Reinventing Education, Revisited

*Two years into San Diego's plan to transform education with the
help of technology, here's a look at how the project is going*
—and what the district has learned

The slumping economy hasn't been kind to schools, especially in California—but that hasn't deterred the San Diego Unified School District (SDUSD) from its ambitious plan to give all students a technology-rich education.

Two years ago, the district embarked on a five-year journey to transform its classrooms and completely revamp the way San Diego students learn. Since that time, the i21 Interactive Classroom Initiative (i21) has expanded into more than 1,300 classrooms and has distributed some 78,000 netbooks and other mobile devices to teachers and students.

Although district leaders have run into several challenges—most notably funding—they're also starting to see results.

"i21 really creates an environment for learning across our district," said Barbara Allen, director of educational technology for SDUSD. "It's an opportunity to change the way we do things based on new tools, resources, and focusing on 21st-century skills that students need to be able to survive in today's world."

Across the board, teachers have reported an increase in student engagement, more attention to the tasks at hand, and a more enthusiastic response to lessons, because students enjoy learning in this new medium, Allen said.

Reinventing Education, page 18

Reinventing Education ...

continued from page 17

Across the board, teachers have reported an increase in student engagement, more attention to the tasks at hand, and a more enthusiastic response to lessons, because students enjoy learning in this new medium, Allen said.

Teachers also say the technology helps them manage their classroom, helps students who otherwise have struggled in some subject areas, and helps students locate information and develop valuable workforce skills.

As SDUSD strives to reinvent education, its experience and the lessons it has learned could help other districts that are considering similar projects.

"This is [about an entire] environment; you can't say it's [only] about technology," Allen said of the city's efforts. "When you merge good teaching and good curriculum using i21 tools as the platform, then things really start to happen." She added that the project requires all of these elements working together in order to succeed: "It is [about] all of the above in changing the environment, and how we do things, and how we think differently."

Early adjustments

i21 is funded through Proposition S, a $2.1 billion bond measure that passed in November 2008, allotting about $480 million to technology and infrastructure-related work. The district leveraged eRate funds and stimulus funding to pay for ongoing professional development, system maintenance, and other costs.

The i21 classroom pairs Promethean Activboard interactive whiteboards with Lenovo student laptops to engage students' interest and get them excited to learn. Computer workstations, teacher laptops and workstations, audio-visual systems, student response systems, document cameras, printers, wireless access points, and continued training also are included.

Year one transformed classrooms for students in grades three and six, as well as high school math classrooms. Last year, classrooms for grades four, seven, and high school language arts were upgraded. This year, the focus is on grades five and eight, along with high school social studies classrooms. The fourth year will focus on first-grade classrooms, as well as more high school classrooms, and the fifth year will update kindergarten and second-grade classrooms, as well as completing the remaining high school classrooms.

High school science classrooms will be among the last to receive an upgrade, owing to preconfigurations that have made it more challenging to upgrade these rooms.

The five-year plan has not veered much from its original course, although new technologies and developments in ed-tech deployment have allowed the district to experiment with devices and technologies it didn't think were possible a few short years ago. New opportunities, meanwhile, have presented the district with the chance to expand its reach.

"We said that what we do in year one will look nothing like what we probably will be doing in year five," said Darryl LaGace, SDUSD's chief information and technology officer. "It's very hard to lay out a five-year plan around something as [rapidly] changing as technology."

The district is conducting an Android pilot and an iPad pilot. The iPad pilot began late last spring and will continue through November at various grade levels and school sites.

"We see the iPad and Android devices as two major shifts, as kind of game-changers when it comes to what we would be doing as far as handing students devices," LaGace said.

SDUSD also is one of 20 school and library sites selected to test the Federal Communication Commission's "Learning on the Go" wireless pilot program, which uses eRate dollars to support off-campus mobile internet connections for students.

"It's pretty exciting, because we're probably one of the largest pilots from a national perspective—but more importantly, the impact and potential that this could have … are huge," LaGace said. FCC Chairman Julius Genachowski, he said, "is really considering taking this data and changing the eRate rules, changing the funding mechanism that would allow schools to tap into this money and offset the cost of [wireless] broadband."

In SDUSD, the "Learning on the Go" pilot will reach sixth-grade students in eight middle schools and is school-wide in two additional middle schools, reaching more than 3,000 students in all.

"Teachers, as long as there is no access issue, will shift their thinking. … They will really immerse themselves in [the possibilities]," LaGace said. "That's exactly what we're seeing when we ensure that every student has access to broadband."

But above all, LaGace said, the i21 plan's premise remains the same: "We are following our grade-level rollout and are strategic in the fact that no third grader will walk into a classroom, from 2009 and on, without a very different learning opportunity."

Leading the way

Leadership and communication have proved critical to an undertaking of this magnitude, and district leaders have made a conscious effort to involve all stakeholders in the i21 process.

"The San Diego experience has been very open, very transparent, and pretty consistent—there is consistency in communicating and outlining the strategy," said Darrell Stewart, enterprise account manager for Intel's public-sector business. Stewart has worked with SDUSD officials and its ed-tech partners to help them understand the different levels of engagement necessary to make a one-to-one computing program successful.

In fact, the district's open communication and its commitment to involving not only administrators and teachers, but also parents, community groups, and businesses, has helped the initiative remain on a successful path—despite the uncertainty created by a weak economy.

"If communication is there, people are more willing to step outside of their comfort zones," Stewart said. While there are many political factors involved, he said, "at the end of the day, [it's about] making sure [people understand] that what we're doing is not trying to eliminate teachers' jobs, not trying to hurt folks—we're trying to make a better environment for the students."

Leadership is "absolutely essential" to an initiative such as i21, LaGace said. "The leadership matters at all levels, but most importantly, when you're asking a teacher to make such a shift in [his or her] delivery model, you have to have a supportive leader in your principal."

Principals must be willing to take risks and must understand what a new teaching and learning environment looks like, he said—and they must know how to measure success in that environment differently.

A look inside an i21 classroom

Harlan Klein, principal of San Diego's Innovation Middle School (iMiddle), said the i21 initiative has transformed students' attitudes toward learning.

iMiddle students receive netbooks that operate with 3G wireless connectivity paid for by the school. Students bring their devices home and can connect to the school's network from anywhere, but school filters and firewalls remain in effect—blocking access to questionable or unsafe websites on school grounds as well as at home, a library, or other location.

The school achieved the top ranking on the state's most recent Academic Performance Index.

"All our data suggest that not only are the most exceptional students making progress, but all students are making progress," Klein said. "We're raising achievement from the ground up."

Klein said iMiddle has "virtually eliminated the far-below achievement gap" through its one-to-one program. "I attribute a lot of our success to our technology integration," he said.

The i21 initiative has "definitely provided more accountability for students" through the use of Zangle Gradebook, he said, which gives students and parents access to assignments, homework, and school communication online.

In addition to the online gradebook, iMiddle teachers maintain classroom blogs or Moodle sites. Tests and quizzes are delivered electronically, which gives students and teachers immediate feedback on performance and weak areas.

All student work is saved to student profiles housed on the district's network, and that work remains accessible during students' time in the district by using the student's Active Directory ID number.

If iMiddle students go on to high school and have difficulty with a math course, Klein said, they can "go back to their student portfolio and look at their saved notes from the previous year, and watch their former teacher's video post explaining the concept—it's all saved electronically."

The technology has "dramatically increased the students' motivation and their ability to recognize where their own inadequacies are," Klein said, adding: "It really has helped teachers differentiate their instruction, and they're able to target specific students for specific intervention based on the data."

Klein said i21 has helped otherwise shy students participate in classroom discussions, because they feel comfortable using the i21 technology tools in the classroom. He said student engagement is one of the biggest successes to emerge from iMiddle's part in the i21 initiative.

The curriculum exhibits "a much higher relevancy to the work students are doing," he said. "Learning is more meaningful for students, because they have ownership of it. That ownership and responsibility

Learning is more meaningful to students.

have been critical to our success. There are very few times in any classroom where it's a stand-and-deliver type of instruction. The engagement is vastly increased, because there's such diversity in how things are presented."

For example, teachers assign projects to students, and while those projects must contain certain elements, students are allowed to use nearly any technology, delivery method, and media they wish to complete the project.

"Students feel a lot more engaged in their curriculum, because they have ownership over what they're learning and how they're learning it," Klein said. "Because they have that freedom, I've seen students take a lot more risks, and they put more time and effort into projects and assignments." **eSN**

Reinventing Education ...

And although school district leadership might initiate such a large-scale project, all stakeholders must be involved in the planning.

"Like any major change in the public or private sector, it has to be leveraged from the top, and hopefully it's not viewed as top-down as much as a collaborative up-and-down effort," said SDUSD Superintendent Bill Kowba. "We believe that parents, students, and staff are going to buy into it and work just as fervently to make it happen. And I believe we have that in this district. Kids were early adopters, if not natives—all we did was give them the green light to use those skills in the classrooms."

While the district's stakeholders have embraced change, some have been more willing than others to jump in head-first. Some parents and teachers needed encouragement and support as the district incorporated new technologies—and new teaching methods, too—into its classrooms.

"For us, this initiative was a huge movement," Kowba said. "We were leaving the industrial age of black chalkboards and analog-type thinking. I don't know how any district, of any size, can do something like this without having the school board and top leadership signaling to all stakeholder groups—staff, parents, community groups—to say that we value this as a major movement, that we're leading and advocating."

"Some districts are better prepared and understand what it takes, organically, and others have to get there," Stewart said. "Sometimes it's part of the wariness of the district [leadership] to embrace technology. Organically, they [know] it's more than just dumping a bunch of laptops in a classroom—they'll have to change how their organization does things. That brings a certain level of discomfort. It involves drastic strategic changes."

Digital challenges … and opportunities

SDUSD, which operates a virtual high school, is hoping to lead a change when it comes to online learning policies, which now allocate state funding based on seat time, or the amount of time a student is physically present in a school.

"When you shift some of your delivery to more of a blended model, that presents a certain set of challenges in our attendance accounting rules and practices," LaGace said.

Social networking sites, and finding a balance between their educational value and student safety, present another hurdle.

"We're moving to a model where we want to educate students … about their appropriate online behavior, so that we can open these things up a bit more," LaGace said. District IT staff are developing social media guidelines for both staff and students, and they're updating the district's acceptable use policy.

"I think all the tools out there for kids and teachers are very powerful, and there's a lot of benefit, but we have to make sure that we have the guidelines in place so that we can allow the kids this access," LaGace said.

He added: "People are trying to follow existing policies and rules that maybe don't fit anymore."

LaGace said he envisions classrooms offering students a much more digital learning experience.

"We're headed down a path of really a much more digital delivery model for content, feedback, and formative and summative assessment," he said.

"I also see a lot more opportunities to have individualized learning, to have kids making equal if not greater growth [in a digital classroom] than what we would have seen in a traditionally paced model that we'd [get from] a textbook."

Funding obstacles

Despite its success in securing the bond that financed the i21 initiative, SDUSD is not immune to making tough financial decisions.

Last year, SDUSD was forced to cut nearly $100 million from its operational budget. "We lost the most teachers we've ever lost at any one time," LaGace said, estimating that close to 500 certificated positions and 600 classified positions were cut.

California's state legislature has presented a balanced budget, but if state revenues do not come in at the percentage predicted in the budget legislation, lawmakers might have to kick in "trigger legislation" that would prompt mid-year cuts.

"That's challenging on a couple of fronts," LaGace said. "The project is funded by the bond, so it tends to stay on track fairly well, but what we see is a challenge from these hits to education in general—you spend time, train teachers, and now when you have to deal with things like the layoffs we [had] last year, teachers are bouncing around. That's been a difficult thing for us to manage. That's a problem, whether you have the technology or not."

LaGace said teachers who have been trained in i21 classrooms might be bumped to classrooms that are not yet upgraded, and teachers who have not received i21 training might be placed in an i21 classroom and be forced to "rush" their training.

"You might have someone diving into an i21 class-

Teachers have reported an increase in student engagement and enthusiasm, and many achievement indicators are on the rise as well.

Reinventing Education ...

room who doesn't have the experience," LaGace said. "But the kids all have the experience. They're expecting it."

The district is working on a sustainability model to ensure that it does not run into a situation where it cannot afford to maintain its existing technology when the i21 project's five years are up.

When SDUSD delivered its end-of-year report to the school board last spring, it had "a packed room of excited teachers and principals who wanted to share what the difference was," LaGace said. "Now, even in tight bud-

get times, we're saying to superintendents, to our offices, 'We need to start building up sustainability funds so that once we get past our five-year plan, we can continue.' We have modeled it out, and we're working on it."

Professional development

While Proposition S provided funding for the i21 Initiative, it did not pay for teacher training.

"As a district, we've had to invest in professional development training," LaGace said. "We're really challenged for dollars, but [spending on professional development] ensures that we're investing in this [project], and a lot of departments know that we're investing in these dollars to change our district."

SDUSD offers teachers between 18 and 36 hours of

professional development opportunities per year year, and LaGace estimates that on average, teachers receive close to 30 hours of training.

"The money could be spent in other ways; there's no question, especially in these tough times," he said. "But the school board committed to knowing that it can't roll this initiative out without funding the teacher training. It would be the worst thing to do."

Having educators perform a self-assessment to identify where they are in terms of technology comfort—for instance, if a teacher is a beginning user, or an innovator—has helped SDUSD identify how to best acclimate teachers to teaching with the technology.

"The teachers are significantly moving up the scale, and moving as a faster rate," LaGace said. "In our first year, we had about 85 to 86 percent participation among teachers, where they were integrating the technology multiple times a week or on a daily basis."

By the end of the second year, LaGace said, participation was around 90 percent.

"They might all be at varied levels [of technology use], but they're not at a point where they're not using it," he said.

Allen, the district's ed-tech director, offered more insight into how teachers are adapting to the change.

At the beginning of each school year, teachers who are new to the i21 program are asked a series of questions about how they use technology and what classroom methods they use, she explained. At the end of the year, those teachers answer the same questions after having taught in an i21 classroom.

Last fall, more than 70 percent of the incoming i21 teachers said they use lectures, note-taking, or reading text to introduce new information to students. In the spring, after their time in an i21 classroom, the percentage of teachers introducing new materials with those low-tech methods dropped to 37 percent.

Among the same group of teachers, only 26 percent said they used some sort of digital tool in the classroom, such as a website or video, in the fall. By the end of the school year, 62.8 percent of teachers had made the shift to using more interactive visual and auditory tools.

"There was a shift in how teachers present information," Allen said, noting: "They're beginning to change their practice."

Teachers who are new to i21 receive an introduction to the program and the technology, and they get their equipment at that time. What's important, LaGace said, is that teachers return to a classroom where the equipment is already installed and functioning, so they can begin using the technology immediately. Teachers then attend two more in-depth training sessions before participating in a student engagement training component in the fall.

This year, the district's curriculum office identified new student achievement goals that incorporate technology use. SDUSD has partnered with Sublime Learning to deliver online tutorials in how to teach with the technology.

Another important point to note is that professional development is ongoing.

"Just because you get training, to think that there isn't work for year one teachers to do in year two is absolutely not the case," LaGace said. "Our training is compounding—the more teachers we bring on, the more veteran those teachers become."

He added: "It's amazing to enter year one rooms a year later, after those teachers have the training and experience under their belts; you walk in those rooms, and they are like night and day. It's just amazing what they are doing."

SDUSD also is introducing a Digital Lead Teacher project, which is now in a pilot phase. The district is divided into clusters, and within each cluster, an elementary, middle, and high school teacher will receive specialized training around teaching with technology.

"It's not as much about technology as it is about supporting the teachers on their campus," LaGace said.
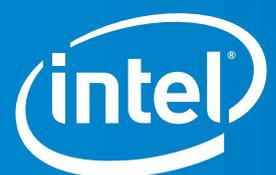
10 Indicators of SDUSD's Success

Student Success Indicators	2007-08	2008-09	2009-10
Number of Schools Named California Distinguished Schools	6	6	**16**
Percentage of Students in Grades 2-11 Scoring at the Proficient and Advanced Levels on California Standards Test in English Language Arts	47%	52%	**56%**
Percentage of Students in Grades 2-11 Scoring at the Proficient and Advanced Levels on California Standards Test in Mathematics	42%	46%	**49%**
Percentage of Students in Grades 2-11 Scoring at the Proficient and Advanced Levels on California Standards Test in Science	42%	49%	**57%**
Number of Schools With an Academic Performance Index (API) State Score of 800+ (800 is the State's Goal for High Performing School Designation)	59	76	**86**
Number of Schools With an API Score of 900+	13	20	**22**
Number of Title I Schools With an API Score of 800+	31	47	**59**
Number of Schools Meeting State API Sub-Group Standards	91	116	**116**
Number of Advanced Placement Exams Taken by High School Students	9,272	10,288	**12,267**
• Number of AP Exams Taken by African-American Students	436	610	764
• Number of AP Exams Taken by Asian Students	2,955	3,155	3,651
• Number of AP Exams Taken by Hispanic Students	1,829	2,484	3,106
• Number of AP Exams Taken by Native American Students	60	44	52
• Number of AP Exams Taken by White Students	3,954	3,949	4,417
Number of Students Expelled from School	381	280	**247**

Reinventing Education ...

continued from page 20

"We're working on leadership at multiple levels—with principals, area superintendents, and the school board, all the way [down] to creating these digital lead teachers."

Through the pilot project, experienced i21 teachers are able to offer support to their colleagues whose classrooms have been upgraded just recently, which can help these novice i21 teachers gain confidence in using technology.

"Our teachers are very sharing and very supporting, and the Digital Lead Teacher [project] is going to help that effort even further," LaGace said. Lead teachers are selected from the i21 initiative's year one group, meaning they have been immersed in the training from the beginning. They will attend grade-level meetings and curriculum meetings and are available to help and support their peers.

The pilot will expand to more schools in November, with a goal of expanding it to all district schools in the 2012-13 school year.

In training teachers how to use technology to enhance instruction, SDUSD follows the Technological Pedagogical Content Knowledge model, or TPACK,

Superintendent Bill Kowba said the district's goal is not to showcase shiny new objects ("It's not about the decor in the room"), but to elevate student achievement, reduce achievement gaps, and increase graduation rates, among other objectives. "Three years from now, all classrooms will be 'smart' in nature," he said. "We can get there, but it will take a lot of continuous effort."

a relatively new professional development concept that focuses on how educators can integrate technology into their instructional practices effectively and effortlessly.

LaGace said TPACK been a "good cornerstone" as the district moves through the initiative.

TPACK is the work of Punya Mishra and Matthew Koehler, both associate professors of educational technology at Michigan State University's College of Education.

At the center of the concept is how three knowledge areas—technological knowledge, pedagogical knowl-

edge, and content knowledge—intersect with one another.

The concept is built on Lee Shulman's idea of Pedagogical Content Knowledge, which examines the relationship between what an educator knows, and how he or she then transfers that knowledge to students in ways the students will understand, even if the subject matter is quite complicated.

Instead of emphasizing either teacher subject knowledge or pedagogy in isolation, Pedagogical Content Knowledge recognizes that the intersection between the two is important. When examined, that relationship can reveal which teaching methods are most appropriate for the content in question—and how this content can be restructured for better transfer of information.

TPACK takes this idea of Pedagogical Content Knowledge one step further, blending technological knowledge into the mix.

The blueprint

SDUSD has followed Intel's K-12 Computing Blueprint as a loose model for its technology implementation and project management.

When enough time and thought are devoted to the blueprint's components—including leadership, funding, infrastructure, professional development, and digital content—those components create an environment in which the results meet or exceed expectations, Intel says. Policy occupies the outer circle around each blueprint component, as it influences all aspects of education.

(To learn more about Intel's K-12 Computing Blueprint, see the sidebar "A blueprint for ed-tech success.")

According to the blueprint, selection and purchase of student devices should not be the initial focus.

"You can't look at it from a device-centric perspective," Intel's Stewart said. He said what really resonated with SDUSD officials was that "its vendor community was trying to be partners, and not just trying to dump a product on them."

Planning an approach and defining the project's goals should come before project leaders even think about specific devices, Stewart said.

"The blueprint is one of the things we pointed out very early in this program—that picking the device was probably one of the last things they wanted to do," he said. "[We suggested instead that] they really wanted to focus on developing a strategy and a set of goals that the district could act upon, and once they decided that they wanted to move down this path to achieve the goals they'd outlined, there are things like infrastructure, professional development, and funding models that needed to be in place and needed to be thought of as a long-term goals."

"Whether you're using this K-12 model, or you choose another, it has to be a holistic approach—you can't just think about gadgets," said Eileen Lento, government and education strategist for Intel.

One of the first steps a district should take is to set up a leadership team, and define what success would look like in that district.

"A lot of districts skip this step," Lento said. "Very specifically, what would success look like for students, and for teachers? And then districts need to talk about how they would know they're moving toward that success—how would you measure it? What data do you have, and what funding?"

Another critical step is to gather stakeholders together—including school administrators, teachers, parents, community members, and local businesses—and make sure everyone understands that the transformation will be a complex process, and one the school system can't accomplish alone.

"You need to have stakeholders at the table working together, and respecting that this is about distributed intelligence—which, by the way, is also about modeling the skills these kids are going to need to be successful," Lento said.

For school systems to realize success, the change must be systemic.

"In schools that just transliterate what they were doing from a pencil to a computer, nothing changes, because they're doing exactly the same thing. It's really about engendering that second- and third-order change," she said.

"If results are the table you're trying to put before you district, all of those [blueprint] components are the legs of the table. If you pull one out or shortchange one, your table's going to wobble, and you're not going to get the results you're looking for."

Looking ahead

SDUSD's leadership team hopes its i21 initiative is replicable in other school systems across the country, Kowba said.

"We would like to think that this is the right thing for us, and for districts anywhere," he said, adding that the district has welcomed visitors from other school systems. "We want to share; we want to learn from others and meet in the middle."
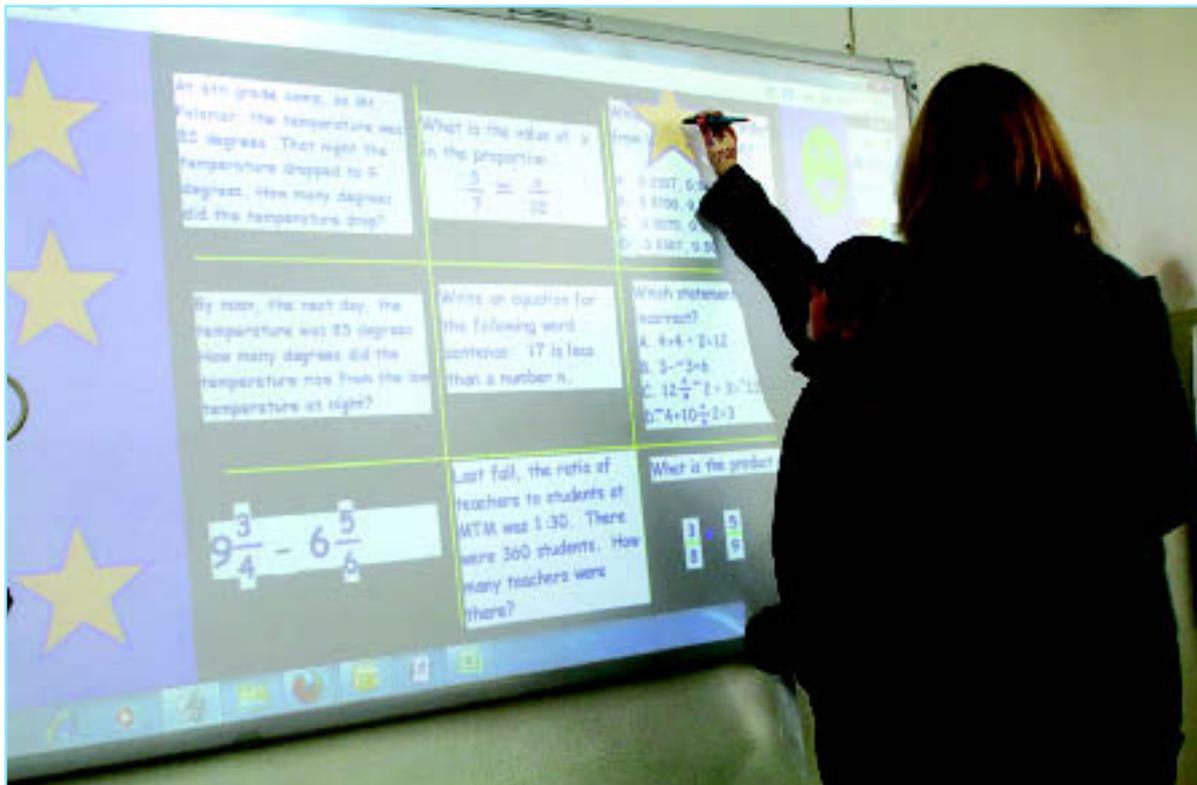
Above all, he emphasized, the project's focus is on students and learning.

"We have to be very careful about technology enabling academic excellence," Kowba said. "It's not about the décor in the room; we are not about being in a high-tech environment—we're about being in an academic environment."

He said the district's goal is not to showcase shiny new objects, but to elevate student achievement, reduce achievement gaps, and increase graduation rates, among other objectives.

"Three years from now, all classrooms will be 'smart' in nature, all students will have laptops or other mobile devices, and they can use them on campus, at home, or wherever they are," Kowba said. "We can get there, but it will take a lot of continuous effort." **eSN**

A blueprint for ed-tech success

San Diego's i21 initiative follows Intel's K-12 Computing Blueprint for eLearning Initiatives, which helps school leaders implement anytime, anywhere learning programs. The blueprint is based on real-world successes and includes consideration for the many variables facing schools today, Intel says.

Here are its components…

Policy

Policy affects every component within the blueprint, and rightly so—as "federal, state, and local policy provides the context in which all education takes place," the blueprint notes. School leaders must understand policy, and how it affects education, in order to make technology initiatives successful.

Educators, school leaders, and other stakeholders can become involved with policy making or regulation in several ways, including as individuals or as members of an association or advocacy group. Other ways include working closely with local media, developing fundraising plans, and partnering with local or community organizations to support policies that will benefit all parties.

Though many policies are created at the state or federal level, school districts have control over their own acceptable use policies. These guidelines for technology use should include the definitions of appropriate and inappropriate technology use, consequences for violating the policy, and plans for addressing student safety, among other items.

Leadership

Inspiring and supportive leaders are behind nearly every successful school technology implementation. School and district leadership have a huge influence on whether ed-tech programs are effective, and state and federal leaders also can help or hinder an ed-tech implementation through their actions or policies.

The Software & Information Industry Association has developed a number of suggestions for school leaders as they prepare to implement a new technology program. Some of those suggestions include identifying the program's objectives before planning, drafting evaluation criteria, and assigning an effective leader to manage the project.

"Effective leaders are ones who are able to balance top-down and bottom-up approaches to planning and implementation," according to the blueprint.

If school and district leaders hope to implement a successful technology initiative, they should identify key stakeholders who will have a say in the process; build a technology task force; develop teacher buy-in; create a strategic and sustainable plan; involve people, process, technology, and data; and maximize communication.

Teachers and students who support the proposed initiative can help by championing the vision among colleagues and stakeholders. Explaining the proposed initiative's potential benefits and outcomes can help generate early buy-in.

Effective communication is essential to effective leadership, and communicating through social media plays a large part in today's schools. School leaders increasingly are using social media such as Twitter and Facebook to communicate with students, parents, and community members. For instance, the Urban School of San Francisco uses Facebook and Twitter to update students and parents on the progress of its one-to-one laptop program.

Funding

Project leaders must account for not only the upfront costs of any proposed technology implementation, but also the ongoing funding that will be necessary to sustain the project.

The strained economy has made many people wary of large-scale education investments, but initial project costs could be covered by a variety of sources, including grant-making foundations, community bonds and allocations, and statewide pilots and seed funding.

If school and district leaders hope to procure computing devices, such as laptops or tablets, they have a few avenues to consider. Purchasing the devices is a beneficial option if ongoing funding is a concern, but leaders must consider the need for future upgrades or device replacement. Leasing the devices spreads the cost over a period of time and makes upgrading or replacing devices easier. A lease/purchase arrangement offers some installment financing, and some hardware companies support upgrades during the lease period. Leveraging student or family-owned devices is a fourth option, and schools might be able to negotiate lower student or education rates at which families can purchase devices for their children.

Consideration for ongoing costs is essential if school leaders hope to support a technology implementation for the long term. Ongoing costs might include hardware maintenance and replacement expenses, subscription fees for online content or access to other resources, and professional development costs.

Schools might be able to locate funding for this ongoing support through grants, discount programs such as the eRate, support from local organizations, community partnerships, or family contributions.

Besdies taking a realistic approach to budgeting, it's important to "look for ways in which the innovative use of technology can actually save a district money," the blueprint notes. For example, communication costs might fall if teachers and administrators begin to communicate with families electronically instead of through paper-based means alone.

Digital content

Investing in technology for its own sake will not change education. Effective professional development, willingness from teachers, and a realistic and enthusiastic vision for how technology can enhance curriculum and instruction are necessary as well.

Technology should be applicable to all learning styles and should support student activities that would be difficult or impossible without use of the technology. Digital content should be flexible, meet the needs of all learners, be translated into other languages if applicable, and be adjusted to fit different abilities. And ongoing professional development will help teachers feel confident and well-equipped as they incorporate technology and digital content into their lessons.

Infrastructure

Aside from the devices themselves, school leaders should consider infrastructure issues that might arise during a technology implementation. These issues might include which mobile devices to choose, or how to deploy a secure wireless network.

When it comes to computing devices, project leaders must know the student-to-device ratio, how many—if any—desktop devices are needed, and what precise mobile devices will best suit students' and teachers' needs. Leaders also should consider implementing a battery exchange program, providing on-site charging and device docking, making software upgrades easy, and establishing detailed plans for device maintenance and support.

Devices will best support students and teachers if they offer several hours of battery power between charges, have sufficient storage capabilities, and have wireless capabilities.

The network that will support these student and teacher devices is equally as important as the hardware.

Tech should be applicable to all learning styles.

A school network should be stable and secure, and it should able to support the necessary number of users without slow traffic or hiccups. Some schools are moving from wireless Wi-Fi networks to WiMAX, which is faster than Wi-Fi and has a greater access range.

School IT leaders will have to support this infrastructure, and they will best be able to do so if they schedule regular collaborative meetings; log, track, and analyze reports to identify and address weaknesses in the IT infrastructure; and use students to help maintain equipment and support users, Intel says: This approach reduces the load on the IT staff, while giving students a chance to develop and apply their own IT skills.

Professional development

"Professional development is one of the most crucial—and frequently overlooked—aspects of implementing a technology initiative," the blueprint says. In fact, truly effective professional development goes well beyond a single training session and "is ongoing, frequently reinforced, well-supported, and embedded into the daily life of schools."

The blueprint contains many tips to help school leaders build and sustain an effective professional development program, including:

- Provide teachers and administrators with the technology one year prior to implementing with students; before they can be comfortable using the technology to teach, educators must be comfortable employing it for their own personal use and professional growth.
- Offer opportunities for educators to get their how-to technology questions answered through just-in-time, technology-based modules and peer support.
- Teachers, like students, should have opportunities to learn at their own levels and in their own style.

Just as school leaders aim to use data to monitor and shape instruction, they should do the same when it comes to professional development. A human capital management solution will let a district track teachers' participation and progress in professional development offerings.

Results

Education leaders should approach ed-tech initiatives with their intended results in mind—and beginning a project by identifying its goals from the get-go, and determining how to measure progress toward those goals, is a critical first step.

Consistently monitoring data and results is key as well, because the initiative might need some revisions or tweaking to ensure that benefits everyone involved.

According to the bleuprint: "Not only is this sort of evaluation crucial to the success of individual programs, it helps education leaders in other parts of the country and world learn from one another's success and build new programs based on scientifically-based research." *e*SN

Intel
and the
Schools of Distinction sponsors congratulate the 2011 winners

Star Innovator
Valley Christian Junior High School
San Jose, California

Mathematics Excellence
Crellin Elementary School
Oakland, Maryland

Valley Christian Junior High School
San Jose, California

Byron Senior High School
Byron, Minnesota

Science Excellence
Farmington View Elementary School
Hillsboro, Oregon

Preston Middle School
Fort Collins, Colorado

Lynbrook High School
San Jose, California

Visit www.k12blueprint.com for more information about the 2011 winners and sponsors.

The search has started for the 2012 Intel Schools of Distinction. Apply now www.intel.com/education/soda.

(intel)

A special thanks to the 2011 Schools of Distinction sponsors:

BRAINHONEY®

BrainWare SAFARI

DELL

I·CAN Internet Community Action Network
Empowering Individuals Thru Technology

KNOWLEDGE DELIVERY SYSTEMS

LanSchool

PEARSON

sas

SMART™