

smart classroom

by Susan Brooks-Young

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Are Document Cameras the Next Big Thing?

The versatile projection technology could be the next recipient of that rarest of educational honors: ubiquitous classroom adoption.

IT'S NO EASY THING for a technology to go from introduction to universal adoption. And if trends over the last 200 years are any indicator, the honor is not eagerly doled out, no matter how useful the innovation is. It took nearly 50 years after their arrival in 1801 for chalkboards to become a classroom staple, paving the way for teachers to provide instruction to large classes, eliminating the need to hand-copy materials for each student.

Since then, just one presentation technology has enjoyed the same level of acceptance: the overhead projector. And despite how overhead transparencies have made it practical for teachers to prepare notes and drawings ahead of time to project during class, it took 40 years to get the technology into their hands. Current presentation technologies far surpass overhead projectors, but none has seen ubiquitous classroom adoption.

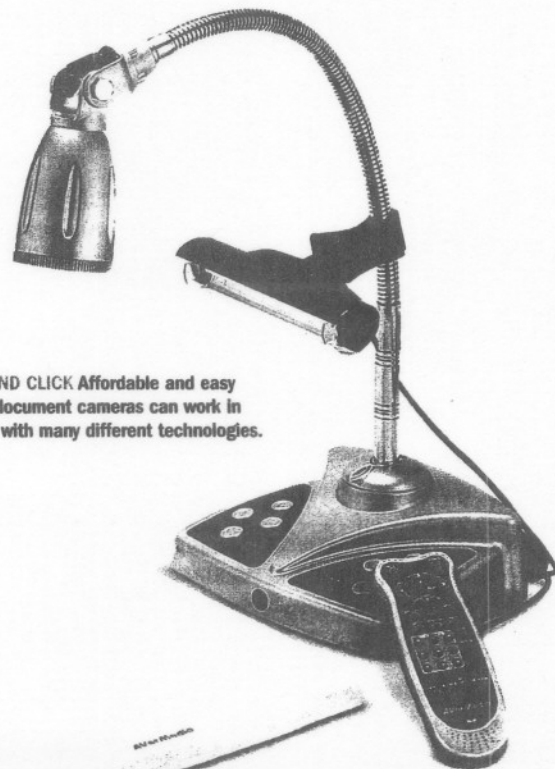
Enter the document camera. This cost-effective, easy-to-use device works in conjunction with a projector, television, plasma screen, or monitor to display documents and 3-D objects. Capable of capturing images and video to upload to a computer for use in multimedia projects and web pages, some models even allow users to share the screen display or freeze and annotate images. More importantly, students of all ages can use document cameras to share their work. As a result, schools are purchasing them in increasing numbers.

The growing popularity of the device has not escaped the notice of education leaders in the state of Washington, where document cameras are now more widely used in classrooms than digital cameras. In fact, two well-established regional projects in Washington use document cameras in their professional development curricula. One project is for K-12 teachers, while the other targets secondary school math teachers. Each is designed to help participating teachers make better use of technology to impact teaching and learning.

The K-12 program is led by Debbie Tschirgi. In 2005-06, Tschirgi, the director of educational technology programs for Educational Service District 112 in Vancouver, WA, designed and launched a program called the Sustainable Classroom

Project (www.esd112.org/edtech/scp/index.cfm). She explains that the program is a response to the need for educators to "develop a replicable classroom model of technology integration that is sustainable and supports research-based instructional strategies."

The technologies used in the program are highly visual and interactive, and can be operated with a single classroom computer. The instructional strategies are derived from the book *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement* by Marzano, Pickering, and Pollock (Association for Supervision and Curriculum Development, 2001). The original program was piloted by 10 technology-proficient K-12 teachers and reviewed



POINT AND CLICK Affordable and easy to use, document cameras can work in tandem with many different technologies.

by an external evaluator, who concluded that "key decision-makers for educational organizations and institutions should consider the document camera as a standard technology solution that will provide visually rich learning experiences for their students."

Even before Tschirgi organized the Sustainable Classroom Project, math integration specialist Mary Anderson was working with teachers in ESD 123 (Pasco, WA) to improve mathematics instruction in grades 6 through 12. Seven years ago, many districts in Anderson's region adopted a reformed math curriculum that required middle and high school students to not only find the correct answer to a problem, but also explain the reasoning they used to arrive at the solution. This approach to mathematics instruction required major shifts in both teaching and learning.

About the same time, ESD 123 decided to use funds from Title II, Part D of the No Child Left Behind Act to support a program called No Limit!. Designed to develop instructional models that support deeper understanding of mathematics concepts, No Limit! uses professional learning communities to focus on effective instruction and integration of appropriate technology. Blending these two math initiatives was a natural.

During the first two years of No Limit!, ESD 123 staff members made no recommendations about technology selection. A handful of teachers opted to use document cameras. In each case, the technology proved particularly effective in helping them and their students implement the reformed math curriculum. In year three (2003-2004), ESD 123 staff began urging all No Limit! districts to purchase document cameras.

Document cameras initially appeal to end users because they're easy to operate and similar to familiar tools like overhead projectors. How, then, do school leaders encourage teachers to move beyond the basic use of the tool, and what is the value in doing so? Tschirgi and Anderson identify two fundamental lessons they have learned. First, begin with a thoughtful design for professional development. Second, focus on shifting from teacher- to student-centered strategies.

An Extra Level of Professional Development

All too often, professional development segregates content from the technology that will be used to support it. As a result, educators struggle to make connections between subject matter and use of technology as an instructional tool. Both the Sustainable Classroom Project and No Limit! offer two strands of professional development designed to support teachers as they change instructional practice.

While it takes less than an hour to learn basic use of a document camera, the advanced features are what make it an effective teaching tool. In the first strand, teachers learn the fundamentals, then are offered another four to six hours of training on the advanced features, which enable them to extend their use of the document cameras.

The second strand focuses on instructional practice and content. The Sustainable Classroom Project adheres to nine research-based instructional strategies identified in *Classroom*

Instruction That Works. Nine three-week online modules provide background on each strategy and ways technology can be used to support the strategy. Teachers then write and implement related technology-supported classroom activities.

The No Limit! model brings professional learning communities together monthly to discuss curriculum and instructional strategies. Technology is not a separate agenda item, but conversations about the content inevitably lead to discussions of ways teachers are using document cameras to improve instruction. Anderson recently asked No Limit! participants to describe how the document camera has changed

BYTESIZE

A series of short video clips showing document cameras in action in the classroom can be viewed on the Sustainable Classroom Project web page at www.esd112.org/edtech/scp/index.cfm.

the teaching and learning of mathematics in their classrooms. The teachers identified four major changes:

- ▶ more class time devoted to discussions of students' written work and thought processes
- ▶ increased numbers of students, especially English language learners, sharing and explaining their work
- ▶ growing student confidence in their mathematical abilities and better comprehension of concepts
- ▶ increased teacher understanding of students' thought processes

A Gradual Adoption

Ideally, a technology adoption should change something about the way teachers teach or children learn. But Tschirgi points out that there's a midway outcome that must be honored as teachers become accustomed to using a technology. "The fact is that many teachers will first be hooked by a technology that enables them to do something in a different, more effective way," she says. "Teachers new to document cameras often focus first on the fact that the equipment makes it easier for them to show objects or text to students, or to demonstrate a lesson."

It isn't until later that the teachers fully embrace those capabilities that facilitate the shift from teacher-centered to student-centered learning environments. "Ultimately," Tschirgi says, "this project encourages teachers to make sure that it's the students who take the lead, using the document camera for presentations and peer teaching."

Anderson thinks document cameras are a good candidate for the next universal presentation technology adoption. "In my view," she says, "the document camera is the single most important piece of technology for all teachers, especially for math teachers who are seeking to understand their students' thinking about the mathematics they are learning." THE

Susan Brooks-Young is an education consultant and author based in Lopez Island, WA, and Vancouver, BC.

Poor classroom acoustics are impairing students' hearing and their ability to learn. The need for audio amplification systems is coming through loud and clear.

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SOUND SOLUTIONS

by Neal Starkman

“
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he square of the high moose he calls some of the squares of the other two sides.”

Some students will tell you that's the Pythagorean theorem. No, they're not dumb; no, they don't have attention deficit disorder; and no, their teacher doesn't enunciate poorly. In many instances, even if they sit just six feet away from the speaker, they simply can't hear.

The problem isn't one of volume. In fact, what usually happens in a classroom when students say they can't hear is that the teacher speaks louder. That may be fine for vowels, but it doesn't do much for consonants—and it's generally the consonants that provide the intelligibility: An oo ee i ats o? (Can you see why that's so?) And even a loud voice isn't likely to make it to the students in the back row if the classroom has bad acoustics. The only tangible result is usually teacher vocal strain.

Rather, student hearing difficulties are largely the result of three factors:

- ▶ *A child's auditory neurological network isn't fully developed until around age 15.* For purposes of comprehension, children require louder voices and a quieter ambience than adults do.
- ▶ *Classrooms are noisy.* There's noise from other students, from computers and printers and lights and heating systems, and from people in the hallways and traffic outside.
- ▶ *Students don't have the experience to “guess” at what they hear.* If they don't know the word *hypotenuse*, then they can't process hearing “high moose” as anything but “high moose”—they can't make the connection. And this is exacerbated if the student isn't a native English speaker or really does have a hearing deficit.

The main problem, as Debbie Tschirgi, director of educational technology programs for Educational Service District 112 in Vancouver, WA, explains in her widely referenced white paper, “Classroom Amplification Systems: Understanding and Overcoming the Acoustical Barriers to Learning,” is inadequate signal-to-noise ratio in US classrooms, which impedes communication. She says that while the American Speech-Language-Hearing Association recommends a classroom noise level no higher than 30 decibels, the typical classroom has noise levels that range from 41 to 51 dB. (Keep in mind that loudness is measured on a logarithmic scale: A 40-dB classroom is 10 times as loud as a 30-dB classroom.) Tschirgi's research indicates that for teachers to communicate well, their voices—or signals—should be 15 decibels more than that of the background noise, a “score” of plus 15. But she finds that most classrooms have signal-to-noise ratios ranging from minus 7 to plus 4.

A multiyear study conducted by **Orange County Public Schools** in Orlando, FL, “High Performance Schools Equals High Performing Students,” provides a summary, damning state of affairs: “Research has shown that a typical classroom provides an inadequate environment when auditory learning is the primary tool of instruction. As many as one-third of all students miss 33 percent of verbal communication in a typical classroom.” ▶

Hearing Is Believing

Technology has come up with a solution: tools that focus voices in a way that minimizes intrusive ambient noise and gets to the intended receiver—not merely amplifying the sound, but also clarifying and directing it.

One provider of classroom audio technology is Audio Enhancement, which has a manufacturing relationship with Panasonic. Using an Audio Enhancement system, teachers speak into a microphone, and speakers transmit the voice throughout the classroom. Teachers can also hook up the system to computers, DVD players, VCRs, interactive whiteboards, and just about any other classroom tool. They can capture audio and put it on the internet. They can even tie everything into the school's public address system.

For example, Audio Enhancement's CAE-100W classroom audio system, called "The Innovator," comes with four infrared microphones, multimedia mute control, and a PC user

interface. Teachers can use a remote control to modulate the volume of their own microphone, the students' microphones, and the auxiliary inputs. The entire product consists of four ceiling speakers, a receiver, handheld student microphones, a pendant teacher microphone, a dome sensor, a cable, and a charger. It costs about \$1,200 a classroom.

So, for about a grand, the teacher can always be heard clearly, anywhere in the classroom. When students participating in discussions use the microphone, they too can be heard clearly, anywhere in the classroom. And the same is true of any audiovisual presentation, from films to tapes to podcasts.

Interestingly, one person who needed to be convinced of the need for the technology is now the company's vice president of emerging technology, Jim Snyder, who was previously the CTO of Lake County Schools in Florida. "When I first heard about [these systems]," he says, "I said, 'No way; the teacher doesn't need a microphone.'" But the act of installing one into class-

CAN YOU HEAR HER NOW?

Propelled by her son's own classroom auditory troubles, one parent became an advocate for sound enhancement technology.

Christopher DeMallie was in kindergarten when he began to struggle in school. He couldn't sing the alphabet song; he misused his pronouns; he wouldn't participate in "circle time"; and in general, he'd become upset whenever the conversation turned to school. Searching for a solution, his mother, Suzanne, took Christopher to a pediatrician, a psychologist, and finally an audiologist. The audiologist concluded that Christopher had a "temporal processing deficit"—sounds got distorted on the way to his brain.

Christopher's teacher placed him away from open windows and doors so the ambient noise wouldn't interfere with his hearing, and his mother got him some private speech therapy. Today, three years later, Christopher is fine, deficit-free.

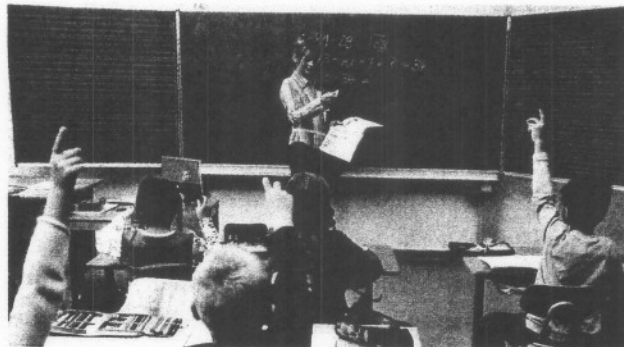
As a result of her experience with her son, Suzanne began to educate herself on hearing problems. She discovered that students who couldn't hear well and thus became distracted or disinterested were sometimes being misdiagnosed with attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD),

and even being prescribed Ritalin, when what was needed was a better classroom

environment. Her research showed her that classroom acoustics were typically to blame. DeMallie concluded that children with much better hearing than her son were still facing auditory deficits in school.

She started her own organization last summer, the Institute for Enhanced Classroom Hearing (www.classroomhearing.org), in Towson, MD, with a mission to "improve the auditory classroom environment through integration of classroom sound enhancement technology." DeMallie sees the research into the benefits of sound amplification systems as conclusive ("It's a no-brainer"), the cost as manageable ("It's a lot cheaper than retrofitting the classroom"), and the need universal ("This problem affects every child every day in every classroom").

The cost of enabling every student in a classroom to hear clearly is not as daunting as it



may seem. For an adequate sound amplification system, DeMallie recommends "an infrared model with four speakers and a pass-around microphone for the students, at an approximate cost of \$1,500 to \$1,700, which should include professional installation and in-service training." According to DeMallie's calculations, that averages out to 16 cents a day per pupil (given 25 students per classroom). And, she adds, the sound system is used about five hours per day, not just a sporadic few minutes here and there, as other classroom technologies such as a TV/VCR are used.

"When research overwhelmingly supports an educational need that is financially justified and reasonable," she says, "we as a society owe it to the children to supply them with that resource. Every child deserves a chance to hear the teacher. Every teacher is important enough to be heard."

rooms made a believer out of Snyder. Lake County teachers who tried it out on a demo basis didn't want it removed: "Everyone who used it swore by it," he says. The district's schools found that teachers' absentee rates were down because the teachers had more energy and weren't harming their voices.

shy bilingual students have taken to speaking with the microphone. "It made them more confident," she says. She has seen a huge gain in test scores. Sometimes, she says, teachers take their microphones with them to lunch and forget to turn them back on when they return to class—but the students invariably

"[The sound system] wasn't just making it louder and blaring. He was talking very naturally. I thought, Wow, this *is* making a difference."

—Kate Clark, Ocoee Middle School

Another doubter turned convert is Kate Clark, the principal at **Ocoee Middle School** in Florida. Ocoee is about 10 miles north of the Disney complex, with more than 1,700 students. The school began using Audio Enhancement systems in the 2000-2001 school year. Like Snyder, Clark was skeptical.

"I was a real naysayer at first," she says. "It was the most ridiculous thing I ever heard of." But then she attended a meeting about the new product in a conference room, and the speaker was turning the system on and off. "It wasn't just making it louder and blaring," she says. "He was talking very naturally. I thought, Wow, this *is* making a difference." She began looking at the research and soon became a proponent.

Ocoee tried out the system in two very different places: in an old science room with wood cabinetry and hard surfaces, and in a portable classroom with carpets. Regardless of the surface areas, the audio was distinctly enhanced. "It was phenomenal," Clark says. Both teachers got to keep their systems beyond the planned two weeks.

Clark enthuses about the changes in the school. Teachers, their voices saved from overwork, tell her they have as much energy in sixth period as they do in first period. Some of her

tell them. Ocoee has audio speakers in classrooms, in the band and chorus rooms, in the media center, and in the gym. "It has made the biggest difference in the world," Clark says. "Teachers would overwhelmingly pick this as the best technology they have."

Measured Progress

Bruce Bebb says that in the near future people will find this kind of audio enhancement as natural and essential as good lighting. He's the marketing communications director of LightSpeed, based in Tualatin, OR, and a former elementary school principal. LightSpeed's Infrared Classroom Amplification Technology (REDCAT) device is another wireless infrared classroom amplification system. It costs about \$1,000 a classroom.

"You basically pull it out of a box and set it anywhere in the room within minutes," Bebb says. One flat-panel speaker (22 inches long, 10.5 inches wide, and 3.25 inches deep) projects the sound, but Bebb says that "you are hard-pressed to point to where the sound source is." His demos have ended much as Snyder's and Clark's: After seeing the device at work, everyone in the audience wants one.

Bebb cites the Trost Study, an independent study of LightSpeed systems installed in Canby, OR's **Trost Elementary School**, carried out by the **Canby School District**. Some of its findings from amplified classrooms:

- ▶ 35 percent higher first-grade scores on the Dynamic Indicators of Basic Early Literacy Skills (DIBELS)
- ▶ 35 percent higher words-per-minute reading scores by fourth- and fifth-graders
- ▶ 21 percent higher scores on the Technology Enhanced Student Assessment, a standardized test given by the Oregon Department of Education
- ▶ 72 percent decrease in teacher redirections
- ▶ 43 percent decrease in off-task student behaviors

Those numbers would come as no surprise to Patrick Mahaffey, a third-grade teacher at Carlsbad, CA's K-6 **Olivenhain Pioneer Elementary School**. He's been using an audio system from Califone International for years. He can offer confirmation of the relief that audio systems give to teachers' voices—his voice no longer gets worn out the way it once did. He also observes that children with attention deficit disorder "tend to have a little longer period of focus time" with the amplified sound. His only issue is that he sometimes forgets

Asking the KEY QUESTIONS

IN HER WHITE PAPER on classroom sound systems (edtech.esd112.org/whitepapers), Debbie Tschirgi, educational technology program director for Educational Service District 112 in Vancouver, WA, advises schools to ask manufacturers of sound technology some important questions before making a purchase. For example:

- ▶ Do you provide infrared or radio-frequency systems?
- ▶ How do you address the masking of the weaker, higher-frequency sounds, such as consonant sounds?
- ▶ What are the options for microphones? Where can they be placed? How many can be used simultaneously?
- ▶ How can your product tie in with other systems in the classroom, for example, computers, VCRs, and DVD players?
- ▶ What are the options for speakers? Where can they be placed?
- ▶ What's the average life of batteries used in the microphones?

to turn off the microphone when he goes to counsel a student one-on-one; other students point out the error soon enough.

Another Califone user is Steve Lewey, the project manager in the technology department of **Lake Washington School District**, just north of Seattle. He's had the company's speakers installed in every classroom in the district—1,400 of them. The district uses the speakers as part of its projection system—computer, ceiling-mounted projector, DVD player, and VCR. "The system as a whole," says Lewey, "has got the students more engaged."

Califone develops products for auditoriums as well as classrooms. For example, the Presentation Pro 300 line—an amplified 30-watt speaker with built-in receiver, microphone, tripod, remote, and case—sells for about \$365. "We've got 60 years of making audio products specifically for schools," says Tim Ridgway, the California-based company's vice president of marketing. Ridgway explains that the amplification systems keep the sound from bouncing off the classroom walls or ceiling, and instead keep it focused on the students. "What that means," he says, "is that it effectively increases the signal-to-noise ratio."

web

For more information on this topic, visit www.thejournal.com and search by the keyword audio.

links

American Speech-Language-Hearing Association
www.asha.org

Audio Enhancement
www.audioenhancement.com

Califone International
www.califone.com

Educational Service District 112 white paper
(by Debbie Tschirgi)
www.edtech.esd112.org/whitepapers

Institute for Enhanced Classroom Hearing
www.classroomhearing.org

LightSpeed
www.lightspeed-tek.com

Miami-Dade County Public Schools study
www.lightspeed-tek.com/files/Miami-Dade%20Report.pdf

Orange County Public Schools study
www.cefpi.org/pdf/Journal39-3-HPS.pdf

Panasonic
www.panasonic.com

Trost Study
www.lightspeed-tek.com/files/trost_study.pdf

Sounds Good to Everyone

A study released this past March, "Improving the Classroom Environment: Classroom Amplification Systems," done by **Miami-Dade County Public Schools**, spells out the general benefits of audio systems to students and teachers, namely, increases in student attention, participation, productivity, comprehension, and on-task behaviors, and a decrease in discipline problems.

The report also alludes to additional studies of the health benefits for teachers in sound-amplified classrooms, one that found a reduction in teacher sick days because of voice, jaw, or throat problems, and another that reported a 25 percent decrease in teacher absenteeism.

Debbie Tschirgi's white paper provides more impressive specifics. Tschirgi cites a study conducted by Laurie Allen, an educational audiologist in Dubuque, IA, who surveyed 334 students in grades 1 to 6 about amplified classrooms. The study found that:

- ▶ 93 percent of students liked when the teacher used the sound system.
- ▶ 95 percent said it was easier to hear the teacher when the speakers were on.
- ▶ 87 percent said they do better when the speakers are on.

Tschirgi points out that although classroom amplification systems have long been used to help hearing-impaired students, the research indicates that there are benefits in store for students with normal hearing ability also. She writes, "The rationale...is simple: How well children hear their teacher affects how well they learn....Sound amplification is a cost-effective way to improve classroom acoustics so that all students can learn to their potential."

As ever, though, the best testimony comes from the audience of student users. Cassandra, a sixth-grader at Ocoee Middle School, says that the poor acoustics in her elementary school classroom caused her "to miss a lot of things," even though she has no medical hearing problems and usually sat near the front of the room. After class, she'd ask the teacher to repeat some of the information, but it wasn't as good as getting it the first time. Alexis, an Ocoee eighth-grader, says that in addition to all the noise in her elementary school classroom—such as air conditioning—sometimes teachers would turn their backs when writing on the blackboard, and it would be even more difficult to hear them.

At Ocoee, things are different. Alexis says that when she first came into an audio-enhanced room, "I was pretty surprised—you could hear throughout the whole entire room." And Cassandra says that audio enhancement "made note-taking a lot easier for me." She explains that particularly in science class, students have to watch PowerPoint presentations and listen to the teacher at the same time; audio enhancement makes it easier to do that. "It really does help the kids out," she says. "It really does make a difference." **THE**

Neal Starkman is a freelance writer based in Seattle.

Only with the **right training**
can teachers use interactive
whiteboards to bring the
learning environment to life.

Board CERTIFI

Tom Reardon knows his way around an interactive whiteboard. Reardon, a mathematics instructor at **Austintown Fitch High School** in Ohio, uses the device to record his class lectures and offer sample tests that he posts on his personal website for students to download. Last year he created a video-on-demand for students in his AP calculus class to use as a reference for the take-home test he assigns during spring break, in preparation for the state exams.

"I did each of the 50 problems as a mini video on the board, burned them onto a CD, and gave one to each of my students and told them if they got stuck on a problem to watch the video," he says. "It was like my being in their homes. When they returned from break and I asked if anyone had any questions from the test, no one had any because I had already answered them."

Reardon says the results were quantifiable. "We did another practice exam, and out of 17 students, 11 of them scored a 5 [the highest grade], four of them scored a 4, one scored a 3, and one scored a 2," he says. "Those are astronomical numbers. My students went from about 50 percent getting 4s and 5s to almost all getting them." ▶

ED

by Charlene O'Hanlon



Reardon's work demonstrates the full power of an interactive whiteboard when it's in the hands of an expert user. It's because of this potential that school districts across the country are outfitting every classroom in every school with one, throwing their weight behind a technology they believe enhances not only the teaching experience but also the interaction between teacher and student.

"For years we have been trying to digitize kids and measure the impact, but this movement turns that idea around and digitizes the teachers," says Mike Horan, director of instructional technology for the **Sarasota County School District** (FL). "It can point directly to a level of engagement students are now bringing."

Make no mistake, however: Interactive whiteboards are only as effective as the instructors using them. To use the boards to

their full effect, teachers must receive proper training. And with all the things an interactive whiteboard allows a user to do—manipulate text and images; save notes for review via e-mail, the web, or print; show and write notes over educational video clips; use presentation tools to enhance learning materials; showcase student presentations—it is essential. School districts are increasingly recognizing this, making training compulsory before instructors are let loose with the technology.

"We have expected teacher competencies, and every teacher must pass tests before they can use the interactive whiteboards," says Amy Ellisor, technology integration specialist at **Richland School District Two** in Columbia, SC, where teachers use the original interactive whiteboard, the Smart Board from Smart Technologies.

AT WAR OVER WHITEBOARDS

Are they a breakthrough technology, or do they prop up conventional teaching methods?

RESEARCH IN THE UNITED KINGDOM would appear to lend great support to proponents of interactive whiteboards. Results from a yearlong pilot program in Maidstone, Kent (www.kented.org.uk/ngfl/ict/IWB/whiteboards/report.html), in which interactive whiteboards were installed in six primary schools, showed that, in part, "the interactive whiteboard is an effective medium for teacher input to the whole class, and for reviewing the lesson. The teacher is able to present from the front, and is better positioned to observe pupils' response....[It is] an effective support for teacher-led group work."

It's the "present from the front" wherein lies the rub. It is the crux of the argument for the naysayers of the device, who believe interactive whiteboards are a "crutch" technology that, for all their functionality, only promote the traditional stand-and-deliver method of teaching, with the teacher dictating from the head of the classroom to aisles of seated students, in opposition to the movement toward student-centered learning.

Mike Horan, director of instructional technology at Florida's **Sarasota County School District**, says the concern is valid, but a quality teacher who can draw on the full extent of the whiteboard's features and capabilities is the determining factor.

"I agree that interactive whiteboards don't really help foster the group method of learning," he says, "but nothing will accomplish that if you don't have a good teacher. There is no magic bul-

let, and if you only look at the service, [their argument] can be true. But the resources [for the boards] dig deeper and evolve how teaching is being done."

Many teachers are demonstrating that an interactive whiteboard can be used to encourage, rather than thwart, a student-centered learning environment.

Eric Payne, math instructor at **T.C. Williams High School** in Alexandria, VA, uses an interactive whiteboard to set up games that he can manipulate as the students work together to solve them, thereby increasing student/instructor interaction. "I have games where students go to the whiteboard and have to uncover certain answers and make correct matches," he says. "I also have organizational-type puzzles where students take turns and try to solve the puzzle. They work together as a team to make this happen. While they are doing that, I sit at the workstation and interact with the game from a remote location. I couldn't do that with an overhead projector or a regular whiteboard."

"In my class," says Staci Gille, a first-grade teacher at **Cape Coral Charter School** in Florida, "there are design centers the kids rotate into, and the interactive whiteboard is one of the centers. Using it does involve taking turns and paying attention to what the other students are doing. The students are definitely working together."

Steven Hook, an administrator at Cape Coral, says interactive whiteboards can be used in a way that supports the key tenet of student-centered learning—that the teacher act as more of a guide while the students choose their own paths to problem solving. "Students can utilize all types

of information from a number of different resources—they can pull up video clips or sound clips and make a topic come alive," he says. "This has assisted the teacher in becoming more of a facilitator of learning."



Ellisor says the district has three tiers of Smart Board training: learning the basics; building lessons in order to show users how to develop and save lessons and promote interactivity; and advanced integration. Teachers take a total of 45 hours of classes, and the courses are taught mostly by fellow teachers. Ellisor says, "We also have on our website the training handouts so teachers who weren't able to attend a particular class can get access to the PDFs."

Riverside Unified School District (CA) has about 500 interactive whiteboards scattered throughout its schools. "I can take a great teacher and teach them technology, but I can't take a good technician and teach them how to be an effective teacher," says David Haglund, an instructional technology specialist for the district. "If you don't incorporate instructional and content training, achievement will go down."

Haglund says his district's interactive whiteboards were purchased through a federal grant that mandated a portion of the funds be reserved for training in the use of the boards and other technologies obtained with the funding. In this, the first year of the grant, about 40 percent of the money was dedicated to professional development; in the third year, that figure will reach 100 percent. "There are significant findings in research," Haglund says, "that say if the school district doesn't provide the proper amount of professional development, then the level of instruction goes down, and not in a small way."

Engaging the Natives

The fallout from having an inadequately trained teacher using an electronic whiteboard in the classroom, according to Jill Hobson, director of instructional technology at **Forsyth County Schools** in Cumming, GA, which has whiteboards installed in every one of its 1,500-plus classrooms, is that a lesson "can end up being a big PowerPoint presentation. But what we're seeing is that when the technology is put into the hands of teachers with training, they get it." By *it*, Hobson means the most beneficial and effective way to use an interactive whiteboard: as an instrument to cultivate interactivity in the classroom. "They see that the tools are meant to have kids coming up to the board."

"We are dealing with digital natives," says Pat Henry, director of marketing and business development for Georgia-based interactive whiteboard maker Promethean. Henry says that today's students need an extra level of engagement. "Calling them out of their seats to get them involved is not enough. We need to find what actually creates the interaction, and that is incorporating technology with learning."

Although data-driven research on the effectiveness of interactive whiteboards is hard to come by, anecdotal studies abound, reporting an increase in student engagement with both the subject matter and each other. And teachers who measure those sorts of things report marked improvement in academic performance by their students as a result of the interactive whiteboards.

The majority of hard data that does exist points to an increase in retention rates and test scores. **Spring Valley High School**, in Richland School District Two, reports that test scores in its advanced placement biology class, which uses



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interactive whiteboards regularly, have risen 30 percent more than scores in classes that are not using interactive whiteboards in every lesson.

“[Lessons using an interactive whiteboard] can end up being a big PowerPoint presentation. But what we’re seeing is that when the technology is put into the hands of teachers with training, they get it.”

—Jill Hobson, Forsyth County School District

Plus, says Sarasota County’s Horan, for schools looking to incorporate some sort of technology into the learning environment without breaking the bank, interactive whiteboards are the way to go.

“When you look at 1-to-1 technologies,” he says, “there are a lot of dollars being spent without a measurable impact—I

put effort into it, and I get where? But on the other side, with interactive whiteboards, I’m not spending as much money and I’m getting the buy-in from teachers, who can choose to use resources they had already developed or use online textbooks.”

And, Horan adds, teachers’ comfort level with the technology is high right away. Interactive whiteboards

allow instructors not as comfortable with using all the tool’s features to tread lightly yet still deliver a message effectively. “I call this a bridge technology,” Horan says. “Other technologies expect you to reinvent yourself. This enhances what you’re already doing.”

Like Horan, Richland’s Ellisor touts the technology’s affordability. “You think you can differentiate [results between] one piece of equipment for \$2,000 and 20 machines at \$2,000 per,” she says. “But that is absolutely not the case because students are getting off their fannies and going up to the board. They’re going on virtual field trips. They’re clicking on interactive games, manipulating the hands of a clock. It connects everyone in the room and the resources that were in the media center or on a whole other continent. This is the type of stimulation they respond to.”

Leveling the Learning Field

Interactive whiteboards are now well into their second decade, but as Nancy Knowlton, president of Smart Technologies, points out, their appeal with students is strong as ever. “A lot of teachers tell us they are surprised that students are not to

the point of boredom,” she says. “The technology continues to keep them focused and engaged in the classroom. The desire to participate is consistently high.”

“The technology really gets their attention, even now when they are accustomed to it,” says Eric Payne, math instructor at T.C. Williams High School in Alexandria, VA. “When I started using a board at the beginning of the year, it was obvious how much it caught students’ attention. Even now, with the students used to it, I still think I get a better level of attention from them than I would just writing on a chalkboard.”

Much of the ongoing popularity of interactive whiteboards, educators say, is that they level the field between teacher and student such that both sides are using technology in a way that is equally comfortable to them. “Through the technology,” Promethean’s Henry says, “teachers can talk to students at the students’ level, yet have their own way of delivering instruction that is not foreign to them.”

Forsyth County’s Hobson notes that many teachers benefit from their students’ ease in working in a technology-infused environment. “Kids know how to use the tools; they are unafraid of not knowing,” she says. “The teacher might be a little more hesitant, so the kids coach the teachers, and we have a lot of classrooms where the teachers actually turn it over to the kids. Having the whiteboard has actually increased the use of all classroom computing.”

The interactive whiteboard is also squaring up the field among different types of learners, be they visual, tactile, or special needs, because the board incorporates the sights, sounds, and stimulation that each style thrives on.

“Like any technology, it’s all in how you implement it,” says Staci Gille, first-grade teacher at Cape Coral Charter School in Florida. “There are very different learners in every classroom, and the visual and motion aspects of the boards really appeal to all of them.”

Having that level learning field also encourages students to be more interactive and take more chances with the technology, says Richland’s Ellisor. “They are so stimulated, there is no fear. All of a sudden, the traditional things that tier children go away. This is a comfortable part of their day outside the school. They see it as what is in their world. And that engages them.” **THE**

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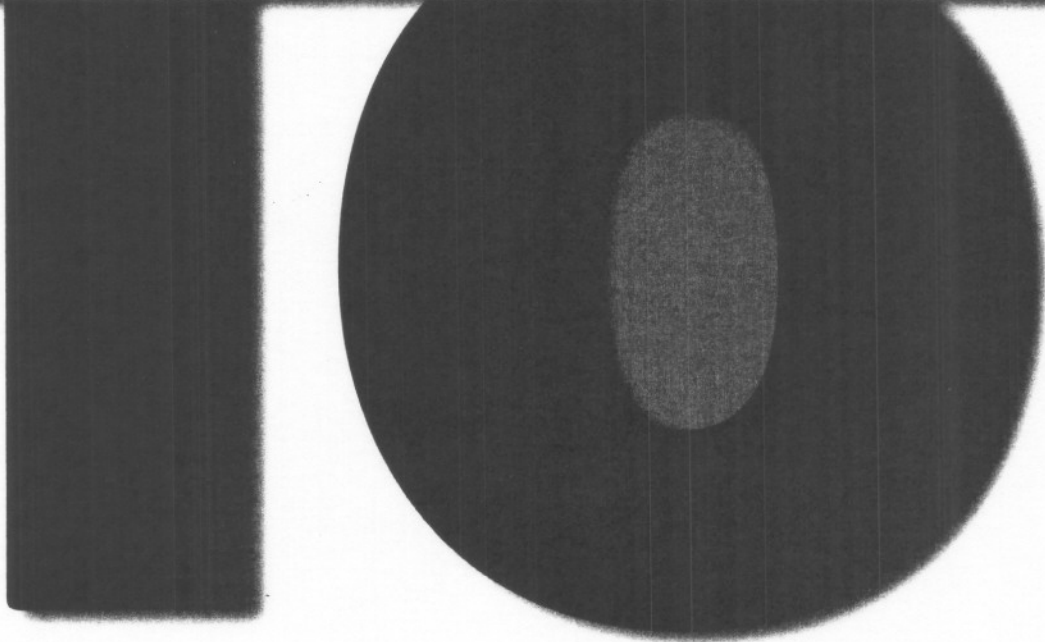
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Revamp special ed

Want to free up a member of your support staff for a full day, each and every week? That's what Andi Asel of Phoenix Union High School (AZ) District did. Asel is the program coordinator for special education for the district, overseeing four comprehensive and one alternative school with about 850 special ed students—more than double the number of kids she handled four years ago when she started at Union. In the beginning of her tenure, each school site would e-mail a spreadsheet 'census' to the district office regarding IEP compliance. Then, one of Asel's staff would spend one entire day collating informa-

tion and inputting everything into a single document for reporting. So when the state of Arizona offered a paper-reduction grant to schools, Asel jumped at the opportunity. She found the ideal solution in Special Education Automation Software, or SEAS. Asel says the software interfaces seamlessly with the district's SASI student information system, which means she can instantly access a student's IEP, contact logs, or disciplinary and attendance records. "It has reaped enormous benefits," she notes, from districtwide demographics to individual compliance.



Improve parent involvement

R U NUTZ? What kind of school administrator would send text messages to parents? One who knows the value not only of communication, but of not overusing it. Dr. Richard Maurer, superintendent of schools in Ardsley, New York, offers parents in his district a number of options for communicating with schools through K-12 Alerts, and for the past two years, those options have included text messaging. Maurer says he has designed the information flow so that

parents only get what they want. He says parents know that the information is important—he doesn't send the newsy, chatty stuff that many school leaders give out. The change-over to text and e-mail has been a big cost-saver: Maurer estimates that he's saved tens of thousands of dollars a year because the district no longer sends out multi-page, multi-colored monthly newsletters. And, there's been huge savings in the hidden costs that go along with that, such as using staff to fold and staple and address labels. Texting is quick, efficient, and saves money, but there's a third reason that text messaging gets a big thumbs up in Ardsley. "It's a great way to stem rumors," Maurer notes.

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*"It is so encouraging to hear a student say,
'This is the first time I've ever liked to read a book!'"*

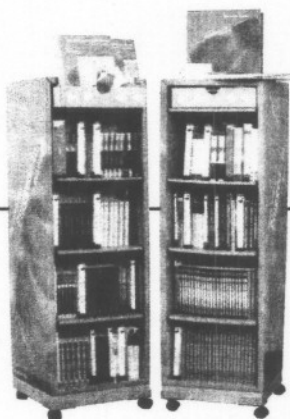
—Amanda Patrick, Alabama Public Schools

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