



# Schools Plug Into BYOD: Mobile Devices Transform Learning at Katy ISD



## Executive Summary

**Customer Name:**  
Katy Independent School District  
<http://www.katyisd.org>

**Industry:** K-12 Education

**Location:** East Texas

**Number of Users:** 8000 employees  
and more than 63,000 students in:

- 32 elementary schools
- 12 junior high schools
- 9 high schools

As Lenny Schad watched his children doing their homework one evening, he had an epiphany. Observing how his high school aged daughter and pre-teen son effortlessly multitasked – completing assignments on their laptops while listening to music and texting friends via their cell phones – Schad, who is chief information officer at Katy Independent School District (KISD), knew he was witnessing something profound.

At the time Schad and school administrators were pondering a complete retooling of the district’s teaching and learning model. Their goal: to reignite a zeal for learning in KISD’s K-12 students and keep them engaged, while leveraging the investments the district already had made in its technology infrastructure.

The actions that Schad’s children took for granted that evening in 2008 proved portentous for an innovative technology initiative for KISD; one that has consistently seen test scores improving, and unprecedented levels of teacher and student engagement. Most exciting for students is that the initiative is based on the tools they prefer and live with every day – smartphones, iPads, iPods and virtually any other mobile device they choose to bring to class.

## Traditional Teaching Model No Longer Relevant

Katy ISD encompasses 181 square miles in east Texas bordering Houston’s “energy corridor.” The district’s 56 schools serve more than 63,000 students, nearly 40 percent of whom are low-income and at-risk. Reflecting the international base employed in the energy sector, KISD has a diverse (and transitory) population. Over 70 languages are spoken in the district, and approximately 2500 new students are enrolled each year.

In 2008, as the economic downturn continued to constrain funding for education, Schad and his fellow administrators took a serious look at curriculum delivery in KISD. “We decided that we had to fundamentally change the way we teach; the old methods were no longer working,” Schad recalls. “We made the decision to launch a three-year program that would transform instruction, improve engagement, and breathe new life into the curriculum through technology.”

“We needed to find a better way of connecting with our students,” says Alton Frailey, Katy ISD superintendent. “They’re way ahead of us, in terms of their use of technology. We knew that in order to be successful we’d have to be responsive, we’d have to make sure that things work, and we’d have to have enough bandwidth.”

With these goals in mind, KISD administrators created a new initiative with three areas of emphasis:

- The introduction of Web 2.0 tools into classroom instruction
- A focus on digital citizenship
- A pilot to determine the feasibility of allowing students to bring their own Internet-enabled devices to class

### 1:1 Computing Not Sustainable for District

Though many districts in the U.S. have deployed one-to-one computing programs – in which each student receives a laptop computer for his or her usage 24/7 – Schad and his colleagues did not believe such an initiative was the best solution for Katy.

“Sustainability for 1:1 initiatives has always been problematic. So instead of giving every student a laptop, we felt it was more important to invest in an infrastructure that could leverage the personal investment parents make in their kids’ devices,” Schad says.

### Teachers Evangelize Pilot Program

In the first phase of the program, KISD acquired 150 HTC phones, donated by Verizon, which were to become the program’s core technology. The phones – which became known as mobile learning devices (MLDs) – did not offer calling or texting capabilities to the fifth-grade students who received them. Instead, students used the devices (which featured large screen sizes and easy-to-read text) to do Internet searches and use applications to complete assignments.

The district also enlisted the aid of a group of tech-savvy teachers to create a “Web 2.0 toolbox.” Vetted by the district’s instructional technology and curriculum teams to ensure alignment, the toolbox consisted of such applications as Edmodo, Color Notes, Discovery Education, Quia, and others that foster collaboration between teachers and students. The Instructional Technology department also became Web 2.0 evangelists, visiting every campus demonstrating the contents of the new toolbox.

Superintendent Frailey says, “That was one of the smartest things my IT team did: They reached out to early adopters first, and created some instant successes within that ‘cohort.’ Then those teachers were able to talk to their colleagues and alleviate some of their fears.”

**“We didn’t try to force it down anyone’s throat. Instead, we started building great success stories about teachers, and recruited them as leaders of the Web 2.0 movement.”**  
 Lenny Schad, Chief Information Officer Katy Independent School District

### 2009-2010 MLD Pilot Test Scores

Same students	2009	2010
Reading	86	94
Math	80	92
Science	86*	95

5th grade students	2009	2010
Reading	94	94
Math	89	92
Science	87	95

### Comparison of 11 Campuses

Same Students	2010	2011
Reading	91	93
Math	90	92
Science	62*	90

### 11 Campuses Average Comparison

5th grade students	2010	2011
Reading	90	93
Math	91	92
Science	90	90

## Cresting the Learning Curve

At the time of the smartphone rollout, SMART Boards were making their first appearance in the classroom and the first Web 2.0 toolbox training sessions were being held. As KISD Director of Instructional Technology Darlene Rankin observed, “Our technology-savvy teachers were excited to have the support for the new tools. As the information about the collaborative tools continued to spread, teachers began to see the learning environment being transformed.”

From the beginning the Web 2.0 tools captured the imagination of Katy teachers. Mindy Dickerson, now principal at Beckendorff Junior High School, was principal at Cimarron Elementary School during the first year of the technology initiative. Extremely proficient with educational technology, Dickerson was eager to deploy the new tools at Cimarron.

“That first year was great; it was a huge learning curve for teachers,” says Dickerson. “The kids figured everything out really quickly, but the teachers were kind of shocked to realize they needed more time to become familiar with the tools; it was a totally different way to think about learning. But they depended on each other a lot and powered through everything, and had wonderful results.”

## Engagement, Academic Achievement Climb

In the second year of the pilot program, KISD distributed Android Incredible smartphones to 10 new schools and 1500 more fifth-graders. The district also did comprehensive outreach to parents and family members to educate them about the Children’s Internet Protection Act (CIPA) and the Child Online Protection Act (COPA), which restrict children’s access to potentially offensive online material. At the same time KISD amended its acceptable use guidelines to create “responsible use guidelines,” reinforcing the concept that all students must become responsible digital citizens.

Once again, teachers and administrators were elated to witness the surging levels of engagement and achievement among students who had access to the technology tools. In some instances performance on math tests increased from the 70th to 90th percentile, with similar results posted in all subject areas.

“There wasn’t one teacher who didn’t see improvements in engagement and test scores,” Schad says. “We heard so many testimonials from teachers who said, ‘I’ve been teaching for 20 years, and I’ve never seen anything like this.’ The creativity these tools allowed was just amazing. Plus, the MLDs really reinforced the notion of differentiated learning: By giving students the option of using pencil, paper, podcasts and so forth, we were allowing them to tap into their individual learning preferences.”

## Digital Immigrant Makes Significant Strides

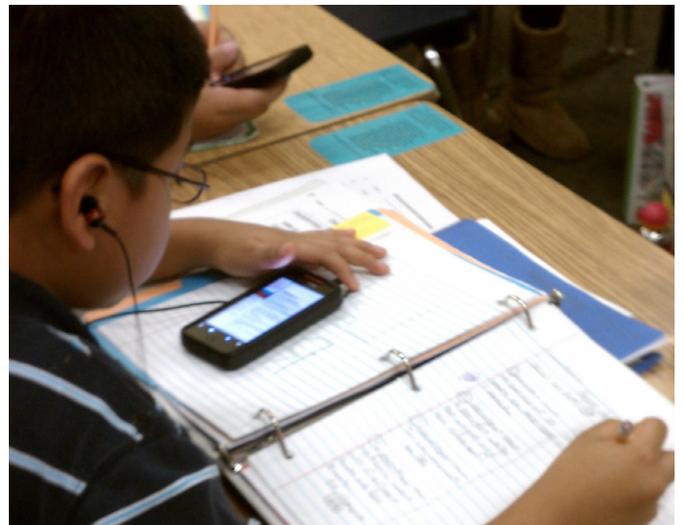
Leona Bernard is in her late 50s, and has been in education for nearly three decades. Prior to the pilot program the fifth-grade reading teacher at Franz Elementary School had only owned a flip cell phone, and she had yet to learn how to text. But the moment she watched her students working with the MLDs, she realized she couldn’t afford not to make technology the centerpiece of her curriculum. “The engagement level was like night and day. The first time I read aloud from a book my kids were actually taking notes, which they’d never done before. I had to stop them, because I didn’t want them to miss the reading!”

**“This technology is the equalizer; it puts everyone on the same footing. And, it allows me to do things equitably for all students.”**

Leona Bernard, 5th-grade Teacher  
Franz Elementary School, Katy ISD

Using the Android application Color Notes (an electronic sticky-note tool), Bernard’s students subsequently began jotting down their impressions of their readings. Bernard also launched an interactive blog, where the class could post their responses to their assigned books. Additionally, students visited Dictionary.com for help with their vocabulary words, and referred to ReadKiddoRead.com to find new titles to enjoy.

In Bernard’s estimation, the MLDs are helping to dissolve the digital divide that previously existed in the Katy district. “It allows me to do things equitably for all students. In society, the person who doesn’t have access to these tools is going to be held behind. So it is really important as a teacher to adapt to the students.”



### **Apps Engage, Excite Kids**

Teachers throughout the Katy school district have devised a seemingly limitless range of exciting, engaging applications for their students, including:

- Leveraging Google Maps to create maps of the state, then using the mobile devices to label various points and embed links to additional information
- Using “prezis” (interactive presentations that include links to digital multimedia content) to compare and contrast such topics as the death penalty
- Uploading daily announcements into Edmodo, where responses can be posted
- Charting the planets and phases of the moon via smartphone; creating a “marketing program” for each planet (i.e., identifying the best food, clothing, and other components needed to attract tourism)
- Creating a scientific “scavenger hunt” via WebQuest, encouraging students to visit specific sites to read and absorb content

### **Cisco Technologies Support BYOD**

- Cisco Wireless LAN Services Module
- Cisco Aeronet 3502I Access Points
- Cisco Catalyst 6500, 3750 and 2960 Switches
- Cisco Nexus Switches
- Cisco Unified Communications
- Cisco Physical Security Solution
- Cisco ASA 5500 Series Adaptive Security Appliances

### **30 Devices; No Waiting**

Before KISD rolled out the BYOD component of its technology initiative, AP government and history teacher Kay Fenn says she was frequently competing with her colleagues for time in the computer lab at Cinco Ranch High School. Now when Fenn gives an assignment requiring an Internet search, students are online in seconds – either using their own mobile devices, or flipping open one of the new laptops housed on a cart in her classroom.

“It’s worked beautifully,” Fenn reports. “We can do on-the-spot research, which has really enhanced the classroom environment. Plus, we use tools like Poll Everywhere.com (an audience response system that leverages smartphones, Twitter and the web), and kids text in their answers to questions I pose for them.”

Fenn adds that on any given day, some students forget to bring their wireless devices to school, a few may be on parental restriction and forbidden to use their phones, and others simply do not have a device. In these instances students who do have phones and tablets willingly share with those who do not, with an additional two or three laptops from the cart ensuring that no one lacks access to the web.

### **And Now: BYOD**

KISD Director of Technology Operations Lonnie Owens has witnessed his district’s technology initiative from start to finish. Owens says it was hard to dispute the results of the MLD distribution. “Discipline issues went down and test scores went up, so we viewed it as a success. But the pilot also demonstrated that we had found a sustainable model: We could get our students connected to the Internet without significantly impacting our budget.”

Thus, at the start of the 2011-2012 school year the Katy district launched the third phase of its technology transformation: the installation of a wireless network on every campus, and the rollout of a new “BYOD” (bring your own device) model. To support the former, KISD’s core network was upgraded from 1- to 10-Gigabit Ethernet, and new Cisco wireless access points were deployed district-wide.

“What we were building for,” explains Owens, “was density not coverage: Between staff and students we could potentially have 80,000 mobile devices on the network, and we knew our prior network infrastructure would not sustain that amount of traffic. So we switched to Cisco access points, which allowed us to run separate SSIDs (service set identifiers) for our high schools, junior high schools and elementary schools. This has enabled us to provide Internet access to every single student who brings an Internet-enabled device to school.”



## Anxiety-Free Learning

In Fenn's classes, along with others throughout KISD, excitement for the new teaching and learning paradigm continues to run high. "I really thought the novelty would wear off, but this is such a comfortable environment for my kids... there's just a whole different vibe in my classroom."

"We've found that kids who have trouble focusing, or are fidgety or disruptive, just zone right in," continues Fenn. "Sure, a few text, but they also stay on task; they're not texting in their pockets, or agitated to run out into the hallway and text."

**"This has created an environment that allows everyone to relax into a topic better than anything I've ever seen. When you 'unplug' kids, it makes them anxious; now that anxiety is gone."**

Kay Fenn, AP History & Government Teacher  
Cinco Ranch High School, Katy ISD

At Dickerson's school, teachers also use PollEverywhere.com to gauge students' mastery of their subjects. Dickerson believes the model is an ideal fit for the way today's generation of learners prefer to work. "Kids are texting anyway. I talked to a lot of teachers at the beginning, and said 'if you give kids a positive outlet for texting, they'll use their phones in an educational fashion.' In junior high especially, as the content gets deeper, it's very easy to lose kids. This is definitely keeping them engaged."



"Adults still see the devices as something extra, but our kids see them almost as part of their hands," says Frailey, laughing. "To them using the devices is as natural as breathing, and it's completely relevant. Now they're rushing in, literally bounding in to show their work. That energy level, that engagement... that's what it's all about."

### Mobile Devices Address Special-Needs Students

Katy ISD administrators report that the use of mobile devices also offers significant potential for students with learning differences. For example, one student uses his device to receive written notes on assigned readings from his teacher. The student then runs the notes through an optical character recognition scanner, transforming them into the spoken word.

"This student doesn't comprehend material that he reads; he needs the notes transformed into auditory input," says Rankin. "Using his device, he can also make the text low-contrast, which is easier for him to view. It's amazing to watch him, and see all the ways he can put the content into his learning modality. Educating students is not an exact science, so understanding each one and the dynamics that make each unique is key to the process."

### A Positive Partnership with Cisco

With thousands of new users signing onto the KISD wireless network every day, using a variety of mobile devices that support rich digital media, network performance and reliability are crucial. Throughout each phase of the rollout – and now that mobile learning is possible district-wide – Schad says Cisco has been an integral part of the equation.

"The content our kids are producing, and the kind of work they're doing, requires much greater bandwidth and storage," he observes. "Cisco helped us plan for this. They've always been critical partners, and will have frank discussions with us about the risks involved. They're the first ones to come to the table with whatever resources are needed."

**"Having Cisco as a partner is like having a nice security blanket: we know when the chips are down, they'll do everything they can to make things work."**

Lenny Schad, Chief Information Officer  
Katy Independent School District

“Working with Cisco has been one of the easiest parts of this process,” Frailey adds. “Cisco is known for being well ahead of the pack, and the interaction that my team had with them really helped us stretch and make connections. Cisco has been a very strong partner to our district.”

“Our network is holding up well with our growth; I’m very happy with the role Cisco has played,” says Owens. “Working closely with our account manager has been phenomenal for us, because it’s allowed us to efficiently design our system and make it sustainable long-term. Plus, we can really manage the environment to its full potential.”

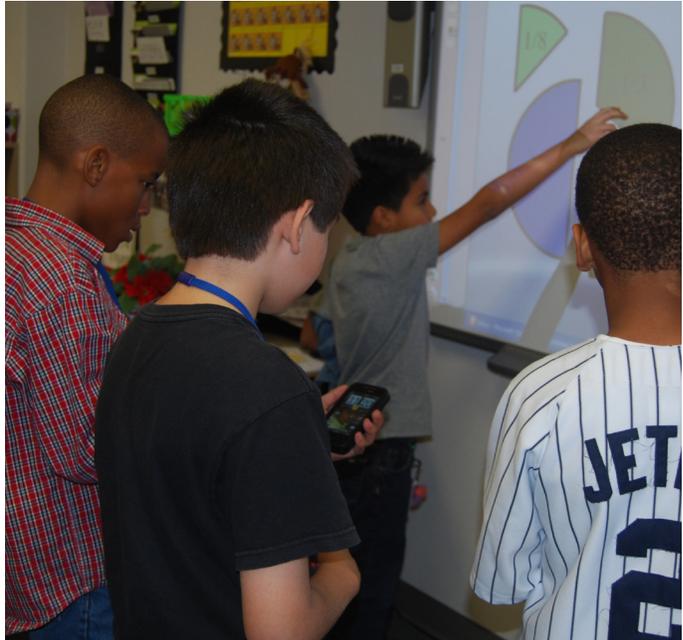
### It’s How Students Learn

KISD Instructional Technology Coordinator Jeremy Frazier believes that teachers and students realize the value and importance the MLD brings to their classroom. The 80-plus teachers have become so accustomed to using the device, that it has become second nature to the learning environment. Class sets of calculators, wall maps and hardbound dictionaries have become obsolete. In the latter case, learners know the value of being able to look up a word in an online dictionary that will not only define the word, but also provide an animation and a pronunciation, all in multiple languages. Also, maps are interactive and the calculator is just a click away.

“Students are now more collaborative, and we have noticed that teachers meet more often to plan lessons that incorporate the technology,” says Frazier. “The students are completely engaged, which is fascinating to watch. It’s all about group dynamics; the types of things employers tell us they’re looking for. That type of collaboration in our classrooms is changing the way students learn, and the way teachers plan for learning.”

**“I really do feel this is a shift in education; it’s not just the latest gimmick. This is what kids do automatically, and how they learn.”**

Jeremy Frazier, Technology Integration Coordinator  
Katy Independent School District



Dickerson believes the technology tools have successfully blurred the line between work and play. “It’s really cool to see the kids light up now. Learning has actually become fun.” Concludes Fenn, “Our kids are plugged in 24/7. If we’re going to engage with them, we need to be there, too.”



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