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SPECIAL REPORT

Leading a Digital Transformation

How to use E-rate and the power of digital to transform education

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eSCHOOL NEWS

In Mooresville, North Carolina, school leaders haven't bought a textbook in nearly five years. Yet achievement is on the rise, students are more engaged, and the level of sophistication in their work is remarkable.

In one recent project, a sixth-grader gave a presentation on the authentication of Mesopotamian religious artifacts. She had done extensive research on the topic, and she used archival photographs comparing real and fake artifacts. She even interviewed a professor with expertise in the field and created some faux relics to display.

"It was stunning," said Superintendent Mark Edwards. "It could have passed for graduate-level work."

Nearly nine years ago, the Mooresville Graded School District began its journey toward what Edwards calls a "digital conversion," transforming its classroom instruction and central office operations with the help of technology.

Today, all students in grades kindergarten through 12 have access to a digital device—students in kindergarten and first grade use iPads, and students in grades 2 through 12 use MacBook Airs—and they can take their devices home for learning beginning in fourth grade.

Mooresville uses an all-digital curriculum, and its technology conversion has led to more personalized, student-centric, and data-driven approaches to teaching and learning. "It's rare that you see whole-group instruction anymore," Edwards said. "What you see is small-group collaborative work, where students are developing expertise working in teams."

At the same time, Mooresville has begun streamlining its operations as well—and it has seen a fantastic return on its technology investment: Although it's near the bottom of the state in per-pupil funding, the district ranked third last year in student achievement.

Mooresville's example shows not just what is possible with technology, but that any district can make the same transformation, regardless of its resources—provided it follows the right steps.

"It's all tied back to improving student outcomes," these outcomes are not only academic, but also experiential–such as developing important skills in communication, collaboration, critical thinking, innovation, and leadership.

What Is a Digital Transformation?

In other industries, technology has had a transformative effect as it has become embedded into organizational processes, said Irfan Ali, director of global industry IoT sales strategy and operations at Cisco Systems.

The same is possible for education, although districts like Mooresville have mostly been the exception rather than the rule so far. But with the right tools and techniques, K-12 districts can experience the same transformational benefits that businesses have realized over the last few decades.

Ali describes digital transformation in K-12 schools as using technology to create better access to educational experiences for students. For instance, can students learn anytime on demand, rather than having their education limited to attending a class at a particular time and place? Can they have a different level of experience that is more personalized to their needs? Can teachers deliver instruction in more innovative ways that both engage and empower students?

"It's all tied back to improving student outcomes," he said. These outcomes are not only academic, but also

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experiential—such as developing important skills in communication, collaboration, critical thinking, innovation, and leadership.

Some of the key technologies that enable this transformation include:

Mobility solutions, which include mobile devices as well as wireless connectivity, broadband networks, caching servers, filters and firewalls, network monitoring tools, mobile device management software, and other technologies that enable remote access. "These are paramount," Ali said. "We want to make sure students can connect in a secure manner and have opportunities for anytime, anywhere learning."

Collaboration tools, or technologies that enable students to interact with each other and with subject matter experts, creating a shared learning environment that leads to richer experiences. "There should not be a big gap between in-person learning experiences and remote ones," Ali said.

By taking ownership of their own learning, Mooresville students are learning how to use digital resources to do advanced research on topics that interest them, such as the student who took her learning to a deeper level by researching Mesopotamian artifacts.

In McAllen, Texas, educators are seeing similar results from their own digital transformation. The McAllen Independent School District has given each of its 25,000 students an iPad, leading to a dramatic rise in student engagement and a shift toward inquiry-driven, project-based learning.

"Students are finding information without the teacher holding their hand," said Ann Vega, director of instructional technology.

Students are connecting with and learning from their peers in other countries. They're peer-editing each other's work. Elementary students are recording and timing each other reading aloud to test for fluency. Fourth-graders are blogging about the books they're reading in class.

As a result of these efforts, elementary reading scores are on the rise, and McAllen's three comprehensive high schools are ranked among the best in the nation by *Newsweek*. "We've equipped our students and staff to compete at a global level," said Superintendent James Ponce.

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Data analytics: Having access to actionable, real-time data through the use of analytics tools can help educators target their instruction more effectively to fill gaps in students' skills, and it can help administrators recognize significant trends and focus their resources on the areas of greatest need—leading to smarter practices.

In Mooresville, giving all students a powerful digital device that enables 24/7 learning has opened new possibilities for their education. Mooresville has shifted to a more student-centered, inquiry-based model of instruction, in which students are challenged to find information for themselves instead of being given all the knowledge by their teachers.

Five Keys to Success

Leading a digital transformation on the scale accomplished by Mooresville or McAllen is a huge undertaking. As you prepare to lead a digital transformation in your own district, here are five keys to success.

Have a plan

Before you can embark on a digital transformation, you have to have a clear vision for what you hope to accomplish with technology and how it will transform teaching, learning, and school operations. You also have to get buy-in from teachers, parents, and other stakeholders.

McAllen ISD is guided by a strategic plan called "Transforming Learning in the Classroom, Campus, and Community," or TLC3. Its goals include focusing on the instructional needs of teachers and the learning needs of students; providing job-embedded professional learning opportunities for teachers; and integrating technology into all aspects of the community. The plan also calls for all students to master the "four Cs": communication, collaboration, critical thinking, and creativity.

To create its plan, McAllen assembled a cadre of students, parents, teachers, and other community members, who all had input. Mooresville went through a similar process in forming its own strategic plan.

"Approaching this as a community-wide effort and engaging parents, community leaders, your local chamber of commerce, and other stakeholders is important, so there's a communitywide understanding about the essential need to move in that direction," Edwards said.

Invest in your network infrastructure

Before rolling out devices to every student, both Mooresville and McAllen built out their network infrastructures to ensure that it could handle the load.

"We had to ramp up our Wi-Fi from

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being almost nonexistent to having seamless coverage throughout our buildings," said Patrick Karr, network services manager for McAllen. "Relationships with companies like Cisco and Apple made it easier, but trying to ramp up from where we were to where we are today has taken many hours."

With phone service, you expect to place a call and have the person on the other end pick up without a hitch, Karr said. Internet connectivity is the same way; it should work smoothly, without students and staff having to think about it—and that requires a solid infrastructure.

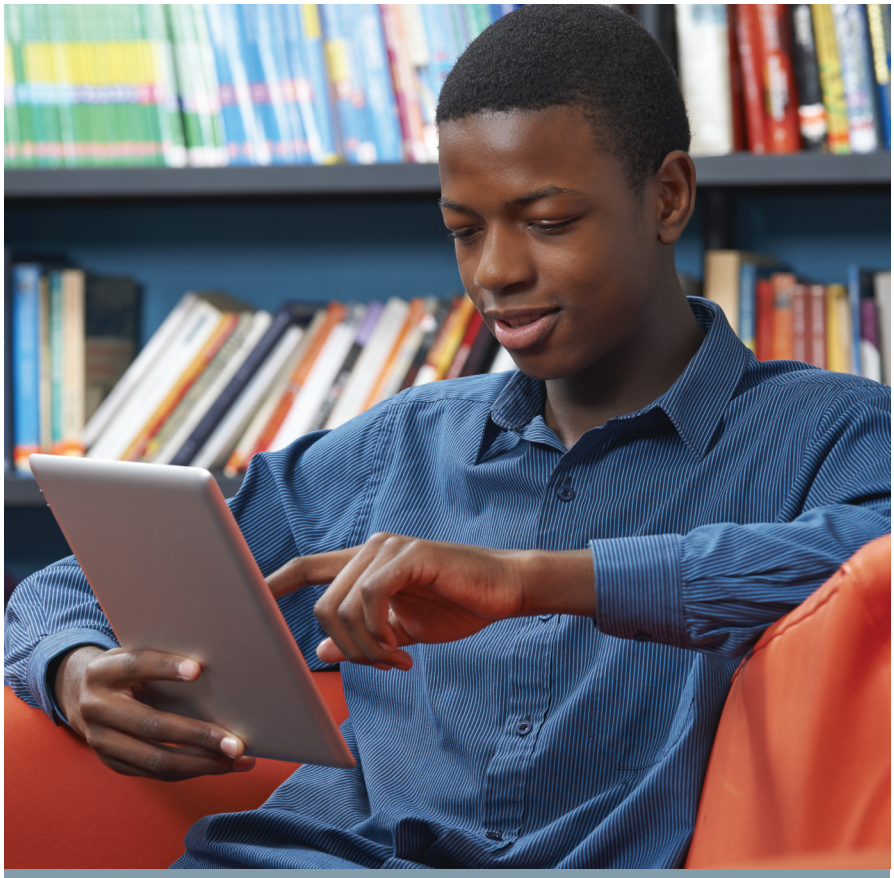
"You have to have leaders who understand the importance of your network infrastructure, and you have to have the financials to be able to achieve it," Karr said. "When you build something like this, you don't build it on a shoestring budget, because you can't afford to. If you do, you'll fail."

The State Educational Technology Directors Association (SETDA) recommends that schools provide at least 1 gigabit per second (Gbps) for every 1,000 students and staff members by 2017 to enable rich, transformative teaching and learning experiences.

Karr suggests planning for more bandwidth than you think you need, because network demands increase exponentially as students do more bandwidth-intensive work. "When we built out our network, we were anticipating a need to support two devices for every user," he said.

Consider the human element

The biggest challenge standing in the way of a digital transformation in K-12 schools is not the technology itself. "I would say the biggest challenge is cultural and operational," Ali said. "Schools have to shift their culture to leverage these new tools, and that has been the biggest impediment in most cases."



We had to ramp up our Wi-Fi from being almost nonexistent to having seamless coverage throughout our buildings," said Patrick Karr, network services manager for McAllen. "Relationships with companies like Cisco and Apple made it easier."

Edwards would agree. Shifting this culture involves developing the capacity of teachers and administrators to use technology effectively, he said, noting that most school systems "have not paid enough attention to change management and building a culture that embraces innovation."

Professional development is a key part of this capacity building, and it should consist of sustained, ongoing professional learning opportunities that are directly relevant to teachers' needs. Teachers also should have plenty of chances to learn from and collaborate with their colleagues in designing dynamic, technology-enabled lessons.

But building a culture of innovation requires more than effective professional development, Edwards said. It also involves creating a safe environment for teachers to experiment and try new things.

"We knew that some teachers would move faster than others," he said, "but we respected and showed appreciation

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How E-rate 2.0 Can Help with Digital Transformation

The Federal Communications Commission's historic overhaul of the E-rate Program in 2014 has paved the way for digital transformation by helping more schools upgrade their broadband networks.

Here's what you need to know about these changes.

More funding is available for network upgrades: The FCC has raised the funding cap from $2.4 billion to $3.9 billion per year, with at least $1 billion of that pledged for network upgrades. The agency also changed the E-rate rules to extend this funding for network upgrades to more applicants.

Network upgrades are no longer a Priority 2 service: Until last year, Wi-Fi and other internal broadband connections were considered "Priority 2" services and were funded only after all requests for Priority 1 services (telecommunications services and Internet access) had been met. However, that left most schools without any E-rate funding for internal connections. Starting with the 2015 funding year, the FCC changed the description of these services to "Category 2" instead of "Priority 2," reflecting that these services no longer will be given a lesser priority.

Network services have a five-year funding cap: To spread Category 2 funding to the broadest number of applicants possible, the FCC has taken two key steps: (1) It has limited the maximum discount on these services to 85 percent instead of 90 percent, and (2) it has capped the amount of funding that applicants can receive on these services within a five-year period.

For schools, the cap amounts to $150 per student per site on the pre-discount cost of Category 2 services over five years. For instance, a school with 1,000 students that qualifies for a 60 percent discount could buy up to $150,000 in Wi-Fi and other network services over a five-year period, receiving $90,000 in E-rate discounts to offset the cost.

To ensure that smaller schools can buy the minimum amount of Wi-Fi gear they need, the FCC created a "funding floor" of $9,200 per building. (Again, this refers to the pre-discount price of equipment.) So a school with only 50 students and a 60 percent discount would not be limited to $7,500 in Category 2 services over five years; instead, it could spend up to $9,200 and receive up to $5,520 in E-rate support during this period.

> The FCC has raised the funding cap from $2.4 billion to $3.9 billion per year, with **at least $1 billion** of that pledged for network upgrades.

Because of this five-year cap, K-12 technology leaders will have to think strategically about their Wi-Fi needs—and they should look at purchasing equipment with a five-year lifecycle in mind.

Changes have been made in eligible services: The redesigned E-rate Program also contains significant changes to the kinds of services that are eligible for support.

For instance, funding for all voice-related services is being phased out entirely by the 2019 program year. Email, voicemail, and web hosting are no longer eligible; also ineligible now are all products and services in the categories of circuit cards and components; interfaces, gateways, antennas, and servers; storage devices; video components; and data protection components (except for firewalls, uninterruptible power supplies, and battery backups, which are still E-rate eligible).

The new rules make caching servers, which store information locally so it can be accessed more quickly, eligible for the first time. Support for the basic maintenance of internal connections also is available, but only if the equipment itself is eligible for E-rate support—and only if schools haven't exceeded their five-year limit on Category 2 funding.

The new rules also created a new category of eligible services: "managed internal broadband services." Before, schools could apply for E-rate discounts only on the purchase of routers, switches, wireless access points, and other internal connections, or on the basic maintenance of this equipment. Now schools can enter into contracts that call for Wi-Fi providers to install and manage this equipment—and this full-service approach to wireless service is E-rate eligible.

What's new for 2016: The filing window for the 2016 program year is likely to open in January and will last until March. And there are several procedural changes that school leaders should know about, said John Harrington, chief executive officer of the E-rate consulting firm Funds for Learning.

For instance, applicants now are required to use a new online portal to apply, meaning that there will be a learning curve for applicants to get used to this new system. If you haven't already done so, Harrington recommends that you create a user account and start familiarizing yourself with the new system as soon as possible. eSN

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for any forward movement. Nurturing and support are very important in this process." Mooresville also identifies teacher leaders and has them help train other staff members.

"Hearing a veteran teacher say, 'I can do this' has been motivational for many teachers who had some reticence," Edwards said.

Be creative with funding

Funding is another huge barrier to digital transformation in schools—but successful districts such as Mooresville and McAllen have found creative ways to overcome this hurdle.

The E-rate Program has played only a minor role in Mooresville, because its discount percentage is not as high. So Edwards and his staff have had to think outside the box. (A school district's discount percentage is determined by the percentage of its students who are eligible for free or reduced-price lunches.)

To help get its digital transformation off the ground, Mooresville tapped the power of community partnerships. Lowe's Home Improvement, which has its corporate offices in Mooresville, stepped up with an initial $250,000 investment. The district also has partnered with community organizations and local companies to help extend broadband service into students' homes. "Ninety-five percent of our students now have home broadband access," Edwards said.

The State Educational Technology Directors Association (SETDA) recommends that schools **provide at least 1 gigabit per second (Gbps) for every 1,000 students and staff members** by 2017 to enable rich, transformative teaching and learning experiences.

McAllen has been able to use the federal E-rate Program, which provides discounts on telecommunications, Internet, and network services, to pay for much of its network infrastructure.

The E-rate Program is phasing out support for voice-related services by 2019 to focus more on broadband, but McAllen qualified for a high enough discount (near 80 percent) that it was able to use the program to fund internal connections even before those changes began last year. "We were only spending 20 cents on the dollar for our network services," Karr said.

Mooresville hosts its own educational technology conference and uses the proceeds to help pay for its professional development efforts. And its digital conversion has saved on the cost of curriculum materials, paper, toner, and postage—money it has reinvested in its technology initiatives.

With a history of success behind it, Mooresville last year was able to pass a large bond referendum that will help pay for technology for many years to come. The referendum's 70 percent pass rate "speaks loud and clear to the support we have from the community," Edwards said.

Don't go it alone

Investing in the right technologies to support a digital transformation, and making sure all of these technologies work together for a seamless, secure user experience, can be difficult. Choosing a supplier that is not just a vendor but a full partner in your digital transformation efforts can help you eliminate this challenge.

For both Mooresville and McAllen, Cisco has been that partner, supplying not just industry-leading technology but also the expertise needed to make these initiatives a success.

Cisco has been a partner in McAllen's digital efforts for nearly 17 years, Karr said. Its role has included building an identity services engine for the district, designing and testing the network, helping IT staff analyze network traffic, and installing next-generation firewalls that have supported new ways of teaching, learning, and connecting securely from home, school, or in between.

"It has been a very good relationship that has provided a huge value-add for us," he noted.

Edwards said he appreciates Cisco's thought leadership as much as its technical expertise.

"When we hit some implementation challenges early on, they sent engineers to help evaluate our infrastructure and worked as advisors for us," he said. "We also had somebody from Cisco give a presentation for us last year on where things are going with technology. We try to build relationships with service providers where we're working together and solving problems to improve teaching and learning, and Cisco has been a really good partner for us." eSN

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Cisco Solutions Simplify Digital Transformation

Successful digital transformation requires technology that is easy to deploy, use, and manage—and that's a key area of emphasis for Cisco.

"We make it as simple to acquire and use technology as possible, so school leaders can put all of their muscle behind their true focus: education," said Charles Garcia, director of sales for Cisco's U.S. public sector business.

Here are some Cisco® solutions that can help simplify school IT, helping ensure that technology is not an obstacle but an *enabler* of transformation.

Cisco Mobility Express

Setting up a wireless network can be challenging, especially for smaller K-12 districts with a limited IT staff. Cisco Mobility Express aims to make the process easier. Designed for a site needing up to 25 wireless access points and serving up to 500 client devices, the solution enables non-IT personnel to build a wireless network using a simple, over-the-air configuration interface.

The Cisco WLAN Express Setup Wizard configures multiple access points simultaneously in minutes. What's more, you can access the dashboard through a web browser or Cisco's Wireless Mobile app to operate, monitor, and troubleshoot your network.

The Mobility Express technology is built into Cisco Aironet® 1850 and 1830 Series access points, which support 802.11ac Wave 2, the very latest Wi-Fi standard—enabling speeds faster than 6 gigabits per second (Gbps).

Cisco Meraki for K-12

Cisco Meraki® is a cloud-based management solution that simplifies both network and mobile device management, said Xan Stevenson, a sales manager for Cisco's Cloud Networking Group.

Meraki includes 802.11n/ac access points, Layer 3 Ethernet switches, security appliances that provide Children's Internet Protection Act (CIPA)-compliant web caching and content filtering, and cloud-based network management functionality that also includes mobile device management capabilities. All hardware and licenses are E-rate eligible, with the exception of MX Advanced Security licenses (50 percent eligible) and Systems Manager licenses (not eligible).

The Meraki cloud-based dashboard provides visibility into bandwidth consumption and allows IT staff to shape bandwidth usage and troubleshoot the network, Stevenson said, adding: "You can hotlink right to the switch and access point it's connected to." What's more, Systems Manager, the mobile device management solution, allows you to create network access policies for all devices in specified groups, letting you easily manage 1:1 and bring-your-own-device (BYOD) programs—and it connects with an Active Directory server to make the onboarding process even simpler.

> "We make it as simple to acquire and use technology as possible, so school leaders can put all of their muscle behind their true focus: education."
> –Charles Garcia, director of sales for Cisco's U.S. public sector business

Meraki cloud-managed security appliances include anti-phishing and intrusion-protection capabilities, as well as a SafeSearch feature. The content filtering capabilities make it easy to give students limited access to YouTube videos for educational purposes, while blocking access to inappropriate videos.

Because the Meraki platform is cloud-based, Cisco is able to push out upgrades over the Internet, so schools always have access to the latest network technologies, Stevenson said. The system scales to any size and sends automatic alerts if there is a network problem that needs addressing. Plus, remote troubleshooting capabilities allow previously time-consuming tasks, such as cable tests, to be performed anywhere. For schools with limited budget, staff, and time, the Meraki solution fits the bill.

Collaboration Solutions

Cisco also offers a number of solutions that help students and staff collaborate within or outside of school, such as:

Cisco Unified Workspace: Using virtual desktop infrastructure (VDI) technology, this platform unifies voice, video, and data within a single user experience, allowing students and staff to use the device of their choice for working on or off campus.

Cisco WebEx® for Schools: Schools can use the Cisco WebEx platform for online meetings, office hours, classes, study groups, or review sessions. Cisco WebEx Meeting Center allows you to meet online in real time with parents, staff, and students, without requiring everyone to gather in one place. Interactive features include real-time testing and grading, instant feedback, assessment tracking, breakout sessions, and hands-on labs to deliver a variety of dynamic e-learning opportunities.

Cisco TelePresence®: This next-generation video conferencing technology brings users together for a high-quality, immersive experience. eSN

For more information about Cisco's learning solutions for schools, go to http://www.cisco.com/web/strategy/education/primary.html.

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In the past, learning was constrained by time and place. But today, the transformation to digital is opening a new world of educational opportunities–opportunities not only for students to learn more, but to learn in new ways, in new places, with new connections to resources around the globe.

Cisco is leading this new digital world in education with visionary technologies that support blended learning experiences, worldwide collaborations, and rich online media experiences. From the network up, our solutions are building digital schools, colleges and universities so that campuses are fully connected, educators are fully empowered, administrators are fully informed, and students can learn without limits.

Learn more www.cisco.com/go/education

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