Change Project Literature Review
Improving Student Learning with Interactive Whiteboards

In the early 1990s, the interactive whiteboard was introduced to the public. The boards were used as tools to help corporations conduct training sessions and meetings, professional sports teams improve coaching and in educational settings (Interactive Whiteboard). Over the next decade and a half, the use of interactive whiteboard technology has grown substantially. Most of the growth seen in the use of interactive whiteboards is in the classroom. According to The America's Digital School 2008 Survey, more than 85% of school districts were using interactive whiteboards with 11.8% housing one board per classroom while 61% share one board per five classrooms (Interactive Whiteboard). With the use of interactive whiteboards on the rise in classrooms across America, a review of the existing literature on the subject is appropriate to evaluate the positive and negative changes this new technology brings to the classroom. This review contains information on the impact of interactive whiteboards in the mainstream classroom as well as the special education classroom. Also included are opinions, both positive and negative, of teachers using interactive whiteboards in their classrooms.

Interactive whiteboard is a general term which is used to describe a large, interactive display much like the traditional whiteboard found in classrooms. Common brands of interactive whiteboards are SMART boards, produced by the interactive whiteboard pioneer, Smart Technologies Inc. since 1991 (SMART Technologies Inc., 2006), and the ACTIVboard, produced by Promethean (Promethean World, 2008). To avoid confusion, all boards in this review will be referred to by the general term, interactive whiteboard. The interactive whiteboard can be mounted to the wall of a classroom or be made portable by attaching it to a floor stand. The board is connected to a computer and a projector which casts the computer's desktop onto the solid white screen. Students and teachers are then able to manipulate the computer using a pen or finger (Interactive Whiteboard). The immediate benefit to using such a device is that all students can view the material on the computer collectively. However, countless other benefits are available to teachers with interactive whiteboards in their classrooms.

A closer look reveals that, of the many forms of available classroom technology, interactive whiteboards "may provide a significant potential for meeting the needs of students with diverse learning styles and for engaging students during the learning process" (Beeland, 2002). The touch-sensitive board allows users to interact with computer applications without having to be in front of a computer. This form of technology is essential in classrooms with limited computer access because it provides students a way to experience and learn about necessary computer and Internet technologies. It has been suggested that use of the boards also increases the level of participation among all students which increases engagement. Student engagement is essential for the learning process (Beeland, 2002). In the study titled, "Student Engagement, Visual Learning and Technology: Can Interactive Whiteboards Help?" William D. Beeland conducted a survey of teachers and students to evaluate the claim that interactive whiteboards increase student engagement. Beeland concluded that there was strong evidence to indicate whiteboards increase student engagement during the learning process. Beeland believes that all classrooms could benefit from using interactive whiteboards but recommends wall mounting boards in each classroom. He noted that shared boards are not used as frequently and as effectively. He also advises that whiteboards only be mounted in classrooms where the teacher feels comfortable and willing to use the technology (Beeland, 2002).

Student engagement is one of many benefits of using the interactive whiteboard in the classroom. According to a study conducted at Manchester Metropolitan University, researchers found "evidence that all children, including those with SEN [special education needs], had made exceptional progress in attainment in national tests" (Somekh, et al., 2007). Significant gains were made in all areas including math, science, English, and writing. In some cases, students who had fallen behind were able to make enough progress to catch up to their same age peers. The same study also reported comparable positive benefits for student attention and engagement (Somekh, et al., 2007).

In another study conducted by researchers from the Department of Education at Keele University in northern England, researchers used a questionnaire, observed lessons, and interviews to evaluate the effectiveness of Interactive whiteboards in the classroom. They discovered that there were potential benefits to using interactive whiteboards in the classroom but that the potential benefits were influenced by several factors. The key factor was the will of a teacher to actually use the technology as well as a willingness of teachers to develop materials for use with the boards (Miller & Glover, 2002). There were also concerns with using the interactive whiteboards in the classroom. Some respondents to the survey described problems with using the hardware or forgetting to charge the pen. There was also concern from teachers who relied on the technology for a lesson only to be derailed by technology failure like a computer crash. Most teachers however, did not express any problems with the equipment. Interestingly, one teacher noted, "I would like to see [an interactive whiteboard] used to its full potential so that I know what to strive for" (Miller & Glover, 2002). This seems to imply that proper training on interactive whiteboards is vital for their successful integration in the classroom.

Similar conclusions were reached in a study performed by John P. Cuthell titled, "Interactive Whiteboards: new tools, new pedagogies, new learning?" Cuthell explains that the interactive whiteboard has "transformed teaching" even in instances where the whiteboard is shared among classes. He goes on to state that reactions to using the whiteboard are "unfailingly positive" if a teacher has access to the interactive whiteboard in their classroom and is willing to base their teaching around it. Teachers with the most success were those who eagerly embraced the technology as a powerful tool for learning (Cuthell, 2002).

The studies described above outline the benefits and limitations of interactive whiteboards in the traditional classroom setting. However, one must also evaluate the impact of this technology on the special education classroom. Further evaluation of the research indicates that interactive whiteboards may provide significant benefits to students with special learning needs by providing a valuable source for educational accommodations. Interactive whiteboards can be viewed as a form of assistive technology when integrated into the classroom as they accommodate all learning styles and provide several other features vital to educating students, particularly those with disabilities.

In a document produced by Smart Technologies Inc, creators of the SMART board, various ways in which the interactive whiteboard can be used to teach students with varying learning styles are discussed. For example, visual learners benefit from the interactive whiteboard because it can be used to view multimedia, manipulate objects or symbols and interact with diagrams. Teachers can easily use colors and symbols to help students connect visual cues with words (SMART Technologies Inc., 2006). Meanwhile, kinesthetic or tactile learners interact with the board through touch and movement. By allowing students to write on the board with their fingers rather than a pen, students are able to feel and see the letter components (Solvie, 2004). The board is large, spanning several square feet of wall space, therefore allowing visually impaired students to view the board more easily than a traditional computer screen. Finally, the board meets the needs of students with other learning disabilities, physical disabilities or behavior challenges by providing an appealing interactive activity for learning (SMART Technologies Inc., 2006).

In a report by Pamela Solvie, ways in which the interactive whiteboard can facilitate reading instruction are explored. Reading is described as "truly complex" (Solvie, 2004). Solvie further reports that, "The board allowed use of multiple senses, leading to increased levels of engagement and greater understanding. Color and visual display drew attention to concepts about text and conventions of print. These advantages, as well as the ability to manipulate text were all important considerations for me for use of the digital whiteboard" (Solvie, 2004). Using the technology in this way provides a powerful tool not just for standard learners but particularly for struggling learners. The complexity of reading is broken down into manageable parts which helps to increase understanding.

Furthermore, a study conducted specifically to evaluate the effectiveness of interactive whiteboards on teaching students with moderate intellectual disabilities revealed that the boards can be used to "teach multiple students at one time" and have positive effects on "observational learning and non-target information" (Mechling, Gast, & Krupa, 2007). Researchers conducted the study with young adults with disabilities like Down's syndrome and cerebral palsy. The young adults were taught to read target grocery sight words and match the target word to a corresponding photograph. Before instruction, students were unable to read any of the target words and made correct matches between word and photograph only 16% of the time. After instruction using the interactive whiteboard, all students made significant progress, reading and correctly matching the word to photograph between 88.9% and 98.4% of the time (Mechling, Gast, & Krupa, 2007).

Another important capability of the whiteboard for students, especially those with learning disabilities, is the ability of a teacher to save notes electronically. Depending on the specific form of technology used, some teachers are able to record instruction, making lessons and important material available to students at a later time (Interactive Whiteboard). Students with learning disabilities benefit from repetition and reinforcement which is made possible through this feature. It also eliminates the need for a teacher to take additional time to reinstruct a student. Notes and writing, diagrams, images and text written on the whiteboard can be saved, printed and emailed for future student and teacher use. Students that find it difficult to take notes during instruction can benefit from this feature. It allows students to focus on the instruction itself rather than the mechanics of writing.

Many of the studies described in this review contain first hand teacher and student accounts of using the interactive whiteboard in the classroom. While a few are negative, the vast majority are extremely positive. Negative aspects reported by teachers included the expense of the product itself and difficulty of initial lesson preparation. Teachers also relied so heavily on the interactive whiteboards that if there was a technology failure, teachers became caught without a lesson to present. Others felt they had not received enough training or had difficulty finding ways to integrate it into lessons (Cuthell, 2002).

Positive reports were substantially more common. Teachers reported that they, "couldn't do without it", and commented that the initial amount of work required to prepare lessons was later eased because lessons could be saved. They also reported high student enjoyment, motivation and longer student attention when using the interactive whiteboards (Cuthell, 2002). Other teachers reported that students were not as easily lost during a lesson (SMART Technologies Inc., 2006). Teachers also described that students are able to present using the board, helping them build confidence and focus. Finally, teachers expressed enthusiasm about being able to move around their classroom without being confined to a computer and the ability to demonstrate and model behaviors (Solvie, 2004).

In conclusion, the interactive whiteboard is a valuable technology tool for all classrooms both mainstream and special education. Teachers who embrace the technology, are motivated to implement the interactive whiteboard into their instruction and who are dedicated to the development of lessons using the product, are those who find the most value in using the interactive whiteboard in their instruction. Research indicates that the aforementioned conditions must be met to invoke the most substantial gains in student achievement. Research also suggests that teachers with proper training and with an interactive whiteboard mounted into their classroom are best situated to impact student learning with the technology. By providing teachers with an instrument that increases student achievement, makes learning interactive and engaging, encourages enthusiasm, increases attention and accommodates all learning styles, the interactive whiteboard should be viewed not just as a luxury for classrooms but a necessity which provides essential means for change to promote student learning and achievement.

Works Cited

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