Leveraging Interactive Whiteboards as a Core Classroom Technology

A recent T.H.E. Journal educator survey supports research that shows interactive whiteboards are effective tools for increasing student outcomes. Given their potential for improving teaching and learning, how can educators leverage the strengths of this core technology throughout the school?

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ABOUT THE SURVEY

In February 2011, T.H.E. Journal conducted an online survey of its readers, sponsored by SMART Technologies. The survey asked respondents to provide feedback on a variety of digital technologies found within a school or district's classroom environment.

Over 14,000 selected subscribers—with titles including superintendent, assistant superintendent, principal, assistant principal, librarian, media specialist, information technology professional, and program management—were sent two emails in February with a link to the online questionnaire, yielding a total of 517 usable responses, a 4 percent response rate. Over 75 percent of respondents reported working in the K-12 school environment; nearly half were either principals or assistant principals. Programming, data collection, cleansing, final tabulations, and reporting of the results were conducted by T.H.E. Journal.

Managing Assets Better

In a 2011 survey T.H.E. Journal conducted of its readers, over 80 percent of respondents said that their schools have at least one interactive whiteboard (IWB) in place, and that their implementations of IWBs were having a positive effect on student learning outcomes. Most respondents indicate that they have had interactive whiteboards as part of the school's technology outlay since the 2000s; in most cases, IWBs are part of a core set of interconnected and collaborative classroom technologies.

In-depth case studies conducted alongside the quantitative research suggest that, to ensure interactive whiteboards have a strong impact on teaching and learning, they must be used by all teachers—not just the technologically advanced. The case studies posit several ways that schoolwide implementation can be achieved, with a teacher-led introduction of the technology, backed by appropriate funding and professional development being the cornerstones of any such effort.

In this paper, we examine the results of the February 2011 T.H.E. Journal survey, which was sponsored by SMART Technologies. We also look at the experiences of two districts that have put in place highly successful interactive whiteboard implementations over time. Together these two studies help us better understand the role that interactive whiteboards can play helping teachers improve student learning in the digital classroom.

I. SURVEY RESULTS

Technologies in Use

The T.H.E. Journal survey asked readers about technology products currently in use, their purchase timeframe, factors determining the order of technology purchases, and key ways in which implemented technologies have impacted their work, including the most effective technologies in increasing student outcomes in the past five years.

As Figure 1 shows, the survey revealed that nearly everyone (98 percent of respondents) reported use of teacher computers where they work; almost three-quarters of respondents (74 percent) indicated use of four additional technologies: projectors (94 percent), students computers including laptops (84 percent), interactive whiteboards (82 percent), and document cameras (74 percent). Those four product categories can be said to form the core of classroom technology.

Newer technologies such as iPads, mobile devices including smartphones, interactive response systems, and wireless slate computers, have lower implementation rates. A third of respondents (33 percent) say that iPads and other mobile student devices are in use in their schools at this time.

Extensive classroom investments in technology took place in the 2000's.

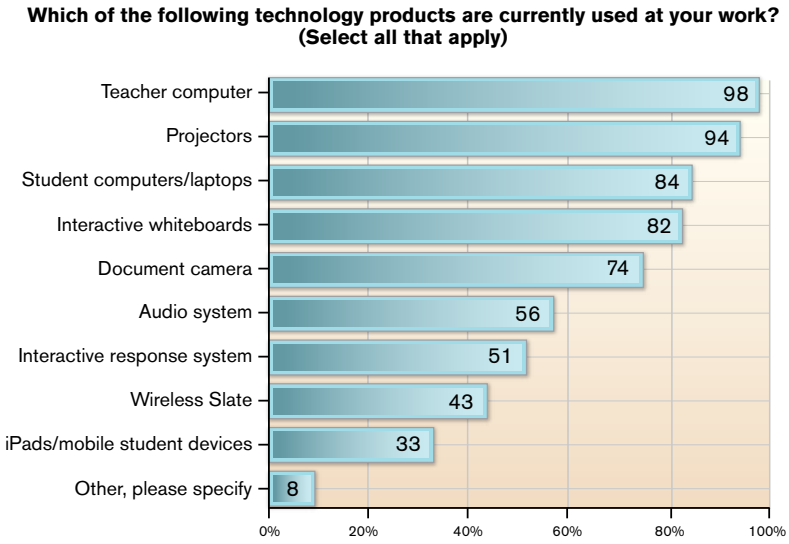

Figure 1: Technology products currently in use

Purchase Timeframe for Technologies

According the survey participants, the earliest technologies put to use in the classroom were computers for teachers, projectors, and computers and laptops for students (see Figure 2). For some schools, those technologies were in use before 1980.

Extensive classroom investments in technology took place in the 2000s, with most funds devoted to projectors (84 percent of respondents made this purchase), closely followed by interactive whiteboards (82 percent), and document cameras (75 percent)

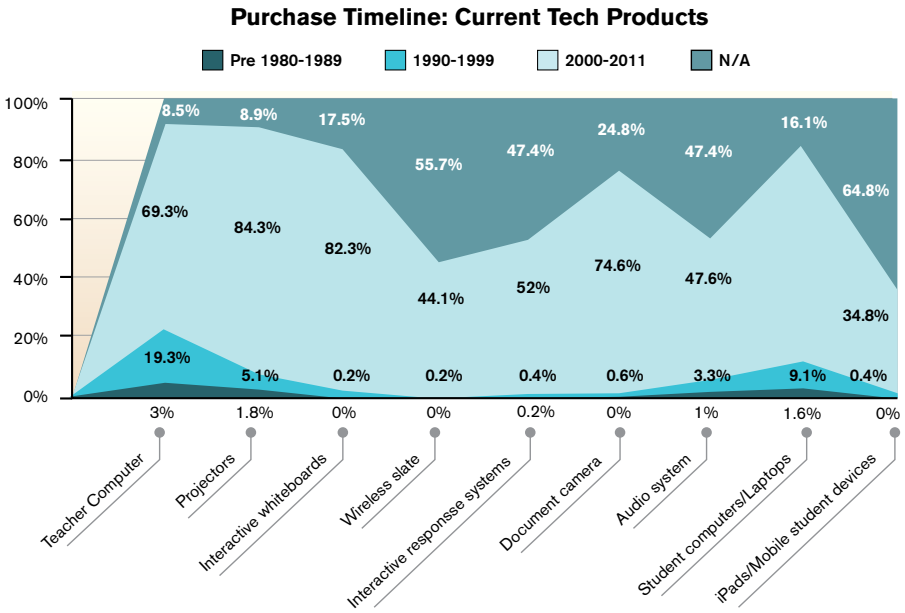

Figure 2: Purchase timeline for current technology products

83 percent of respondents rated interactive whiteboards ranging from effective to most effective

Key Factors in the Order of Technology Purchases

What factors determine the order of priority in technology purchases? As Figure 3 shows, two primary factors seemed to have an impact on the order in which organizations purchase classroom technology: availability of funding (28 percent said that is a determining factor), followed by technology trends and needs assessments (a determining factor for 20 percent). The school or district's technology plan or refresh cycle is also a determining factor for 9 percent of respondents, slightly behind the importance of staff buy-in, ease of use, and training (a determining factor for 10 percent).

The availability of funds, then, is clearly a critical gating item in how and when technology is purchased in schools, perhaps not surprisingly outpacing both need and technology refresh cycles.

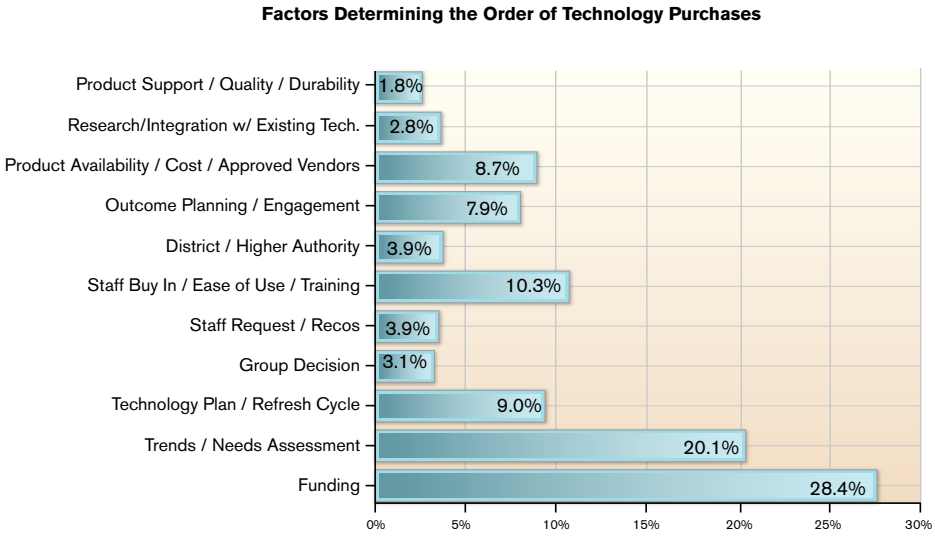

Figure 3: Factors determining order of technology purchases

Effective Technologies for Increasing Student Outcomes

With interactive whiteboards clearly in widespread use, just how effective do T.H.E. Journal survey participants think they are?

As Figure 4 shows, 83 percent of respondents rated interactive whiteboards as ranging from effective to most effective in increasing student outcomes over the past five years. Teacher computers (94 percent), projectors (94 percent) and student computers (91 percent) were ranked along with IWBs as the four most effective technologies for improving student learning.

The most dramatic result of technology in the classroom has clearly been better engagement of both students and staff

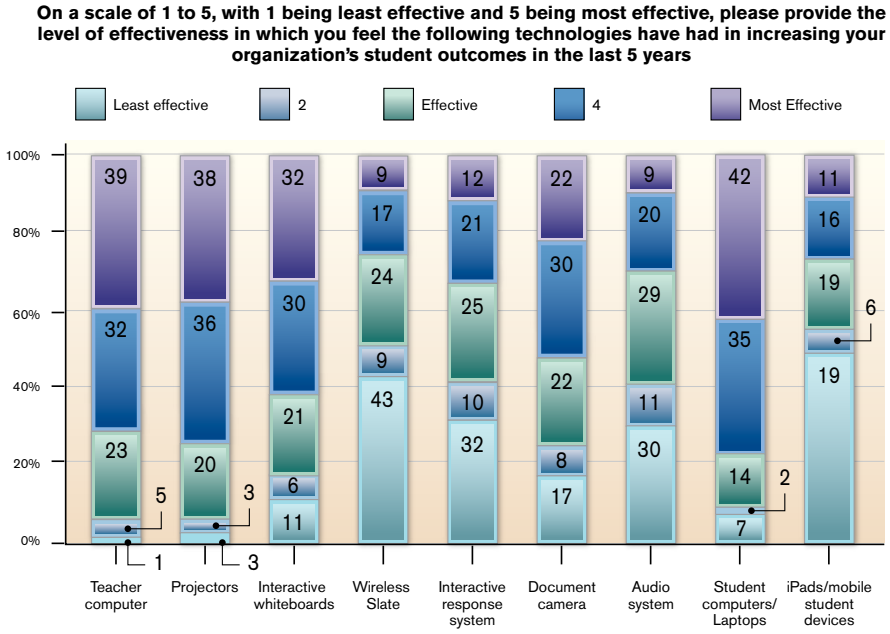

Figure 4: Technologies that affect student outcomes

Ways in Which Technologies Have an Impact

The survey asked respondents how classroom technologies, as a whole, have impacted their work, revealing three primary ways: they have resulted in more engaged students and staff for 24 percent of respondents, have increased accessibility to information and increased student communication for 16 percent, and have improved effectiveness in teaching or learning, or both, for 16 percent.

As Figure 5 illustrates, the most dramatic result of technology in the classroom has clearly been better engagement of both students and staff. The core, most-used technologies, such as computers, projectors, nteractive whiteboards and document cameras, which have now been in place in the classroom for some time, are helping both students and teachers by improving teaching effectiveness, giving students access to more information, and boosting overall classroom communication.

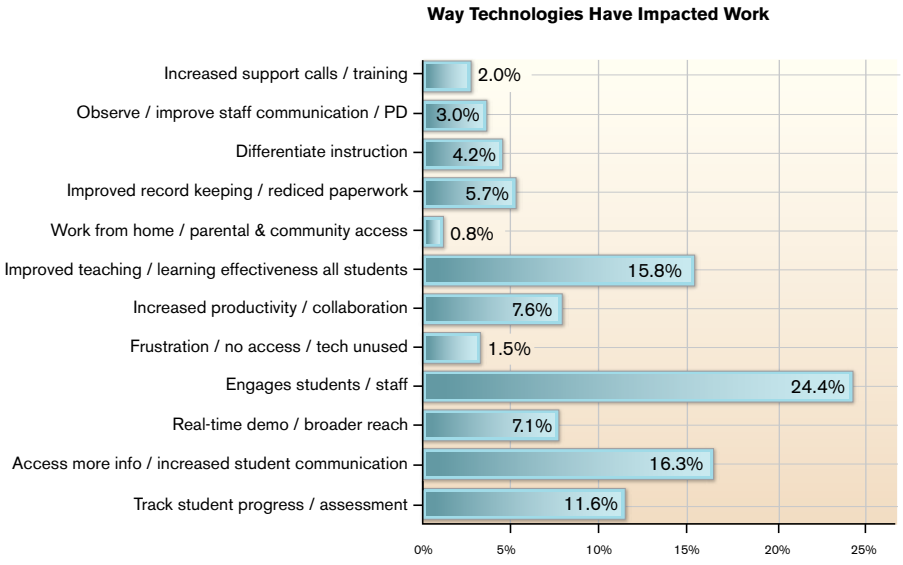

Figure 3: Factors determining order of technology purchases

Interactive whiteboards are best leveraged as a hub to core teaching and learning technologies

Survey Take-Aways

From the survey data we can infer three key take-aways about interactive whiteboards and their role in teaching and learning

1. **Interactive whiteboards are a core technology for teaching and learning.** Core technologies are those that are purchased early in the technology life cycle and then become part of a building block for additional purchases and implementation. Most T.H.E. Journal survey respondents indicated that interactive whiteboards have been in place in their schools and districts since the 2000s. The fact that the IWB can connect to and manage the other core technologies identified in the survey–teacher computers, projectors, and student computers–arguably makes that interactive whiteboard not just a building block, but a core teaching technology, integral to in classroom learning.

2. **Interactive whiteboards are most effective when implemented as a core technology.** Perhaps not surprisingly, the four most effective classroom technologies, according to survey respondents, are the also the four most likely to be found in a school setting: teacher computers, projectors, student computers, and interactive whiteboards. What we infer from this congruence of data is that the effectiveness of each of these tools is not realized on its own but rather in coordinated use with each other. Interactive whiteboards, in particular, are far more effective teaching and learning tools if they are able to play their hub role in connecting all the other core technologies in a digital classroom.

3. **Funding for an integrated core-technology approach must be proactively considered.** Survey respondents indicate that the availability of funding is a key determinant of whether or not schools move forward with a technology purchase. Implicit in this finding is that securing funding for interactive whiteboards is critical for schools seeking to maximize the effectiveness of their core technologies.

II. Case Studies: SMART Boards in Use

That interactive whiteboards are best leveraged as a hub to core teaching and learning technologies is born out by the experiences of two schools– Kenmore Middle School and Naperville Central High School. Each introduced their first SMART Board interactive whiteboards eight and nine years ago, respectively. The boards have become a core technology tool at each school through judicious initial implementations that showcased their potential for improving teaching and learning, which eventually led to widespread use, and ultimately to integration with other technologies at the schools.

Here are these schools' stories.

Naperville Central High School

With 3,000 students, Naperville Central High School is a high-performing public school in Naperville Community School District 203, located in a suburban community 30 miles west of Chicago, in a technology corridor that draws working professionals. Eight years ago, a few teachers returned to their classrooms in the fall to find the familiar whiteboards and markers pushed aside. In their place, they found interactive whiteboards that could display large, colorful slides from a connected computer or projector, along with web pages and other images, as well as allowing (and recording) digital markups right on the screen.

If there's a single lesson from Naperville's experience with SMART Boards, it's this: The key to implementing interactive whiteboards and making them a core technology is training teachers to use the technology effectively.

The teachers, all highly experienced math educators but not necessarily adept with technology, were initially taken aback, Why were they chosen for this experiment?

Mathematics Instructional Coordinator Scott Miller, whose position is similar to that of a department chair, had the unorthodox idea that he would introduce SMART Boards first to those teachers who might need the most hand-holding. His rationale? If those teachers could adopt the new technology tool, anyone could.

Miller concedes his move ruffled feathers initially as the educators scrambled to cope with the new technology. But the SMART Boards, Miller says, are simple enough to use that with minimal training. Teachers were able to display slides and write notes right in class. Integration with other technologies—student response systems, for example—could come later, he reasoned. Miller intentionally mounted the boards smack in the middle of each classroom, making it inconvenient for teachers not to use them.

Sure enough, within two months, every teacher in the math department wanted a SMART Board in his or her classroom. One teacher who was ready for retirement found a new lease on life with the new technology, and stayed to teach for several more years.

Clearly, Miller's gamble had paid off.

That was almost a decade ago. Today, Naperville Central boasts a SMART Board in every classroom, including physical education, and is on a path to gradually upgrade older boards to new models—such as the SMART Board 800 interactive whiteboard—that incorporate more features, are even more intuitive, easier to use, and enable better collaboration..

The high school began using its first SMART Board almost accidentally, when the school won a board for the athletic department. Miller immediately saw the potential for his math department and not only concocted his unusual plan to introduce them to the most technology-shy teachers, but also came up with a novel way of funding them. Since the boards can be mounted on the wall as permanent fixtures in a classroom, he initially used school funds intended for furniture.

Miller maintains a web site with Naperville high school math teacher Dave Sladkey that is full of information for SMART Boards users (www.TeachingWithSmartBoard.com). He has helped Naperville Central to expand IWBs to other departments, and then to the district's other high school, middle schools, and elementary schools. His method: Grab a board from an existing classroom, take it to the new classroom or school, show how it works, and let it sell itself. (See more of Miller's tips in "Bringing More SMART Boards on Board.") Once he had a few boards in place, the district took over the responsibility for, and interest in, purchasing and distributing them.

Naperville is now a SMART Showcase School and has a number of teachers deemed SMART Exemplary Educators, through a program that recognizes teachers whose innovative use of SMART products helps improve educational outcomes.

If there's a single lesson from Naperville's experience with SMART Boards, it's this: The key to implementing interactive whiteboards and making them a core technology is training teachers to use the technology effectively. As easy as the boards are to use initially, the key to deep implementation in the classroom is training teachers in ways to fully integrate them into the curriculum.

Miller says that all too often, schools spend their entire technology budgets on equipment, leaving little or nothing for professional development. That's a mistake. At Naperville District 203, professional development classes are offered in both beginning and advanced uses of SMART Boards.

It does a disservice to this technology to talk about it rather than show the power of its use.

He suggests that with a few hours of training, and within a few days in the classroom, any teacher can feel comfortable with a SMART Board. However, truly working it into lesson structures and changing pedagogy to incorporate the boards and encourage student participation can take a full year or longer. That's partly because teaching styles change with the boards, as does teacher preparation. He tells teachers up front that they will spend more time planning their lessons, Miller explains. But educators catch on early that the time invested up front comes back to them later. "They realize that they're developing something that isn't static," Miller says. "They can tweak content between first and second periods, or over the summer for next year."

Other benefits of developing electronic lesson plans for the boards: Teachers can share material with colleagues much more readily. And if a student is absent, he or she can find out what happened in class via an emailed PDF file or a link to the school's web site, where a recorded lesson can be posted and stored.

Bringing More SMART Boards on Board

Most schools now have a least a few interactive whiteboards in place–to wit, 83 percent of T.H.E. Journal survey participants reported at least one board in their schools. But if you're like many schools, you'd like to expand your program. Here are some tips from Scott Miller, instructional coordinator for mathematics at Naperville Central High School outside Chicago, and Michael Goodman, instructional technology coordinator at Kenmore Middle School in Arlington (VA). Both schools began with a single SMART Board several years ago and now boast an interactive whiteboard in every classroom in their schools.

First, nothing works like **showing the product** in use, Miller says. If this is your first board, contact SMART to get connected with education consultants and get your hands on a demonstration board. Spend a little time learning how to use it, or even better, letting a key teacher or teachers get familiar with it. Also–this is key–bring students with you for any demos. Let them show the board's functionality and appeal, as they'll be eager to do. "As soon as decision-makers see the students interacting with the board, as well as the teachers, that's when things change," Miller says. "It does a disservice to this technology to talk about it rather than show the power of its use." (There is also ample ready-to-use content available on the SMART Exchange at http://exchange.smarttech.com that can be used for teaching and demonstrations.)

Looking for funding, as many schools are these days? Miller describes one school (outside Naperville District 203) that **set up a fundraiser** with SMART Boards scattered around a large room, and students stationed in front of them. Parents and other supporters were invited to see the boards in action, and could pledge a donation right there to help fund an additional board.

Facing a critique that a SMART Board is only one technology device, and can be used by only one student at a time? Not so. Miller says to be sure to **show the board with two students using it at once to demonstrate its collaborative possibilities.** (The SMART 800 series board is set up automatically for collaborative use. And a SMART Table can accommodate four to six users, and up to 140 simultaneous touches,.) "Again, it's best to get the pen out of the teacher's hand and into the students' hands," he says. Students tend to be drawn to the board's natural gesture-driven interface and can give a great demo of how the devices will be used in the classroom.

Although it might seem like a cost saving move to have classrooms share boards, that's not a good idea, cautions Kenmore Middle School's Goodman. You want the SMART Boards to become a central fixture of teaching, and to do that, they need to be a constant presence in the classroom and always be available to the teacher. As easy as boards may be to transport, **avoid the temptation to save money by moving them from room to room**.

UPI/Leslie E.Kossoff/POOL

President Barack Obama signs a SMART Board showing Duke Ellington during a visit to Kenmore Middle School in Arlington, Virginia March 14, 2011.

Kenmore Middle School

Kenmore Middle School is an arts and communications technology focus school serving approximately 730 students in Arlington, Virginia, a suburban community outside Washington, D.C. Eight years after the boards were first introduced, Kenmore now has 72 SMART Boards and 15 SMART Slates, giving them an interactive whiteboard in every classroom and lab, along with the library and media center. "Anywhere teachers give instruction, they have access to a SMART Board," says Michael Goodman, Instructional Technology Coordinator for the school.

The boards have become essential to classroom instruction, he explains, and are readily integrated into lesson plans. "It's just one of the tools that the teachers use in class." Teachers incorporate the boards into their teaching from the beginning of the school year in laying out the class objectives, complete with pictures, then advance throughout the year in using them for a full range of interactive activities with students. "The SMART Board is the center of technology for all my classrooms," Goodman reports.

Goodman says that the road to full integration of SMART Boards began with a single board. In order to convince the school board and central office of the wisdom of purchasing more, Goodman says he and his principal, a strong supporter of interactive whiteboards, managed to buy two more. They then turned to a few teachers who were the district's strongest technology users and enlisted their support by installing the boards in those teachers' classrooms. These teachers, he notes, also had the respect of peers and could recommend technology to others. "We felt that they were early adopters who wanted the technology and would start using it immediately," Goodman says, which proved to be true.

The first two SMART Boards, along with LCD projectors, replaced standard whiteboards that were used throughout Kenmore classrooms in conjunction with overhead projectors to display slides. Those first technology-enriched classrooms at Kenmore also contained a scanner or document camera, an audio system, and a desktop computer.

Some resistance to the new technology came from the school board and the central office, which wasn't convinced that the relatively new technology was proven, Goodman explains. Objections also surfaced regarding cost and mounting requirements.

Boost the Use of Interactive Whiteboards

How can you help teachers transition more easily to a teaching style that makes the best use of interactive whiteboards? At Naperville Central High School, Scott Miller put inexpensive color scanners in every classroom early on. That made it easy for teachers to scan in handwritten materials and save them as SMART Board slides, thus quickly converting their print material to useful interactive whiteboard material.

Of course, after you've invested in the whiteboards, you'll want to make them a primary teaching tool in the classroom. To do that, mount the board right in the middle of the classroom. "Make it inconvenient NOT to use the board," Miller advises. And ceiling-mounted or wall-mounted projectors (rather than on a cart) tend to work better because they don't get moved and bumped and hence don't need constant realignment, suggests Michael Goodman, Instructional Technology Coordinator for Kenmore Middle School in Arlington.

It may seem counterintuitive, but try putting the initial SMART Boards into classrooms with less experienced teachers. Although it isn't always true, less experienced teachers tend to be newer to the profession, but conversely, may be more comfortable with technology, since they are closer to being digital natives. Starting with your least technical teachers shows a firm commitment to the boards and to your teaching staff, Miller says: "The message is, no matter what, we will help you at every turn."

Before the SMART Boards, there was nothing to separate us from the rest of the school system, but once we started putting the boards in, we became a model for the rest of the region.

–Michael Goodman

To address those concerns, once the test teachers were familiar with the boards, the school hosted a technology night and invited teachers and students to demonstrate the boards. Goodman and his staff discussed how the devices would enhance instruction, and how they fit well with the focus of Kenmore Middle School, which is billed as an arts and communications technology school but had little advanced technology in place at the time. "Before the SMART Boards, there was nothing to separate us from the rest of the school system," Goodman says. "But once we started putting the boards in, we became a model for the rest of the region."

Growing pains were a necessary part of the transition. The first thought was to use mobile carts to allow the boards to be shared. But administrators found it much more important to give teachers full access to the equipment at all times and ultimately chose to mount the boards in the classrooms. "Teachers shouldn't have to worry about attaching cables and setting up the equipment," Goodman says, noting that, "if we mounted everything so that nothing moves, adoption was much easier."

The school encountered little resistance from teachers to the new boards, Goodman says, a fact he attributes to the approach of using early adopters to introduce the technology gradually. After the two test teachers were successful, a second group of about 10 teachers was selected, based on the number of additional boards the school could afford. "These teachers were really excited, and they wanted to use the equipment, but they wanted others to test the new technology first. They knew they needed a little more hand-holding," he explains.

Goodman asked each interested teacher to write a proposal describing how he or she would use a SMART Board in the classroom. That requirement helped make teachers a stakeholder in the new technology. Also, many of the teachers selected were in close proximity to each other, so they were able to share what they'd learned about the boards, as well as lessons and other learning materials.

SMART offered a few hours of initial training on use of the boards, Goodman says. But as with Naperville's experience, later training ensured success because it focused on deeper issues around the boards, such as how to integrate them into classroom instruction, and how to develop lessons that take advantage of the interactivity.

These days, new teachers often know the basics of how to use SMART Boards, but because the boards are so inculcated into the school's culture, Goodman says, it's critical that teachers quickly implement the boards completely into their lessons. Starting with slide displays is fine, he says, but he stresses the importance of giving teachers time to build their lessons by watching and talking to seasoned teachers in their subject area. At Kenmore, "they have experts everywhere they go," he points out. "We have lots of seasoned SMART Board teachers on our staff," including teachers who train teachers at other schools and at conferences. Kenmore also hosts the S.U.C.C.E.S.S. (SMART Board Users Conference – Collaborating, Educating, Sharing, and Supporting) every summer for mid-Atlantic area educators.

Other technology at Kenmore includes mobile devices, which Goodman is beginning to incorporate into classes, including some Apple iPads. Kenmore classrooms also include at least two desktop computers per classroom, along with a handful of laptop carts; every grade level has a computer lab. About a third of the classrooms also have audio enhancement systems in which teachers and students use microphones. Cable TV, a DVD player, and VCR capabilities through a projector are displayed on the SMART Boards too. With all that technology to integrate with, though, "the SMART Board is just smack there in the middle of every classroom, and our teachers and students have come to expect this technology tool everywhere they teach and learn," Goodman says.

Funding for Whiteboards

Budget issues are the top determining factor in additional technology purchases, according to the T.H.E. survey of K12 administrators. Fortunately, there are alternate sources for funding for items such as whiteboards, some of them familiar, others often overlooked.

ARRA: Although American Recovery and Reinvestment Act funds are expiring, schools that have those dollars still available can use them for whiteboard purchases.

IDEA: This program, the Individuals with Disabilities Recovery Act , received an infusion of funds as part of ARRA; those IDEA Recovery Act funds must be obligated by the end of September, 2011 (unless an extension is offered). As with all federal spending, rules on what's allowed can be complex -- note that IDEA Part B federal funds, including Recovery Act funds, are to be used only to cover excess costs of providing special education services to students with disabilities. As always, for more information, go to the U.S. Department of Education's web site at www.ed.gov.

Title 1: This is the oldest of all federal education funding programs and aims to level the playing field for low-income students. It is another potential funding source for programs that target low-income and at-risk students. Title 1 also received a funding boost from ARRA and funds may be available, albeit with their own special regulations and spending guidelines.

More ideas: Additional information on funding sources and successful implementations of SMART products can be found at http://smarttech.com/arra

Advice to Decision-Makers

Educators from the case-study schools we profile in this white paper offered a variety suggestions to schools and districts that want to increase the number of interactive whiteboards in use, or to start an interactive whiteboard program from the ground up.

- Don't neglect due diligence in checking out competing vendors and products. One good way to observe products in use is to visit neighboring districts that are using interactive whiteboards. Naperville and Kenmore, the schools profiled in this paper, both offer to work with neighboring districts to help them see the value of SMART boards in their schools.
- Be sure to consider the entire project–including mounting the boards, staffing, and especially professional development–and don't focus exclusively on the cost of the technology. Additionally, consider the **content, community, integrated complementary products, and ongoing support** that is offered by the vendor. Scott Miller at Naperville Central High School stresses that too many schools spend their technology budgets without holding a reserve for **training**. Without instructor lessons on how to integrate the new technology effectively, he says, its impact on instruction will be limited.
- Be creative about a fundraising plan. A suburban school west of Chicago, for example, held a special night and invited parents to view the boards in use by students. Parents and others were then given the opportunity to pledge funds toward purchase of a specific board for a specific classroom.
- Establish measureable results, such as student outcomes, achievements, and usage levels for teachers. Make the integration of technology into instruction a goal that teachers can set. Showcase lessons that teachers create that engage students in the technology.

Concluding Thoughts

Interactive whiteboards are a core technology that is effective in enhancing student learning, usually serving as a classroom nucleus to which supporting technologies such as teacher and student computers, projectors, smartphones and other devices are connected.

With whiteboards clearly established as effective, the question then becomes, how to increase their numbers in the school? As the examples from two successful schools, Naperville and Kenmore, illustrate, much of that comes from acceptance of the boards first by a core group of teachers, who serve as models to the rest their colleagues. School leaders need to leverage that teacher (and student) enthusiasm to demonstrate to the school board and central office the interactive whiteboard's core place in the digital classroom. Adequate attention to and funding spent on professional development is imperative to ensure that the true power of interactive whiteboards is leveraged.

When interactive whiteboards serve as the hub of core interactive classroom technologies, teaching and learning can advance to new heights.

T.H.E. Journal
9201 Oakdale Ave.
Suite 101
Chatsworth, CA 91311

(818) 734-1520

About T.H.E. Journal

THE Journal is dedicated to informing and educating K-12 senior-level district and school administrators, technologists, and tech-savvy educators within districts, schools, and classrooms to improve and advance the learning process through the use of technology. Launched in 1972, THE Journal was the first magazine to cover education technology.

THE Journal's franchise consists of the monthly print magazine (which is also available in digital format), the web site thejournal.com, six newsletters (THE News Update, T.H.E. Journal Insider, IT Trends, THE SmartClassroom, School Security, and Collaboration 2.0), and targeted list rental opportunities.

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SMART Technologies
3636 Research Road NW
Calgary, AB T2L 1Y1
Canada

(888) 42-SMART

About SMART Technologies

SMART is the world's leading provider of interactive whiteboards.* The company introduced the world's first interactive whiteboard in 1991 and remains the global product category leader, providing easy-to use, integrated products and services that improve the way the world works and learns. For more than 20 years, innovation and commitment to excellence have been at the core of our business. We help educators achieve better results with technology products that support student-centered learning. We help businesses become more productive with easy-to-use collaboration solutions that enable better results. Our success is driven by a deep commitment to and engagement with both the education and business communities.

More than 2 million SMART Board interactive whiteboards are used by over 40 million people in classrooms and offices around the world. SMART products can be found in every Canadian province, every U.S. state, every Local Authority in the UK and more than 175 countries worldwide. While our product offering started with the interactive whiteboard, it has evolved significantly beyond that to include other interactive products such as interactive displays, interactive tables, interactive pen displays, student response systems, wireless slates, audio enhancement systems, document cameras, conferencing software, a full line of interactive learning software and more. Beyond products, SMART provides free online learning resources, an online teacher community, and training and professional development to suit your specific needs.

To learn more, visit www.smarttech.com.