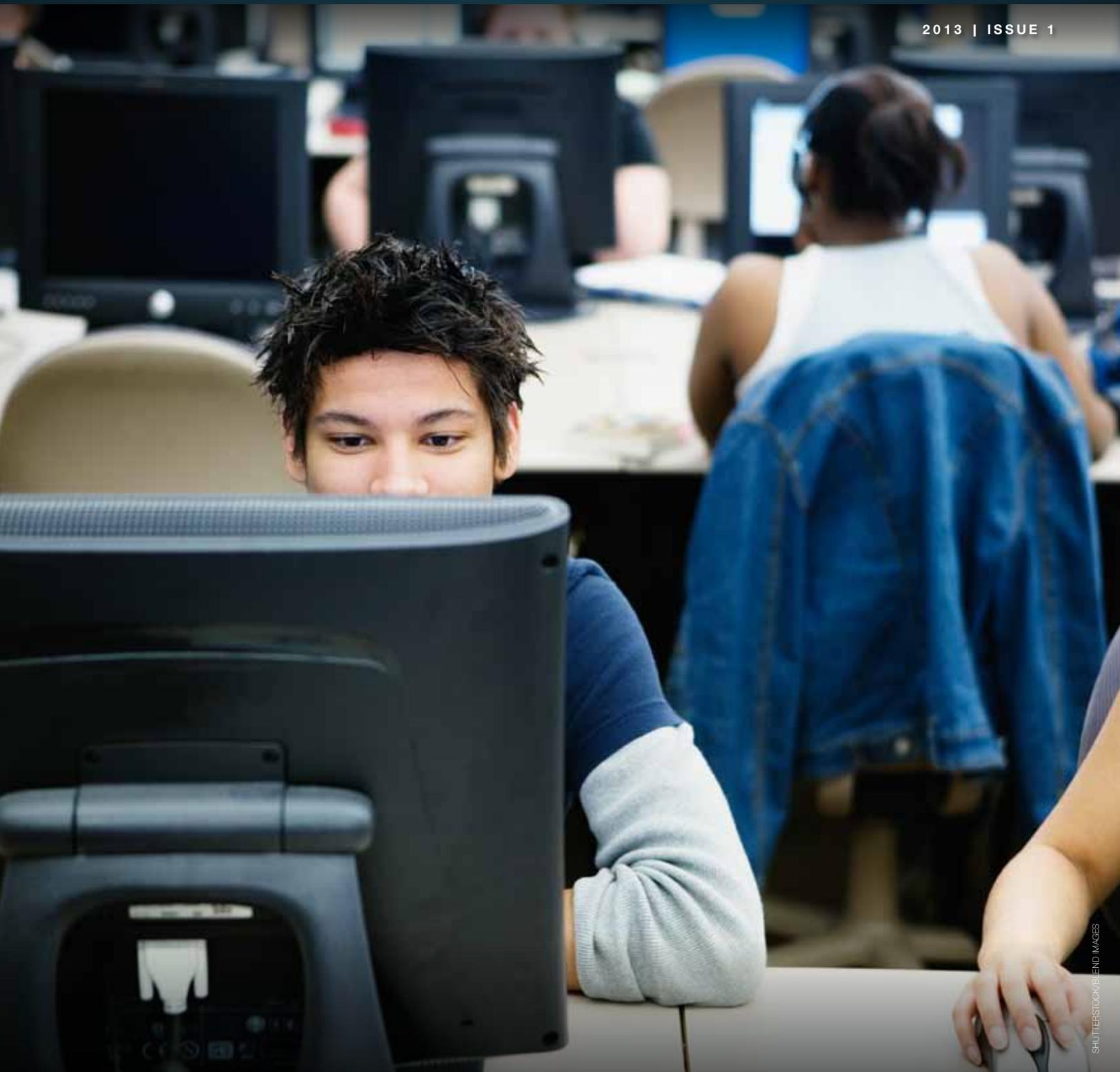
Smart Schools Need Smarter Infrastructure

Mobile initiatives, virtual learning, the move to online assessments, the advent of big data and the demand for 24/7 Internet connectivity are all driving education institutions to upgrade and modernize their IT infrastructures.

Every academic institution has unique needs but the one thing they have in common is that in order to stay smart in this digital world, their IT infrastructures need to be reliable and scalable for the changes happening now and the changes to come in the future. Before institutions even begin this transformation, however, there are two essential obligations that must be met — funding and professional development.

This Funding and Professional Development Supplement to the Center for Digital Education's Smart Infrastructure Special Report examines funding sources and a suggested list of professional development questions for education institutions eager to take advantage of new solutions and strategies that will help them modernize their IT infrastructures.

IT Infrastructure Funding

FEDERAL GRANTS

Magnet Schools Assistance Program. The Magnet Schools Assistance Program (MSAP) is a federal competitive grant through the Office of Innovation and Improvement (OII).[1] Since 1985, the program has provided grants to eligible local educational agencies to establish and manage magnet schools that are operated under a court-ordered or federally approved voluntary desegregation plan.

MSAP assists schools that emphasize academic subjects such as math, science, technology, language immersion, visual and performing

Ball High School, part of Galveston Independent School District in Texas, benefitted from the 2010 Magnet Schools Assistance Program award of $3.95 million to the district.

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arts, or humanities. The grant supports the development and design of innovative education methods and practices that promote diversity and increase choices in public education programs. It supports projects that assist in the desegregation of public schools through the elimination, reduction and prevention of minority group isolation in elementary and secondary schools with substantial numbers of minority group students. Additionally, MSAP aids in the development of courses and innovative instruction that strengthen students' knowledge of academic subjects and their grasp of tangible and marketable vocational skills. It encourages applicants to take on systemic reforms and provide all students the opportunity to meet challenging academic content and student academic achievement standards.

Funding for MSAP in 2012 was nearly $100 million.[2] In 2013, the program is expected to have 41 new awardees with total program funding estimated at $100 million and an average award of $2.5 million. MSAP operates on a three-year budget cycle with the next application process beginning in December 2015. However, there are opportunities to apply each year if schools drop out of the program. During the last round of awards in 2010, 36 new grants were awarded with the largest amounts going to:

- Metropolitan Nashville Public Schools in Tennessee: $4 million
- Duval County Public Schools in Florida: $4 million
- Metropolitan School District of Lawrence Township in Indiana: $3.99 million
- Galveston Independent School District in Texas: $3.95 million[3]

Enhanced Assessment Instruments Grant. The Enhanced Assessment Instruments Grant (EHI) is a competitive federal grant available to state education agencies, or a consortium of state education agencies.[4] The objective of EHI is to improve the quality, validity and reliability of state academic assessments. EHI also aims to chart student progress over time, and evaluate student academic achievement through the development of comprehensive academic assessment instruments, such as performance- and technology-based academic assessments.

EHI was appropriated over $9 million[5] for 2013 and funds will be awarded through a competitive application process. Applicants are encouraged to deploy projects that address program objectives by producing significant research methodologies, products or tools regarding assessment systems or assessments. The 2013 application deadline for this grant has not yet been announced. In 2012, three awards were distributed, ranging from $1.7 million to $6.3 million.[6] The three awardees were:

- Oregon Department of Education: $6.27 million
- Maryland State Department of Education: $1.9 million
- Kansas State Department of Education: $1.75 million

Campus Cyber-Infrastructure, Network Infrastructure and Engineering Program (CC-NIE). In order to improve the network infrastructure of higher education institutions, the National Science Foundation is offering the Campus Cyber-Infrastructure, Network Infrastructure and Engineering Program (CC-NIE) grant.[7] Universities and two- and four-year colleges (including community colleges) seeking funding to improve network infrastructure must submit applications in either of the following categories: Data Driven Networking Infrastructure for the Campus and Researcher, or Network Integration and Applied Innovation. It is estimated that $15 million to $18 million will be available for this grant in 2013 and the application deadline is April 3, 2013. Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported at up to $500,000 for up to two years. Network Integration and Applied Innovation awards will be supported at up to $1 million for up to two years.

In September 2012, the University of Missouri-Columbia was awarded $1 million for the creation of an institutional cyber-infrastructure to facilitate collaborative scientific research.[8] Clemson University was awarded nearly $954,000 in April 2012 to build a cyber-infrastructure that will support interdisciplinary, computational and data-enabled science; and transformative research in areas of university emphasis.[9] Additionally, in October 2012, Ohio State University was awarded $987,000 to transition campus core cyber-infrastructure to serve diverse and emerging researcher needs,[10] and the University of Washington was awarded $395,000 to simulate and support the development of future cyber-infrastructure systems — improving the ability to enable the computational and data-enabled science and engineering required to address significant societal challenges.[11]

NEW CHANGES TO A FAMILIAR PROGRAM

The E-Rate program has been covered extensively in the past, especially when it comes to infrastructure planning and funding. However, with the new year came several new changes of which education institutions should be aware.

- **Technology plan requirements:** A technology plan is no longer required for Priority One funding requests. Since the vast majority of applicants are not able to receive Priority Two funding, few districts will need to have a technology plan in order to receive E-Rate funding.

- **Federal rules on gifts:** The Federal Communications Commission (FCC) re-iterated many existing competitive bidding requirements, and added a new requirement: District personnel must comply with federal regulations concerning gifts from vendors. Federal rules allow employees to receive single items worth $20 or less (meals, pencils, pens, hats, t-shirts, etc.) as long as those items do not exceed $50 per year per employee from any one source.

- **Dark fiber:** Districts can now receive E-Rate funding for leased dark fiber. E-Rate will not pay for the build out of dark fiber, but will pay for the build out of lit fiber. Fiber, whether lit or dark, can be leased from non-telecommunications providers.

- **Community use of school Internet access:** Schools can now provide after-school Internet access to the community. The primary purpose of any Internet access must be K-12 education, and community use must not increase the cost of Internet access. Schools cannot charge for Internet use, though they can charge for computer use.

- **Equipment disposal rules:** Up until 2013, in general, state rules required schools to sell excess equipment rather than just give it away, while E-Rate rules forbade the selling of equipment purchased with E-Rate funds. Now the rules allow schools to sell equipment after five years.

- **CIPA changes:** Due to a recent amendment in the Children's Internet Protection Act (CIPA), E-Rate applicants must include the following in their Internet safety policy, "Educating minors about appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms, cyberbullying awareness, and response." Applicants should also be prepared to demonstrate that the policy is put into practice, perhaps with Internet safety lesson plans.

- **Telecommunications melding with Internet access:** The Eligible Services List for 2013-2014 removed the distinction between Telecommunications Services and Internet Access, lumping all Priority One services into a single category. The FCC stated that applicants could put Priority One services under either category on Form 470. However, applicants must still keep services in the right category on Form 471 in order to comply with CIPA.[12]

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PRIVATE GRANTS

Corning Incorporated Foundation.

Since its inception, the Corning Incorporated Foundation has contributed more than $139 million in grants.[13] Public K-12 school districts, community colleges and four-year higher education institutions are the consistent beneficiaries of the foundation's support. Corning's grant donations have included community service programs for students, curriculum enrichment, student scholarships, facility improvement and instructional technology projects for the classroom. Grants are available year round and all requests to the foundation for support must be made in writing. Grant seekers are advised to submit a two- to three-page letter of inquiry, signed by the senior administrative officer of the organization.

Funding from the Corning Incorporated Foundation in 2012 was $8.7 million in direct and matching grants. Grant awards range from $1,000 to $3.6 million depending on the size and scope of the project. K-20 education institutions could use this funding for network infrastructure and back-end modernization projects to support facility improvements, Wi-Fi upgrades to implement instructional technology initiatives in the classroom and classroom technologies to reinforce curriculum enrichment. Following is a list of the top grant recipients from 2011:
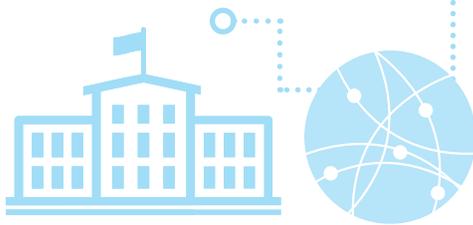
- Corning City School District in New York: $3.6 million for general district operational support and secondary curriculum enrichment

- Lenoir-Rhyne University in North Carolina: $25,000 for the renovation and expansion of the university science complex
- SUNY Canton in New York: $5,000 for the Canino School of Engineering Technology
- Fort Worth Independent School District in Texas: $5,000 for discretionary facility improvements[14]

W.K. Kellogg Foundation.

The W.K. Kellogg Foundation is an organization that supports children, families and communities to strengthen and create conditions that propel vulnerable children to achieve success as individuals and as contributors to the larger community and society.[15] Applicants are eligible to apply year round through an online application process. Today, the organization ranks among the world's largest private foundations and as of August 2011, the foundation possessed over $7.6 billion in assets. Education grants are typically awarded to universities, local children's organizations and school districts, and funding could be used for procurement and integration of classroom technologies, infrastructure and back-end improvements or support.

Harvard University was recently awarded $345,000 to provide core operating support for the Center on the Developing Child, and funding will continue through June 30, 2013.[16] The Center for Education Innovation in Mississippi was also recently awarded $2 million to achieve its mission of improving educational outcomes among the youngest and most vulnerable children in the state by providing general operating support.[17]

William and Flora Hewlett Foundation.

The William and Flora Hewlett Foundation has been awarding grants since 1967 to address a variety of social and environmental problems within the U.S. and around the globe.[18] Currently, the foundation has assets totaling $7.29 billion and many of these dollars are awarded to education institutions.[19] According to the latest data available, the average grant amount in 2011 was nearly $345,000, with 121 of 591 total grants awarded to education-based initiatives.[20] In 2013, the foundation will initially focus on education-based grants for projects related to open educational resources and deeper learning innovation.[21]

This funding opportunity could be used to support projects related to the development of open digital content and curriculum, improved infrastructure and back-end technologies that augment the delivery of open educational resources, and wireless/connectivity upgrades that support classroom technologies. Applications are available year round through an online application process on the Hewlett Foundation website.[22] Below are some examples of grants awarded in 2012:

- University of Washington: $428,000
- Rice University in Texas: $750,000
- Stanford University in California: $240,000[23]

Professional Development

This professional development portion is provided in two sections to be used by either individuals or leaders as they wish. One section addresses content understanding, the second assists professional development leaders in framing discussions around topics addressed in the Smart Infrastructure Special Report.

QUESTIONS FOR UNDERSTANDING

1. Describe and quantify how the increase in mobile devices and digital content has impacted K-12 and higher education in the past several years.
2. How are the Common Core State Standards (CCSS) assessments expected to impact K-12 campus infrastructures? What are districts doing to prepare for them?
3. Name four potential challenges campuses face when readying their wireless infrastructures for a digitally delivered curriculum via mobile devices.
4. List the ways a campus wireless infrastructure can be made more resilient and reliable to provide the necessary connectivity required by a digitally delivered course setting.
5. What are some traffic management strategies for wireless networks?
6. How are wireless networks made more secure?
7. Explain why, even though wireless networking is the hot technology around campus today, the real workhorse is still the wired network.
8. Define what a virtualized desktop is and what benefits the technology can bring to a school or campus.
9. How are campuses using cloud resources today? What are the two most common uses of the cloud?
10. Describe how research institutions are using software-defined networking (SDN) and OpenFlow and explain why.
11. Why are open standards that support SDN important to research institutions?
12. What are the minimum device capabilities required for students to take the new CCSS assessments? Why must these tests be taken online?
13. Explain why it is not unreasonable to expect a testing center with 30 virtual devices to be able to be upgraded for about $1,000.
14. What is today's biggest challenge with big data?

QUESTIONS FOR DISCUSSION

1. How can we improve support for wirelessly connected devices around our school or campus?
2. What process improvements should be instituted to provide the best input into technology decisions for our school or campus?
3. What classroom or online technologies should we utilize in our classes in the next three years that are not available to us now? How would they improve teaching and learning?
4. How can we use the data our campus management systems are gathering on our students and faculty more effectively to improve teaching and learning?
5. How can a virtualized desktop implementation work on our school or campus? What problems would it solve?
6. Data storage has increased exponentially in education in this past decade. What do we need to do to increase our data storage needs?

END NOTES

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Sponsors:

Acknowledgements:

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THE CENTER FOR DIGITAL EDUCATION is a national research and advisory institute specializing in K-12 and higher education technology trends, policy and funding. Along with its research services, CDE issues white papers and conducts the annual Digital School Districts and Digital Community Colleges surveys and award programs as well as hosting events across the K-12 and higher education arena. CDE also supports the Converge media platform comprised of the quarterly themed Converge Special Reports, Converge Online, and custom publishing services.