Research Bulletin

Interactive whiteboards significantly affect teaching and learning

Researchers conclude that interactive whiteboards produce significant results

Study quantifies the impact of interactive whiteboards on student achievement

A new report by the Education and Social Research Institute at Manchester Metropolitan University, UK, a highly ranked research facility, proves that increasing students' exposure to interactive whiteboards through curriculum integration significantly and positively impacts student achievement, especially in math and science.

The report, "Evaluation of the Primary Schools Whiteboard Expansion Project," demonstrates that the more exposure students had to interactive whiteboards, the greater the impact on learning outcomes. For example, most students in Key Stage 2 mathematics made the equivalent of 2.5 to 5 months' additional progress. In Key Stage 1 mathematics, high-attaining females made additional gains of 4.75 months. For Key Stages 1 and 2 science, most students showed progress, particularly low-attaining Key Stage 2 males, who made as much as 7.5 months' additional progress.

The findings are based on the results of the former Department for Education and Skills' (DfES) Primary Schools Whiteboard Expansion project (PSWE). The DfES provided £10 million to 21 local authorities in 2003–04 for the project in an effort to support the implementation and continued use of interactive whiteboards in primary schools in England. (Becta 2007, 3)

Researchers at Manchester Metropolitan University conducted an evaluation of the PSWE project from September 2004 to December 2006 to determine the effects interactive whiteboards have on teaching and learning, and whether continued exposure to the technology had an impact on student learning outcomes.

Background to the PSWE project

In recent years, the UK government has begun focusing on information communication technology (ICT) initiatives in an effort to develop a comprehensive technology infrastructure. National targets have been set for local authorities and schools to implement education technology products in their classrooms, with an emphasis on training teachers, integrating technology across the curriculum and providing adequate resources for teachers.

According to July 2005 statistics, 94 percent of primary schools in England have at least one interactive whiteboard, 50 percent have six or more, and 82 percent have an Internet connection. (Becta 2007, 14,15)

As technology integration continues to spread rapidly in UK schools, education leaders and researchers are increasingly interested in technology's contribution to the development of pedagogies and the effect ICT can have on students' learning.

Research on PSWE

For the university's report, researchers analyzed the progress of 7,272 students in 332 classrooms in 20 local authorities. The participating students were divided into four groups:

1. Students that had completed Key Stage 1 (second graders) in 2005

2. Students that had completed Key Stage 2 (sixth graders) in 2005

3. Students that completed Key Stage 1 in 2006

4. Students that had completed Key Stage 2 in 2006

Researchers were interested in how the length of exposure to interactive whiteboards affected students' progress in English, mathematics and science, as well as any additional benefits interactive whiteboards may have had on special needs students, teacher preparation and the overall atmosphere in the classroom.

Most of the schools participating in PSWE were provided with additional technology resources to support their use of interactive whiteboards in the classroom. Seventy-three percent of teachers were provided with a laptop and 69 percent reported they had broadband connectivity. A variety of interactive whiteboard brands were used in the project, but based on the decisions made by participants in study, 63 percent of the installations were SMART Board™ interactive whiteboards. (Becta 2007, 14)

Summary of students' progress

After the two-year study was completed, researchers compiled the results of teacher logs, surveys and visits to the schools and local authorities. To quantify the impact of interactive whiteboards, researchers measured students' Key Stage 1 results against their Foundation Stage (pre-school) Profile data. Key Stage 2 results were compared against prior attainment in Key Stage 1 national tests.

- In Key Stage 2 mathematics, average- and high-attaining male and female students who had been taught extensively with the interactive whiteboard made the equivalent of an extra 2.5 to 5 months' progress

- In Key Stage 2 science, all students except for high-attaining females (who had already reached their maximum potential), made greater progress with more exposure to the interactive whiteboard. Low-attaining males made as much as 7.5 months' additional progress.

- In Key Stage 2 writing, males with low prior attainment who had been taught extensively with the interactive whiteboard made 2.5 months' additional progress

- In Key Stage 1 mathematics, high-attaining females who had been taught extensively with the interactive whiteboard made gains of 4.75 months, allowing them to catch up with the progression of high-attaining males

- In Key Stage 1 science, females of all attainment levels, and average- and high-attaining males, showed progress with more exposure to the interactive whiteboard

- In Key Stage 1 English, average- and high-attaining males and females benefited from increased exposure to the interactive whiteboard

(Becta 2007, 4–6)

Researchers discovered that interactive whiteboards produced positive effects in the classroom, especially for students of prior average and high attainment. In fact, the results showed that consistent and long-term use of interactive whiteboards had a significant impact on the speed of progress for many students.

Summary of teachers' experiences

The report indicates that teachers have responded positively and enthusiastically to the implementation of interactive whiteboards. Participating teachers noted improvements in their skill level, ability to assess students and lesson preparation.

Skill level
Researchers noticed that at the beginning of the evaluation, teachers used the technology product as if it was a traditional whiteboard, but soon their teaching practices evolved to make the most of its many interactive features.

At the beginning of the project, 161 teachers indicated that they had just begun to develop skills using the interactive whiteboard. By the end of the school year, 74.5 percent of this group felt they had transitioned to be reasonably effective in their use of the technology product (Becta 2007, 101).

Assessment
Many teachers felt that they had more time for assessment because the interactive whiteboard gave students the opportunity to come to the front of the class and interact with the lesson or provide their own contributions. Teachers were therefore more able to effectively judge who understood the lesson.

The interactive whiteboard was primarily used for whole-class teaching, with some group and individual work. Teachers felt that in-class discussion significantly increased, allowing them to assess students' speaking and listening skills.

Lesson preparation
Out of 363 teachers, 326 of them said that the interactive whiteboard reduced their lesson preparation time. They were able to prepare lessons before class, rather than spend time writing notes on a whiteboard or blackboard.

The report indicates that teachers are becoming more confident in their lesson preparation, and some are using the more advanced features of the interactive whiteboard. (Becta 2007, 102)

Benefits for the whole class

The report indicates that interactive whiteboards enhanced the overall classroom experience. Highlighted below are some of the benefits:

- Increases the level of students' engagement in learning activities

- Aids in teaching difficult, abstract and complex ideas

- Enables teachers to access multimedia resources

- Allows young students to demonstrate their knowledge before they have acquired writing skills

- Boosts students' self-esteem and teachers' ability to assess learning

- Engages students with special learning needs and often helps improve their behavior

- Fosters a sense of community and creates a cooperative and sharing environment

- Permits teachers to be more mobile during whole-class teaching

(Becta 2007, 47–51)

Areas to focus on

The researchers believe that the highlight of the project is the impact interactive whiteboards had on teaching practices. However, after reviewing the results, the Manchester Metropolitan University researchers identified some problem areas, including lack of professional development for teachers, training and technical support, accessibility for younger students, and availability of software and resources (Becta 2007, 10–12).

These areas were specifically targeted as causing difficulties for teachers during the course of the project and should be take into account by education leaders when considering interactive whiteboards for integration. The report also recommends that schools simultaneously implement interactive whiteboards into every classroom to promote their consistent and prolonged use.

SMART meets report's standards

The SMART Board interactive whiteboard is a complete solution for teachers. SMART Technologies invented the interactive whiteboard, and its staff has over 15 years' experience working closely with teachers and students to provide the highest quality products to meet their needs. Every SMART product comes with extensive training options and resources to help teachers seamlessly integrate it into the classroom.

Support
SMART offers a variety of professional development, technical support and product training options. Programs such as the SMART Exemplary Educator program and Trade Show Teacher program enable teachers to meet other educators, implement good-practice techniques and broaden their skill sets.

Teachers can visit the support section of SMART's website, **www.smarttech.com**, for a variety of online materials to assist them – troubleshooting instructions, how-to articles and technical bulletins provide them with the information they need to use their product effectively. Educators can also contact SMART support representatives directly by phone or through an online submission.

For help with training, teachers can go to the training center on **www.smarttech.com** for online tutorials, Quick Reference Guides and Hands-on Practice exercises. Teachers and administrative staff will have all the resources, training and support they require as their knowledge of SMART products increases.

Accessibility for all students
Researchers noted that many younger students had trouble accessing the interactive whiteboard due the height at which it was installed. SMART offers products to teachers that are height adjustable, including a wall mount for the SMART Board 600i interactive whiteboard system, the height-adjustable *Rear Projection* SMART Board 2000i interactive whiteboard and moveable floor stands for front-projection SMART Board interactive whiteboards. Teachers can also move the toolbars in SMART Board software to the bottom of the screen.

Software
SMART Board software, which includes Notebook™ collaborative learning software, is a central component of SMART's hardware products. Teachers are able to create lessons, play video files and interact with other software programs. SMART Board software service packs are available for any of the school's computers, so the investment improves over time as new features are added to the software.

Learning resources
SMART's education solutions website offers lesson activities that are correlated to local curriculum standards, teacher-developed and subject-specific. This allows teachers to streamline lesson planning and implement effective lessons spontaneously in class or customize them for use in future lessons. The SMART Learning Marketplace will also give teachers access to over a million subject-specific and education-relevant images, video clips, audio files and manipulatives, published by a variety of leading education content providers.

With 250,000 SMART Board interactive whiteboards currently installed in UK schools, SMART has the expertise and resources to help teachers implement them effectively in class.

References

British Educational Communications and Technology Agency (Becta) "Evaluation of the Primary Schools Whiteboard Expansion Project." 2007. **http://partners.becta.org.uk/upload-dir/ downloads/page_documents/research/whiteboards_expansion.pdf** (Accessed October 17, 2007).

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