Education 3.0

How some schools are taking 21st-century teaching and learning to the next level

When Hurricane Katrina ripped through Louisiana's Jefferson Parish in 2005, tornadoes took down some school buildings and floodwaters rushed through others—wrecking classrooms and making many facilities in the 85-school district uninhabitable.

Once it was safe to return to Jefferson Parish, school district officials got to work, pulling up soaked carpets, boarding up windows, and envisioning what kind of schools they wanted to see rise from all the wreckage.

What the administrators decided was to rebuild the schools not as they once were—traditional educational environments with very little technology overall—but as a place to empower learners to thrive in the 21st century: something California-based technology and networking company Cisco Systems calls "Education 3.0."

The concept focuses on creating schools where technology isn't just layered on top of traditional processes. Instead, technology is woven seamlessly through all aspects of education, from building security to lesson plans and student collaboration—interconnecting all facets of school life, and truly revolutionizing the education experience.

"When we came back from Hurricane Katrina, we were struggling for food, water, and shelter. Then all of a sudden we got a call from Cisco, saying they wanted to do something," said Dr. Diane Roussel, superintendent of the Jefferson Parish Public School System. "There was so much going on for us, it was hard to concentrate on this. But they brought in their coaches and other organizations, and helped us focus on our outcomes and create the model."

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A $20 million grant from Cisco allowed Jefferson Parish—a district with more than 43,000 students, 80 percent of whom qualify for free or reduced-price lunches—to turn 16 of its schools into models of the Education 3.0 concept, with upgraded data centers, wireless connectivity, network upgrades, advanced classroom technology, and more. The goal is to equip all 87 schools similarly by the fall.

"We went from being a system that used limited technology to a tech-advanced system where every room is touched by technology," Roussel said. "This translates to more joyful teaching and learning. It really works."

Jefferson Parish's success with the Education 3.0 concept has attracted the attention of other districts around the United States, providing educators with a view into a new educational model: teaching 21st-century skills to an increasingly tech-literate student population in a way that is engaging, efficient, and deeply educational.

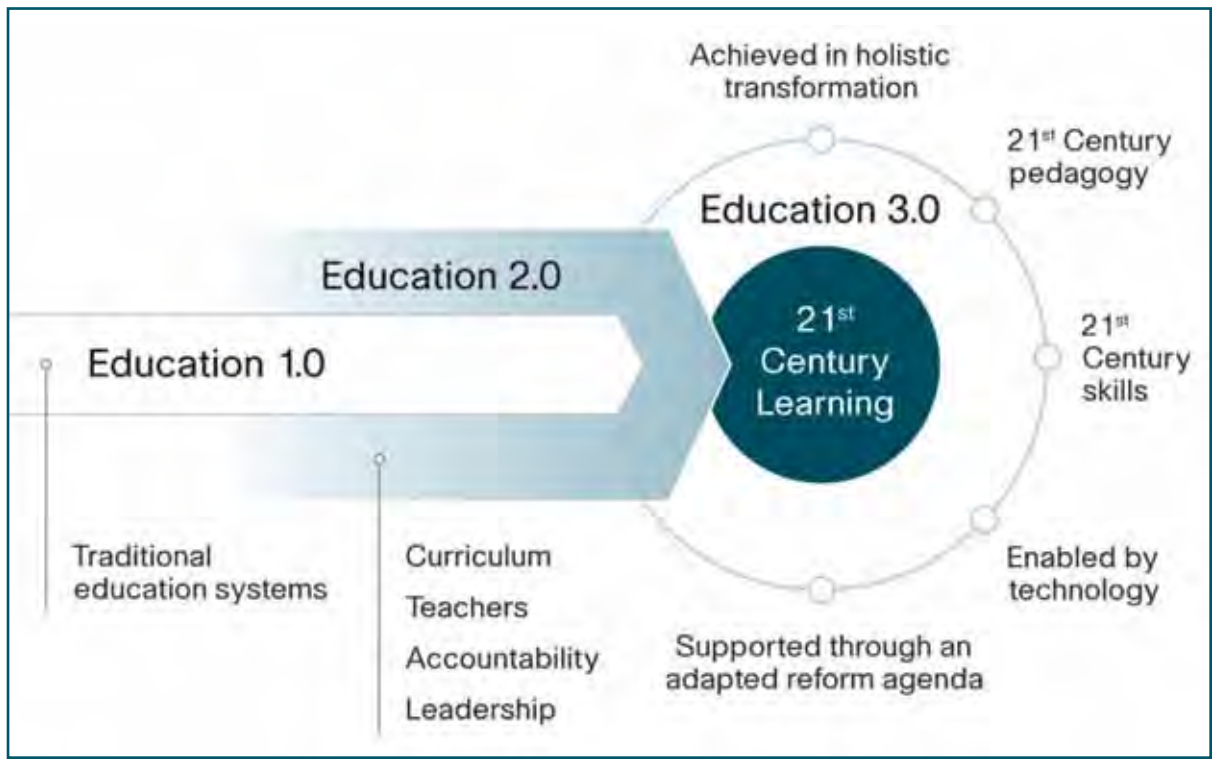
"It's about building a movement for change," said Michael Stevenson, vice president of Global Education at Cisco. "There's widespread excitement about the 3.0 agenda."

Education 3.0 explained

So what exactly is Education 3.0? If Education 1.0 was characterized by a teacher lecturing from the front of the classroom and scribbling on a chalkboard while students were primarily observers and listeners, Education 2.0 took those traditional teaching methods and replaced chalkboards and filing cabinets with personal computers, digital projectors, educational software, and data systems—allowing for massive data collection, as well as some curricular changes and economies of scale.

In other words, schools added computer labs and other technologies to their instruction, but they didn't make those tools a vital, transformational part of the curriculum; for the most part, teachers still imparted knowledge from the front of the class, and students still listened and took notes.

The idea behind Education 3.0 is to take a holistic approach in which technology is as important a part of instruction as the teachers and the lesson plans, and where all three pieces work together seamlessly. Education 3.0, its evangelists say, creates a transformational, hands-on learning environment that help motivate students to develop the skills and knowledge they'll need in the modern world: problem solving, critical thinking, innovation, business literacy, and collaboration.



"With Education 2.0, a lot of the good efforts were siloed. It was a staccato approach—going in and correcting something and moving out and hoping change will be sustained," said Dr. Cynthia Temesi, who—as U.S. engagement lead for Cisco—is the company's voice on Education 3.0. "With 3.0, it's more about holistic transformation. If you're going to make a change in curriculum, for example, you need to understand what technology enables that. What are the system reforms that have to take place?"

Education 1.0 and 2.0 did not focus as much on the real-world skills that students need in a tech-saturated 21st century and beyond, Stevenson said.

"You clearly need to design curriculum and teaching and learning practices and use technology to develop those skills in your students," he said. "So let's say the student was working on a project about climate change. That could bring together several areas of curriculum: mathematics, geography, human biology. The teacher would have the opportunity to design a cross-curricular, problem-solving model that students can really get their teeth into."

On such a project, the students could web-conference with experts around the world and collaborate with children at other schools. The students could use Twitter to post updates on their progress, and use instant messaging to stay in touch with their lab partners. Digital cameras could be used to document images of climate change in their own communities, and the photos could be posted to a dedicated Flickr page or other image-sharing site. The students could broadcast their findings in podcasts and vodcasts.

Teaching students to think this way, and learn this way, will "allow students to be equipped to compete year in and year out," Stevenson said.

There are five components necessary to make this kind of transformation in a school, according to Cisco: (1) influential leaders who have a student-centered vision and offer collaborative professional development, communication planning, and team building; (2) a pedagogy that helps teachers create engaging, innovative, yet relevant work for all students, regardless of their preferred pace or learning style; (3) 21st-century skills included within the standards for core subject areas; (4) continuous evaluation to make sure that best practices become common practice; and (5) collaborative technology that supports student-centered learning, is accessible anywhere, anytime, and accelerates the adoption of components one through four.

This transformation must start with student instruction in mind: Curriculum teams need to develop lesson plans that incorporate technology as an essential component, and one that enables a hands-on, project-based approach to instruction—making whatever adjustments to the classroom environment are necessary. School districts must set up technology-planning teams to assess their current technology, staffing, and workflow, then build a forward-looking technology plan and maintain it. Students must have access to basic technology tools, such as word processing and spreadsheets, as well as always-on connectivity. Teachers—trained properly in the use of new tools and technology to help guide instruction—must select up-to-date content from online resources and edit digital content to personalize the curriculum for each student. And all of this should be standardized across the district to maintain a consistent vision and minimize costs and complexity.

"The phase-in might require three months or a few years," according to a report from Cisco. "It might begin with one subject area, one cross-disciplinary area, one grade level or one school."

To help school systems create the robust technology infrastructure they'll need to realize this Education 3.0 vision, Cisco has developed a framework called "Connected Learning." The company describes this framework as a "roadmap" to help guide schools along the path toward educational transformation. The Connected Learning roadmap includes five key steps:

1. **Saving money by using technology efficiently.** Schools can spend less money by converging several disparate networks onto a single IP network, Cisco says, and they can consolidate and "virtualize" their server resources—which also saves on energy costs.
2. **Investing in the right technologies.** By choosing solutions that can improve efficiencies, create next-generation learning environments, and enhance safety and security, schools can make forward-thinking investments that will pay off for them down the road.
3. **Using the network as a platform.** Implementing the right network architecture will allow schools to use their IP network to deliver a wide range of advanced educational services, Cisco says—from IP-based telephony to video conferencing and streaming.
4. **Taking advantage of funding opportunities.** With the federal economic stimulus package providing several billions of dollars for education, there has never been a better time to invest in ed-tech infrastructure, Cisco notes.
5. **Leveraging Cisco's commitment to education.** Schools can draw upon the company's vast technical expertise in designing their IT systems, and they can benefit from Cisco's various education investments—such as its Global Learning initiative and the Cisco Networking Academy, which uses an online curriculum and hands-on labs to help teach marketable IT skills to approximately 700,000 students in more than 160 countries each year.

For more information about Cisco's Connected Learning roadmap, see the accompanying story *"A roadmap for transformation"* (page 30).

Barriers to adoption

So far, most of the dozen or so schools that are adopting Cisco's Education 3.0 vision are doing so only in bits and pieces. "The best thing we can do is to teach incrementalism," Stevenson said. "You know the destination you want to get to, but many districts can only take very small, incremental steps to get there, because they believe that's all that's possible in today's education culture."

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There are barriers to more widespread adoption of Education 3.0, to be sure. For some districts, cost is a concern, Temesi said. "I've heard different takes on that," she said. "Some keep mentioning the stimulus dollars, and saying funding is not an issue. On the other hand, there are districts that aren't receiving as much stimulus money, or might be having budget cuts."

Still, experts say there are several hurdles that loom much larger than money.

For schools that are accustomed to their traditional ways and are entrenched in their current processes, "there's an emotional barrier," said Mary Anne Petrillo, education marketing consultant for Cisco Global Education. Change is hard, she explained, and there's always a risk involved when you are trying to make a cultural change.

"The board needs to be willing to take [that] risk," Temesi said. "Another piece is the realization that your district leadership, city government, and private industry must come together to create a seamless vision. A lot of times, the tech folks have great ideas and make great purchases, but the administrators don't know why. They all have to come together to understand the importance in designing that vision."

It's also important to make sure Education 3.0 matches up well with the expectations and goals of local government in any given district, Stevenson said. "People are very conscious that their agenda has to resonate with the current legislative agenda at the state or local level," he said. "Sometimes they don't want to take too many risks there."

Teachers are, of course, another crucial piece of the puzzle. "Teachers need to change the way they embrace technology," Temesi said. "Sometimes it can be a show-me process, and once they see the power of what they can do with the technology in the classrooms and how students are reacting to it, that fear and hesitation melts away. It's a shift."

But many schools in the U.S. aren't ready to make a shift; they're still trying to master the elements of Education 2.0, Stevenson said. "They're looking at common standards, use of data, teacher quality. The Education 2.0 battle that's been won in Canada and Europe, Singapore, Korea, Finland—it's a battle not yet won in the U.S.," he said.

Another barrier is assessment. "If you start shifting from a traditional lecture environment to some combination of online and other non-traditional ideas, it challenges the notion of 'seat time' and other assessment topics," said Mary de Wysocki, director of Global Education Engagements for Cisco.

The assessment standards currently in place, and the tests that many schools rely on to gauge student progress, do not mesh with the more interdisciplinary, student-centric thinking of Education 3.0. And if a school has high test scores already, its leaders might not want to mess with what they see as an already winning formula.

"They say, 'Our scores are good, we don't want to change a thing,'" Temesi said. "They've got to get past that barrier." Current tests aren't measuring the skills most valuable to today's employers, she explained, adding that multiple-choice exams aren't preparing students adequately for the fast-paced, critical thinking, multitasking world of the 21st century.

Another potential barrier to adoption of Education 3.0 is leadership. If school district superintendents and other leaders don't embrace and evangelize for the changes necessary with Education 3.0, the idea will stall.

"The leader has to be utterly committed to these goals," Stevenson said. "That's the key with Jefferson Parish. Superintendent Roussel understands Education 3.0. She knows it's about inspiring and aligning high school, middle school, and elementary school principals to follow her lead. She knows it's about moving budget [monies] and other resources to support this direction."

How Jefferson Parish has succeeded

Whereas before Hurricane Katrina students were required to check their technology at the door or confine it to computer labs, the post-storm Jefferson Parish Public School System was determined to bring in as much good technology as possible.

"When we walked around the schools two years ago, we saw they had video conferencing equipment but no one used it," de Wysocki said. "We helped them understand what they had, and helped work on viral adoption."

Given the size of the Jefferson Parish school district, "we decided on a phased approach," said Dr. Mable J. Moore, chief technology officer for the Jefferson Parish schools. "We began with eight schools. Then we put together a roadmap for the remainder of the district's schools. From that roadmap, we decided to take that model and replicate it in phases."

The students were an easy sell; they were already accustomed to using cell phones, laptops, the internet, Facebook, and Twitter in their personal lives. The teachers, though, were a different story—some had just begun to embrace eMail—and were given intensive professional development to ready them for the Education 3.0 environment. They were trained in the use of laptops, interactive whiteboards, online communities, student-centered teaching and learning, web page design, video conferencing, and other aspects of technology integration.

"I told Cisco, 'Don't just give me stuff.' I need people who can help us," Moore said. "We are teachers. We haven't grown up with all of this. We haven't

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The case for dramatic school reform

As a global market leader, Cisco has seen the need for skilled 21st-century workers firsthand. In a report titled "Equipping Every Learner for the 21st Century," Cisco explains why a shift toward its vision of Education 3.0 is necessary.

Learners are changing

"How can traditional modes of classroom instruction engage and inspire students, when life outside the classroom has changed so dramatically?" the report asks. It notes that in 2007, United States teenagers spent 40 percent of their media time on cell phones, the internet, and computer games—up from 16 percent in 1998.

"For many learners, class is the only time in their day when they completely 'disconnect,'" the report says.

More recently, as the Web 2.0 phenomenon has swept the globe, it has enabled anyone to become a creator—such as a filmmaker on YouTube, or an opinion leader on blogs and social-networking web sites. Students who have grown up in a Web 2.0 world are no longer content to sit still through a 40-minute class period and passively take in information.

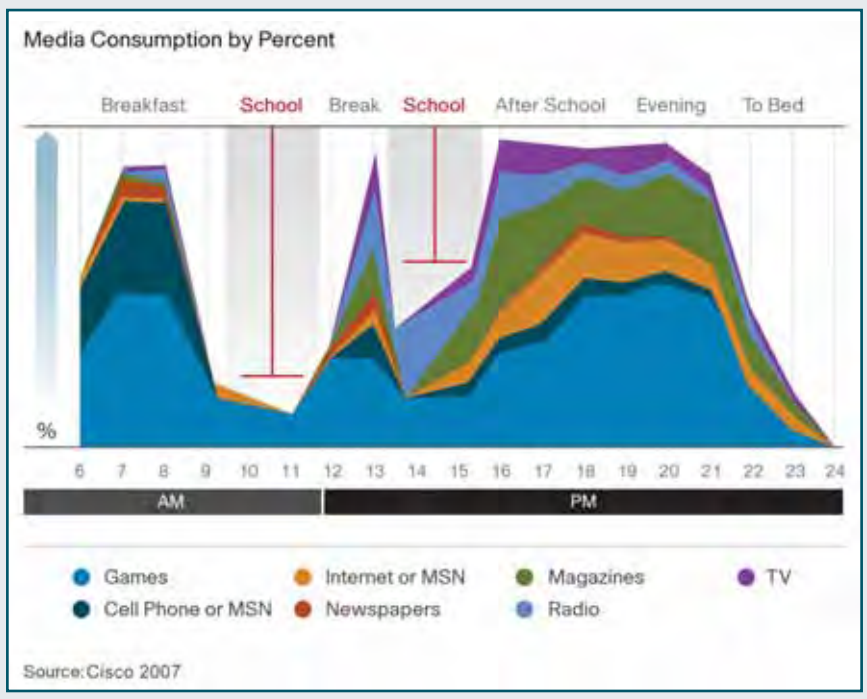
Employers need new skills

At the same time that learners' needs are changing, so, too, are the needs of companies as they confront the challenges of the new global economy.

According to the New Commission on the Skills of the American Workforce: "A swiftly rising number of American workers at every skill level are in direct competition with workers in every corner of the globe. … The best employers the world over will be looking for the most competent, most creative, and most innovative people on the face of the earth and will be willing to pay top dollar for their services."

About 70 percent of new jobs created in the United States from 1998 to 2004 relied on interactions between people and involved judgment, insight, and collaboration, Cisco reports—which underscores the need for workers who can communicate and collaborate effectively.

"Wages for these types of jobs have grown faster than the economy as a whole, suggesting that those who are prepared for an interaction-oriented economy will have a competitive advantage," the report says. This and other trends "have led learners, employers, and global citizens to demand more from their education systems."



Education 3.0 will enable the proper paradigm shift, Cisco says. The ideas behind it are appealing to school systems, but adoption and reform are happening slowly around the country and world. "So far, school system reform is far from universal," according to the report. "It has taken root in a limited number of countries, and in only some districts and schools within them." eSN

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A roadmap for transformation

Jefferson County, La., schools aren't the only ones benefiting from Cisco's extensive IT experience. For example, South Carolina's Greenville County Schools saved $400,000 by converging its telephone system onto its IP network. Alabama's Mobile County Schools reduced the time it takes to distribute in-service training videos from two hours to 20 minutes. And Florida's Ave Maria University saved approximately $1.5 million by avoiding unnecessary cabling in its campus design.

All of these cost savings were realized as part of Cisco's Connected Learning framework, which helps schools build the IT infrastructure necessary to deliver an Education 3.0 experience for their staff and students.

This "roadmap" to success includes five critical components: (1) saving money by using technology efficiently; (2) investing in forward-thinking technologies; (3) using the network as a platform for delivering advanced educational services; (4) taking advantage of available funding opportunities; and (5) leveraging Cisco's knowledge and commitment to education.

"Schools are always facing challenging constraints: saving money, investing, being prepared for the next generation," said Renee Patton, manager of worldwide industry marketing for Cisco. "This allows them to be more efficient, use networking as a platform, and leverage their economic stimulus funds."

Saving money

Schools can save precious IT dollars, Cisco says, by following three simple steps: converge, consolidate, and conserve.

"Converge" means to combine several different networks onto one secure, robust IP network. This lets you operate and manage all your systems through a single network infrastructure—giving you a great deal of control and cost savings.

Traditionally, schools have established separate, "siloed" networks for functions such as data, voice, video, clocks, alarms, bells, security systems, energy-management systems, and so on. But each of these separate networks takes time and money to operate.

Imagine the power of converging all of these disparate systems onto a single wire: Wouldn't it be so much easier to operate your bells and alarms from the IP phone on your desk? Imagine being able to control heating, air conditioning, and lighting from a single district location. And, what if your safety and security systems were integrated to the extent that a fight in the cafeteria could be captured on video surveillance, beamed to the front office, and automatically logged?

A single, converged IP network is a powerful system, Cisco says. It helps ensure that you have the information you need when and where you need it, and it also gives you the capability to deliver voice, data, video, alerts, and more—all on the same wire.

"Consolidate" means to reduce the number of file servers and fully functioning PCs you're running by "virtualizing" their computing power, or transferring this power to the network instead.

Rather than running 30 separate PCs in each of a dozen classrooms, all with their own separate set of operating systems and applications, imagine having thin clients in each classroom that can boot and access applications from a single data center in the district office.

All of a sudden, your IT department moves from managing 360 separate systems to managing overall network transport. Your IT staff can update and standardize operating systems and applications automatically from a central location, without having to visit each classroom individually. That extends the reach and effectiveness of their often-limited resources.

"Conserve" means to save valuable time and energy by converging and consolidating your network resources. For instance, districts would realize tremendous energy savings by moving from 3,000 separate PCs to 3,000 thin clients, which use less power. Think of the money that would save on utility bills alone.

Investing in infrastructure

By investing in the right technology infrastructure, schools can benefit from solutions that improve efficiencies, such as video-based teacher training systems and digital media systems for communicating with parents. They can create next-generation learning environments with digital media, podcasts, and wikis to help students acquire 21st-century skills. And they can enhance safety and security with technologies that protect students' privacy and prevent system infections.

For example, Horizon Charter School in Lincoln, Calif., reduced its communications costs and boosted its efficiency by replacing its old telephone system with IP telephony and implementing Cisco's Unified Communications solution.

The move proved "more cost-effective than our previous telephone system," said IT Director Larry Monson. "We no longer have to bear the cost of a Private Branch Exchange, its maintenance, or a separate phone system, and we gain far more control" over communications. The school also realized greater network security and improved its emergency notification capabilities at the same time.

Using the network as a platform

Over the next three to five years, predicts Cisco CEO John Chambers, "the network will evolve from the plumbing of the internet—providing connectivity—to the platform that enables people to experience life."

What he means is, the network itself enables all of the transformations inherent in Cisco's vision of Education 3.0 and its Connected Learning framework. The network serves as the foundation for a school system's servers, middleware, databases, collaboration applications, business applications, teaching and learning applications, media, storage, and client machines.

Cisco can help build a network infrastructure that integrates Quality of Service (QoS), data security, unified communications, mobility, multicasting, and video capabilities—all customized to meet the needs of individual districts.

Maximizing funding

Cisco says it can help schools and colleges find and apply for appropriate funding sources to help pay for their ed-tech investments, including the historic American Recovery and Reinvestment Act (ARRA), the e-Rate, and other federal programs. The company lists a number of resources on its web site, with product recommendations mapped to available stimulus funds.

ARRA provides $650 million for educational technology in fiscal years 2009 and 2010, plus billions of dollars more for programs such as Title I and the Individuals with Disabilities Education Act. The e-Rate is a $2.25 billion annual fund that provides discounts ranging from 20 percent to 90 percent on telecommunications services for eligible schools and libraries.

Cisco also offers special pricing and financing deals for schools, including a Digital Media System Starter Pack that features lower pricing on 10 flat-panel displays, making it easier to get started with digital signage, then expand as needed; a 10-unit Eco-Pack of its 802.11n wireless access points; specially priced bundles of its Catalyst 4500 E-Series network switches; and the Cisco Capital program, which offers no payments or interest for three months on all Cisco hardware, software, and bundled services.

Understanding education

Cisco school customers can leverage the company's deep commitment to education, taking advantage of programs such as the Cisco Networking Academy.

Established 10 years ago, the Cisco Networking Academy is a unique public/private partnership that is helping to prepare more than 800,000 students in the United States and Canada, and more than 2.7 million students worldwide, for careers in information technology. The program provides interactive, web-based learning with continuous student access to a no-cost curriculum, hands-on labs (using discounted equipment), and online assessments.

The program's curriculum is designed to augment traditional technical education with hands-on skills training in the latest networking technologies. The curriculum has been devised to give students an understanding of networking theory and principles, and the practical experience they need to build and maintain networks, regardless of the specific vendor products used.

Cisco also is involved in the Partnership for 21st Century Skills, an industry effort to infuse the core school curriculum with key 21st-century skills such as problem solving, critical thinking, communication, and collaboration. And its Global Education initiative aims to help design the next generation of assessments that will help measure these skills. eSN

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been to school for all of this. So they came in and sent trainers from all different walks: communications, engineering, and more. They would help us see the future of the technology."

Said Roussel: "The whole culture change is the amazing part of what's happened."

Jefferson Parish now offers its students access to technology in every classroom. Baseline classroom components include teacher laptops, ceiling-mounted projectors, pull-down screens, audio speakers, and IP telephones. Other classrooms also have interactive whiteboards with student response systems, handheld devices for reading assessment, network printers and scanners, digital cameras and video camcorders, web cams and handheld GPS devices.

Students can take college preparatory classes online through the Patrick Taylor Science and Technology Academy. The Cisco Networking Academy provides online courses, simulations, and lab activities to prepare students for careers in IT and networking. The Louisiana Virtual School provides high school students with standards-based courses delivered by certified teachers. Elementary and middle school students work in partnership with Cisco and New Orleans-area museums to conduct research and create podcasts that are used for audio tours at the museums.

For the district's special education students, particularly those confined to their neighborhoods, "this has opened up worlds to them," Roussel said. "Our students run the gamut from gifted to special education to high-income to low-income. We have suburban, urban, and fishing village. We're a multidimensional school system that has diversity, and this seems to work with all of them."

Technology integration specialists work with teachers to help integrate technology into their lessons. Professional development resource teachers work in the schools to focus on lesson-plan development and modeling. Technology coordinators oversee the use of technology in the schools and make sure it's functioning. "Digital opportunity trust interns," who are college students, work 20 hours a week in the schools to assist teachers with tech integration. And design teams from the Schlechty Center—a private, nonprofit organization that focuses on education innovation and student engagement—help maintain student-centered teaching and learning practices.

Teachers use wikis to post information on student work and blogs to collaborate around lessons. District administrators, teachers, and students use podcasts and vodcasts to present work. And the IP-based telephony service Skype is used in the classroom to allow for collaboration with other students in the district, state, country, and around the world.

"The veteran teaching group might have been feeling a little stale and a little reticent before the technology came along," Roussel said. "Now, we're seeing them really embrace it."

Said Moore: "A lot of the older teachers liked technology but were worried they would design lessons with it and then the technology would not work. Many of our teachers are past that now. They're not afraid. They understand the technology is an enabler."

Enabling innovation

Hand in hand with these pedagogical changes have come dramatic changes in the district's underlying infrastructure—which has "chang[ed] the way we do business," Roussel said.

The facilities have Cisco IP video surveillance systems and emergency plans that will be available online via cell phone or downloadable from iTunes. A Cisco Digital Media System now allows for live video streaming of monthly school board meetings. Follett's Destiny Library Management software offers a web-based tool to manage library resources. Parent web portals and school-based data dashboards are currently under development, and soon the schools will have a content management system that will provide storage and access for podcasts, video, and photos.

"You cannot just buy this equipment. It doesn't work that way," Roussel said. "You're not going to see any change in the way learning and teaching is done. You have to redesign the lessons, and then the technology and the tools become the innovation enablers."

The students have responded well to the Education 3.0 vision, Roussel said. "We're reaching children we've never reached before. I've seen students more engaged," she said. "No classrooms with rows of seats. Everyone is gathered around a board, or in separate groups around laptops. You see the kids are excited. They don't want recess or PE or to go home."

In some school districts, the parents might stand in the way of the cultural shift it takes to adopt Education 3.0, Petrillo said. "If they're used to opening a textbook and getting information that way, this new way to access information might be frightening, or give them pause," she said. "So you really need a leader who is mindful of communicating the paradigm shift and helps parents come on board with it."

In Jefferson Parish, however, the feedback from parents has been largely positive. Though a few families expressed reservations about having their children bring home laptops—worried about being responsible for the equipment—most are "excited," Moore said. "The parents are learning so much, too."

Said Temesi: "The stakeholders are all in line, and they're credible and influential. It's all about the leader sharing the vision and making that vision happen."

By partnering with Cisco to implement its vision of Education 3.0, Jefferson Parish is seeing significant improvements in its learning outcomes: 5 percent year-over-year improvement in test scores; rising graduation rates, AP enrollment, and attendance; and engaged students learning from enthusiastic teachers.

"The test scores in Jefferson Parish have been high for two years," Stevenson said. "That shows that this is working."

Cisco and the leaders at Jefferson Parish hope the district's success story will inspire other school districts around the country and the world to take the leap into Education 3.0—at whatever pace and level works for them.

"Education 3.0 is something that's descriptive rather than prescriptive," Temesi said. "We celebrate schools that are doing pieces of this. You have to think of it as a journey, and the journey might shift and change depending on new technology, new system reforms, and new ways of thinking about curriculum and pedagogy. It's not static; it's something that's living and breathing." eSN

LINKS:

Jefferson Parish Public School System
http://www.jppss.k12.la.us

Video of Jefferson Parish officials discussing their Education 3.0 investment
http://www.youtube.com/watch?v=THg8E0T7Xek&fmt=18

Cisco Global Education
http://www.cisco.com/web/strategy/education/index.html

Cisco Networking Academy
http://www.cisco.com/web/learning/netacad/us/index.html

Four key components of Education 3.0

Education 3.0—which focuses on the individual learner, makes learning available at all times, and uses technology as a key driver and enabler—is built upon four pillars:

1. Curriculum, Pedagogy, and Assessment

This involves…

- A student-centered, personalized approach to instruction;
- Interdisciplinary and project-based work;
- A 21st-century curriculum that integrates skills such as problem solving, critical thinking, communication, and collaboration into the core curriculum areas; and
- Authentic assessments that measure these key 21st-century skills.

2. Infrastructure and Technology

This requires…

- A forward-thinking technology vision, led from the top;
- The creation of flexible learning spaces for students;
- A robust IP network that can support several interconnected learning and administrative systems simultaneously;
- Ubiquitous access to technology for all staff and students; and
- Sustained, targeted, and integrated staff development in both technology and pedagogy.

3. Policies, Procedures, and Management

This includes…

- A well-governed and managed system, with clear policies and procedures for using technology to transform education;
- A "change management" plan to guide this educational transformation and ease the transition;
- Data-driven accountability and decision-making; and
- An integrated ecosystem of partners.

4. Leadership, People, and Culture

This requires…

- Visionary leadership;
- Excellent teachers, principals, and system leaders; and
- An ambitious, collaborative, and innovative school culture.

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