English Language Learners: Interactive Whiteboards to Engage, Inspire, Achieve!
Across the country, technology has taken classrooms by storm. As new technologies are introduced, enthusiastic supporters embrace the challenge of mastering the “how-to’s” and finding creative ways to integrate it into their classroom activities. Consider the following quote:

“[This device] appealed at once to the eye and to the ear, thus naturally forming the habit of attention, which is so difficult to form by the study of books. ... Whenever a pupil does not fully understand, [it] will have the opportunity ... of enlarging and making intelligible.”

(Dockterman, 1990, p. 22)

What device do you think the speaker is describing? It sounds as if it might be any one of a number of multimedia devices, including computer, television, or interactive whiteboard. In fact, this quote is from 1855 and describes one of the earliest entries to the field of educational technology — the blackboard. As Dockterman (1990) goes on to say, “It’s a union of powerful technology with the most versatile interface ever invented ... a tool for the professional teacher, a master craftsperson” (p. 23). In the more than 150 years since the introduction of the blackboard, many devices have come to the education market, but none since the introduction of the computer have changed the classroom environment as significantly as the interactive whiteboard (IWB), and though it is less than a decade since its introduction, researchers are demonstrating that these multimedia classrooms do have a significant impact on student achievement.

The following vignettes describe effective activities in a multimedia classroom consisting of an interactive whiteboard with projector, teacher computer, tablet for student use, and learner response system.

Vignettes

**Elementary School** — In Ms. Elliott’s second grade classroom, students are studying synonyms. To begin, she uses a flipchart with a series of pages so that she can keep the lesson fast paced and students engaged (the flipchart is a software application that drives the interactive whiteboard). She opens with a set of pictures in two columns and students take turns going to the board to draw a line between the words that mean the same. Next, she opens a page with a series of sentences, each containing a missing word. The words are written in Magic Ink, so that as students guess the word, they go to the board and highlight it to see if they are correct. To
assess students’ understanding of the lesson and decide if she needs to reteach any of these areas, Ms. Elliott distributes the ActiVotes student response devices and polls the students on a series of questions, discussing the correct and incorrect answers as she goes.

**Middle School** — Sixth grade students in Ms. Angelo’s class are preparing to write a research paper. She created a flipchart using ActivInspire with links to the resources that she will need to get them started. Ms. Angelo moves between the flipchart and other windows that she has set up in advance. They begin by creating a graphic organizer, stating the main topic and a list of subtopics that they want to include. For each, they list a few questions to guide their research. Once they have a few topics, she opens a list of search sites that have been previewed and validated as safe sites with strong academic content. She saves these pages so that she can make the collection available to students later when they are ready to work on their own. As students begin to research, they make notes and take turns transferring their notes to the graphic organizer so that they can see what they have collected. When they begin to write, Ms. Angelo will post their paragraphs so that they can edit them on the ActivBoard and learn from their writing.

**High School** — Mr. Garcia is teaching a lesson about the Holocaust to his junior year students. He is using a flipchart that he created for his interactive whiteboard to introduce the lesson and has also developed a timeline where students can enter the Holocaust dates and pair them with world events that were occurring at the same time. As a source site, he opened a browser window and links to the online exhibits of the Holocaust Museum and invites students to find the events needed for the timeline. One student found an account of a rescue effort in which a Hungarian businessman befriended an El Salvadoran diplomat. Together they found a way to create El Salvadoran certificates for Swiss and German Jews so that they could get out of the country and avoid the round-up. Students were fully engaged in this discussion and asked permission to stay after school so that they could continue their research. The next day, when Mr. Garcia used the ActiVotes for an assessment of what they had learned, the scores were much higher than usual and he felt confident that they had mastered this material.

**Professional Development** — When the school district purchased digital video cameras for the schools, Instructional Technology Coaches needed to be trained so that they could introduce them and show teachers how to use them. A few coaches piloted the cameras and prepared an interactive flip chart to use during training. The flip chart included links to sample videos created by students so that teachers would know what level of work they could anticipate. It also provided step-by-step instructions for how to use the cameras, import the video files to the computer, edit them, and produce a short video. The flipchart was posted on the Instructional Resources page along with similar training materials for easy access by coaches or other teachers.
**Interactive Whiteboards – 21st Century Schools**

Multimedia classrooms have revolutionized schools across the country and around the world. What is this phenomenon? How do these classrooms differ from traditional classrooms? What pedagogical changes are needed to use these tools to their full potential?

An interactive whiteboard, such as the Promethean® ActivBoard, is one of the main components of the multimedia classroom. Whether stationary/wall-mounted or moved from room to room, it becomes the visual focal point of the multimedia classroom. The interactive whiteboard and projector that connect to the teacher’s computer, however, are only the beginning. The board can be an extension of the teacher’s desktop or can serve as an independent image that can be manipulated with a wireless pen using a “toolbox” of digital tools including colors, shapes, magnifying glass, magic ink, and more to create the desired effect. Because the board is interactive, users can move and manipulate objects or link to other pages or websites. For example, in a typical matching worksheet with a column of words and a column of pictures, students can drag the word to the picture (or vice versa). Also, in a geometry classroom, the user can “grab” an angle of a triangle and move it to stretch the shape, changing the size of the angle and the properties of the triangle.

Other components of the interactive classroom may include a tablet for student use, web camera, speakers and teacher microphone for audio enhancement, and student response system. Using the web camera and audio system, classes can experience electronic field trips, hold video conferences with other classes, or conduct research with experts at universities. The possibilities are limitless. Also, using the ActiVotes® learner response system, the teacher can easily poll the class to assess their understanding of a lesson as it is taught to determine whether further reinforcement is needed before moving on.

The educational software comprising the ActivClassroom is ActivInspire, consisting of numerous instructional resources that are grade-level and content aligned. In some cases, publishers provide resources to accompany textbooks. In others, teachers and district curriculum staff create original flipcharts by aligning resources to the content that is being taught. This collection of flipcharts is invaluable as a means of supporting teachers as they become comfortable and confident using the multimedia tools.
Success Stories

The literature contains numerous articles describing success with interactive whiteboards in the classroom. These come from widely diverse sources such as Kent County, Maryland; the Oklahoma State Department of Education, Buffalo, New York; the United Kingdom, and Albuquerque, New Mexico.

In Maryland’s Kent County School District, nearly 60% of classrooms are equipped with interactive whiteboards. The school district set aside funds for these, but teachers must apply to have their classroom updated with the multimedia technology and commit to a comprehensive in-service program including summer professional development, follow-up sessions during the school year, a review of best practices, and participation in a teacher blog. Students have enthusiastically embraced this technology, which enables teachers to present content in a way that is more engaging and also integrates 21st Century Skills. Even teachers who were initially reluctant to use the equipment find that it is now a vital component of their classroom toolbox (Manzo, 2010).

The Oklahoma State Department of Education provides high-quality professional development to educators in public K-12 schools. The Department of Education models best practices in adult learning and using Web 2.0 tools for this training so that school districts will follow this example. Having identified that 1,446 Oklahoma schools had purchased interactive whiteboards for classroom use, the Oklahoma State Department of Education “launched a strategic professional development campaign” to ensure that teachers would have the skills and pedagogical strategies to use these effectively (Hileman, 2010, p. 66). A training plan was developed to address the needs of teachers at all grade levels and across all content areas. Training was offered on-site at the state’s training lab and broadcast remotely via video conferencing to remote school districts. This remote synchronous training was conducted in such a way that if the remote users’ computer was connected to a whiteboard, they would have the same view as the trainer and could also control the whiteboard tools during the presentation. In addition, the workshops were saved and archived so that those who were unable to attend or participate synchronously could stream the training at a later date. This training was supplemented with instructional resources and a Ning site where teachers can communicate with each other and share lesson plans for using with the IWBs.

The Buffalo (NY) Public Schools have been installing IWBs in all classrooms as part of a building renovation project in process throughout the school district. Approximately 37 schools have been refurbished to date, with five more slated to come online for school year 2011–12. As the schools reopen, teachers receive interactive white board training and the support of an instructional
technology coach. The coach meets with them at grade level meetings, brainstorms ideas for how to integrate the technology into their classroom instruction, and models lessons or co-teaches if needed while the teachers gain confidence in using the equipment. As teachers increase their use of technology in the classroom, they find that it is less work, not more as they had anticipated, and that students are both more interested and more engaged, leading to fewer discipline problems. Throughout the school district, principals praise the integration of the interactive white board technology as a new teaching and learning tool and anticipate a positive impact on student achievement.

Beginning in 2002, the government of the United Kingdom provided funds for schools to purchase interactive whiteboards. Understanding that effective use would involve changing both teaching and learning styles as well as increasing teacher technology proficiencies, the government launched MirandaNet, an online learning network for teachers that included partners from higher education, industry, and research. Through MirandaNet, the UK has developed and distributed a set of collaborative curriculum resources that teachers can access. Rather than a scripted solution, teachers have the opportunity to customize these resources to suit their individual teaching styles and differentiate them to meet the needs of the students in their classes. Teachers are very positive about the MirandaNet resource as an opportunity to share experiences in the classroom and work together to enrich their lessons (Cuthell, 2005).

In Albuquerque (NM) Public Schools, a major initiative is underway to install IWBs in every classroom throughout the 139 schools. Beginning in the summer of 2010, when a group of a few hundred teachers received the initial training and piloted the first shipment of boards, the momentum has grown. Since that first year almost 1500 teachers have been trained to use the new equipment. According to Dr. Kevin Cole, “Preliminary feedback from teachers who have them and have been trained is very exciting – they are presenting classroom material in a different way. Students are more engaged, paying attention, asking questions, and interested in what will come next.” Cole noted that teachers who look for different ways to incorporate technology and integrate Internet-based activities are finding the best results.

In all of these cases, the implementation of the interactive whiteboard technology included staff development, a plan for technology integration, and the support of leadership.

**Results with Promethean Classroom**

The introduction of interactive whiteboards to the classroom coincided with a focus on determining conclusively whether educational technology has a significant impact in student achievement. Studies had been conducted in this arena for years, but this topic had been a
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controversial area. As teachers clamored for IWBs in the classroom, administrators sought proof of student achievement, and research began in earnest.

A number of studies have been conducted on the effectiveness of interactive whiteboards in the classroom. In northern Ohio, for example, a study was conducted to see whether there was a correlation between using the interactive whiteboard and student learning (Swan, Schenker, & Kratonski, 2008). Eleven elementary schools, three junior high schools, and one alternative school were included in this study of a low-performing school district with a minority population of one-third and eight percent of the students living below the poverty line. From this population, a sample of two groups was selected: one consisted of 1466 students and their 35 teachers in grades three through eight who would use the interactive whiteboards for reading and ELA instruction; the other consisted of 1686 students and their 55 teachers in these same grades who would not use the interactive whiteboards. A similar group was identified consisting of 1379 students and their 31 mathematics teachers who would use interactive whiteboards and 1813 students and their 43 mathematics teachers who would not.

Researchers compared the students’ scores on the Ohio Achievement Tests (OATs) and found that the aggregate data showed a slight increase for the group using the whiteboards in both subjects. Breaking the scores down by grade, however, the data showed a more significant increase in most grades in both content areas. To try to determine why the gains were less significant in some cases, researchers explored the types of whiteboard use. They found the most significant gains were made in classes where students used the boards for interaction and problem-solving as opposed to those who used the boards simply as a presentation tool.

Probably the most definitive work to date is that conducted by Marzano (2010a, 2010b, 2010c). He conducted a multiyear study involving 27 public schools in 20 cities in 14 states with over 5,000 students included in the sample. The simple objectives of the study were to analyze the impact of using interactive whiteboards on student learning and to analyze teacher behaviors as related to using the technology. (Videotapes were used to collect data for this phase.) During the first year, 85 treatment/control studies were compiled; in the second year, 46 treatment and control studies were added to these.

The results of the study indicated an average 16-point gain with the use of the whiteboard. Further analysis did not find a significant difference based on age, grade level, or subject.
Teacher confidence did seem to play a role: as teachers became more experienced and confident, they found more effective ways to use the boards in the classroom.

Implications for English Language Learners

In Round Rock (TX) Independent School District, further research is being conducted to focus on the use of interactive whiteboards with English language learners (ELL) (Lopez, 2009). Having identified significant differences in the achievement level of ELL students and regular students, the district launched the Digital Learning Classroom in three schools for third and fifth grade students for mathematics and reading/English Language Arts instruction. The classroom technology consisted of a wall-mounted interactive whiteboard with ceiling mounted projector, wireless pen, and electronic slate. The objectives were (1) to determine whether the interactive whiteboards could reduce the achievement gaps between the two groups in these classrooms and (2) to determine whether the ELL students in the Digital Classroom would perform better than the ELL students who were not in these classrooms. Teachers worked with a curriculum specialist on developing instructional resources for the whiteboards and an instructional technology specialist on mastering the skills needed to use the equipment effectively.

The Texas Assessment of Knowledge and Skills (TAKS) data was used for the comparison. In the 3rd grade mathematics tests the results were as follows:

- 69.0% of ELL students in traditional classrooms passed compared to 84.6% of regular students in those classes
- 82.4% of ELL students in the Digital Classrooms passed in comparison to 84.5% of regular students.

In the 5th grade mathematics test the results were as follows:

- 66.0% of ELL students in regular classes passed as compared to 84.6% of regular students
- 88.9% of ELL students in the Digital Classroom passed as compared to 84.6% of regular students.

In the 3rd grade students reading section of the test, the results follow:

- 84.6% of ELL students in traditional classrooms passed compared to 95.1% of regular students in those classes
• 77.8% of ELL students in the Digital Classroom passed in comparison to 95.1% of regular students.

In the 5th grade reading section of the test, the results follow:

• 73.2% of ELL students in regular classes passed as compared to 83.6% of regular students,

• 100% of ELL students in the Digital Classroom passed as compared to 83.6% of regular students.

In most cases, the results indicate that ELL students in the Digital Classrooms made more significant gains than those in regular classrooms. In addition, in most cases, ELL students in the Digital Classrooms outperformed their counterparts in regular classrooms. The researchers attribute these gains to the multimedia classroom and also to pedagogical changes made by the teachers in using the technology.

**Critical Success Factors**

As noted in the research and exemplars described, the way in which interactive whiteboard technology is integrated into teaching and learning makes a significant difference on the outcomes garnered. Once the IWBs and projection systems are mounted and installed and teachers are trained, there exists a learning curve before they are used most effectively in the classroom. As we have seen, the IWBs are used as a projection screen in some cases, while in others they are used to engage students in interactive lessons that present and reinforce content.

What makes some school districts so much more successful than others? What do you need to consider when planning an IWB implementation? Research highlights the following critical success factors.

*Developing Teacher Vision and Setting Expectations* — When introducing a multimedia classrooms initiative, district administrators often include a few teachers in the selection process. This might involve inviting them to visit another school, participating in vendor demonstrations, or serving on the procurement team. These teachers have the opportunity to learn about the tools and get a good idea of what they can do, how they can be used, and begin to formulate ideas of how they will use the tools in their own classes. While it is not feasible for all teachers to participate at this level, teachers who are not part of the initial selection process will need to acquire a vision for the potential and expected level of use for this equipment prior to having access to it or attending the initial training. The clearer their understanding of what the tools can
do, as depicted in the vignettes at the beginning of this paper, the more likely the teacher is to embrace the tools and learn to use them effectively in the classroom.

Aligning Resources to Curriculum — Many school districts today have worked on curriculum mapping, defining a structured scope and sequence for teachers in all content areas, and identifying resources for them to use. When planning to introduce interactive tools, these must be aligned to the curriculum, and it is helpful to have these resources prepared in advance. Promethean Planet® provides a host of materials that are aligned to grade level and content standards and also indexed by publisher. In preparing to support teachers in using these tools, it is extremely helpful to suggest resources that align to the curriculum they are teaching.

Technical Support — Many teachers are uncomfortable with new technology. Most are comfortable with their computers and know what to do if they do not get the response they are seeking. This is the result of both experience as well as trial and error. When a new technology is introduced, a learning curve should be expected. Using the pen, finding the “zoom” tool, using flipcharts with ActivInspire, and creating polls for ActiVotes are all new skills that teachers will have to master; some will do it with more confidence than others. Those who are hesitant will be more confident if there is someone nearby to provide technical support and coaching, and they will be more likely to apply these strategies to other lessons.

Training, Training, Training — As with any implementation, training is one of the most important keys to success. As in the case studies, teachers are most successful with ActivClassroom if they start with a minimum level of technology skills followed by training on the tools. In addition to using the IWB tools, teachers need training on how to integrate them with other resources, such as graphic organizers, and web-browsing tools. In addition to face-to-face workshops, additional training can be provided by coaches working with individual teachers or small groups. Many districts are also offering online training resources, including just-in-time training, tutorials, user-groups, and professional learning communities. The more opportunities teachers have to ask questions, get ideas, and share resources — the more successful the implementation will be.

Conclusion

The National Educational Tech Plan describes an infrastructure for learning that “unleashes new ways of capturing and sharing knowledge based on multimedia that integrate text, still and moving images, audio, and applications that run on a variety of devices. ... It frees learning from a rigid information transfer model (from book or educator to students) and enables a much more motivating intertwine of learning about, learning to do, and learning to be” (US. Department of Education, 2010).
Multimedia classrooms using interactive whiteboards, projectors, cameras, audio systems, handheld devices, and student response systems offer an opportunity to bring this vision to reality. With proper training and support, teachers can use these tools to engage, motivate, and inspire students and to promote authentic learning and increased student achievement.

For more information about Promethean’s products and services, please visit their website at: www.prometheanworld.com.
References


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