

An Assessment of Interactive White Boards
In Lancaster Community
Schools

by

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ABSTRACT

This program evaluation examines the uses and effectiveness of interactive whiteboards within the Lancaster Community School District in Lancaster, Wisconsin. With the need of schools today to maintain strict fiscal accountability, while at the same time embracing new technology and techniques, the district is considering the purchase of several interactive whiteboards. Because there is little information available regarding the effectiveness of these devices, the district seeks to evaluate the value of the boards already in use in Lancaster. The concern is that delivering this new technology into the classrooms of untrained teachers may result in the boards being used as very expensive overhead projectors, and the money spent could be used elsewhere.

This evaluation will study the ways in which the faculty is utilizing the boards, the impact they have on students, the literature available about interactive whiteboards, as well as any concerns or problems related to the boards, and assess the training needs associated with the technology. The results will be used to inform the school board on the

value of the interactive whiteboards and make recommendations regarding future purchases.

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Chapter I: Introduction

The use of interactive white boards (IWBs) is on the rise in Wisconsin and across the United States. This relatively new technology that has the appeal of an I-pod touch on a large scale has been rapidly spreading into the classroom. Many of the school districts in Wisconsin have acquired a few of these IWBs with some even installing them in every classroom. These new devices are exciting for both students and teachers and have vast potential for changing the face of education.

The concern with the use of IWBs is that there is little evidence available to support many of the claims made by promoters of the boards. In fact, Bettaney (2009) questioned whether the IWB is just a hi-tech, paperless, and more expensive way of doing the same things. Teachers and school districts are very excited about the possibilities presented by the IWB, but they are hesitant to purchase large numbers of the boards if they are not sure of their effectiveness. To quell some of these fears, the Lancaster Community School District wants to know more about the effects of interactive whiteboards. This program evaluation will help to discover the effects of the boards in the classroom.

What is an Interactive Whiteboard?

As defined by Smith, Hardman, & Higgins (2006), an interactive whiteboard is a large, touch-sensitive board connected to a computer and a projector that projects images from the computer onto the boards. All programs and applications can be manipulated by touching the screen with a pen or other tool, even one's finger, depending on the model. This relatively new piece of instructional technology has sent ripples through the industry and has been featured on network and cable news coverage of the 2008 Presidential

Election. In contrast to the traditional whiteboard or chalkboard, the IWB allows for a more a more dynamic presentation of the material because the content presented can be manipulated, interacted with, and transformed by simply touching the screen. This can not be done with more traditional equipment.

Statement of the Problem

The problem in this study is interactive whiteboards are a relatively new technology for the classroom, and there is not a great deal of hard data on their effectiveness. In addition, there are some concerns about training for the equipment to ensure the faculty can properly utilize the boards. The Lancaster Community School District needs to evaluate the usefulness of these “SMART boards,” the company name for the product, in the classroom before committing to future purchases of the boards. Since the cost is substantial, approximately \$2,500 per unit for hardware and the recommended software (SMART Technologies Inc., 2006), and the district always has to maintain fiscal discipline, the school board would like to evaluate the use of the “SMART boards” to see if they are a worthwhile investment. The goal of this study is to determine how the IWBs are being used and what are the perceptions about their efficacy? The evaluation examined the use of the boards in the district by both teachers and students, and determined if the boards are being used effectively or if a less expensive alternative could accomplish the same goals.

Purpose of the Study

The purpose of the study is to discover just how useful and effective the interactive whiteboard is in the classroom. To do this, this study will consider the following research questions:

1. To what extent is the instructional technology, interactive whiteboard, being utilized?
2. What further training, if any, regarding the instructional technology is needed in order for the teachers to properly utilize the equipment?
3. Do the teachers of the Lancaster School District feel the interactive whiteboard improves their instruction?
4. Do the students of Lancaster School District feel that the interactive whiteboard enhances the presentation of material and makes the teacher more effective?

The data collected will be used to inform the Lancaster School Board on the use and utility of the interactive whiteboards purchased this year with regards to future purchases and of the professional development or in-service needs in order to fully realize potential uses of the interactive whiteboards.

Assumptions of the Study

In order to discern the impact of the IWB in the classroom, the study assumes that the classrooms surveyed and observed are typical classrooms with students of varying abilities. It is also assumed that the technology is used daily or on a regular basis. The study has not considered problems in running the software or utilizing the boards. The assumption is the IWBs are functioning properly and material can be presented.

Limitations of the Study

The scope of this review is very limited. The survey was done only at Lancaster High School, and only ten teachers at Lancaster utilize the IWB. Because only one cooperating teacher gave the survey, the number surveyed only constitutes approximately one-third of the student population. In addition, many of the survey questions for both

teachers and students rely on personal opinion and perception. For example, a question from the student survey asks them to simply agree or disagree as to if they feel that the interactive whiteboard enhances the presentation of material (see Appendix B). In order to pronounce these results as general, a more extensive and objective survey and study would have to be conducted. Nonetheless, much of what was learned here at Lancaster did correspond to findings in available literature.

In addition, some concerns exist regarding the validity and reliability of the study. Validity, as defined in Ormrod (1998), is “the extent to which an assessment instrument measures what it is supposed to measure” (p. 651). In this case, the study was to gage the effectiveness of the interactive whiteboard and determine how they are being used in the Lancaster School District. The survey does give insight into the types of uses of the IWBs by the faculty, but it is difficult to gage the effectiveness of the board from one set of observations and student opinions as gained by the survey. Data from the review of literature suggests that IWBs can be very effective, but the information from this survey is only a snapshot that does not necessarily determine a causal relationship. In other words, a given lesson that was observed seemed to hold the attention of the students, and they all did very well on their informal assessment, but was it because of the IWB or was it a highly skilled teacher?

Reliability is also a consideration with this program evaluation. The reliability of an assessment is the extent to which the results are consistent about the information being measured (Ormrod, 1998). If this study were conducted in the same class on a different day, would the lesson be as effective as the previously observed lesson? Can the results be repeated over time? These are questions on the reliability of the results. Because the

observations were done at just one time in three different classes, it is difficult to determine the reliability of this evaluation.

Definition of Terms

Interactive whiteboard. An interactive whiteboard (IWB) is a large, touch-sensitive board connected to a computer and a projector that projects images from the computer onto the board and applications can be manipulated by touching the screen with a pen or other tool, even ones finger, depending on the model.

Non-target word. A sight word taught to an individual within a group that is observed by the remaining members of the group.

Observational learning. For this study, this refers to a student learning target words of another student through observation of large group instruction through the use of note cards or an interactive whiteboard.

Pedagogy. This refers to the methods used for, or the art of, teaching.

Sight words. These words are common words a reader should know on “sight.”

SMART board. This term is the product name of a line of interactive whiteboards developed by SMART Technologies Inc.

Target words. Sight words taught to an individual within a group.

Whole class teaching. For the purpose of this program evaluation, this refers to the practice of teaching a class as one, cohesive group at the same time.

Methodology

To discover the value and impact of the interactive whiteboard, several steps were taken. First, a review of available literature about the technology was conducted. The literature selected covered areas from effects of the boards, to different uses for the IWB,

and finally some of the concerns with the boards. The next task was to find out just how these boards are being used. To do so, a survey was sent to ten teachers throughout the Lancaster school district that use Smart boards. In addition, three classes were observed to see the ways in which the boards were being used.

The student survey was given to high school students in five classes of one cooperating teacher. Lancaster School District has a relatively homogeneous population in terms of ethnic and socio-economic diversity. Over 99% of the students are white and the majority of the students are from similar social class backgrounds. The surveys were administered in class and treated as any test would be treated. Students were to complete their own surveys without talking or sharing information or ideas.

The results of this evaluation were then compiled in order to assess the effectiveness of the boards, to discover the training needs of the faculty, and to evaluate the impact on both teachers and students in the classroom. A discussion of this research and how it was conducted is included in this evaluation. Finally this report will conclude with a discussion of the findings and recommendations for future action.

Chapter II: Literature Review

The literature available regarding interactive white boards (IWBs) offers a fairly consistent assessment of the benefits of this technology and some of the drawbacks to using the boards. While almost all of the reviewed literature suggests that the IWBs do improve classroom learning, it also suggests that the lack of training on the equipment and the methods that are often used while operating the board may pose significant limitations. The following literature review will explore (a) the effectiveness of the technology in the classroom, (b) how the boards have both engaged learners and excited teachers, (c) how IWBs are transforming the classroom, (d) the use of IWBs as a tool for special educators, (e) student and teacher training concerns, and (f) concerns regarding how IWBs are used.

The Effectiveness of the Interactive White Board

As previously stated, there is not a great deal of empirical evidence to prove the effectiveness of the IWB; however, there are numerous studies on the boards that tout the device as a tool that energizes students, excites teachers, and transforms the classroom into a more interactive learning environment. Smith, Hardman, & Higgins (2006) asserted, while focusing mainly on whole class teaching, the IWB has transformed the level of discussion, improved teacher-pupil interaction, has led to more open questions and answers from pupils, and engage students more than conventional whole class teaching. These findings will be explored further in the following sections.

Engaging Learners

One of the more documented effects of the IWB is how it engages learners. Zevenbergen & Lerman (2008) stated the IWB has a considerable motivational effect on

students. Students were more interested in the lessons being taught, and they wanted to interact with the device. Often students disengage during class, and the thought of interacting with the IWB with such features as interactive games that allow students to touch the screen to manipulate the content of a sentence or find countries on a map helps to keep their attention. Since the introduction of IWBs in the Lambton Kent District in Ontario, Canada, teachers have seen their students become more engaged than ever, asking for more time using the IWB (Starkman, 2008). Suspensions district wide have gone down and grades have gone up. Not all of this can be attributed to the use of the IWB, but it has had an impact. As stated in Kennedy (2005, January), “Used successfully, the interactive boards can transform students from passive listeners to active learners engaged in a collaborative process” (p. 18).

Creating Excitement among Teachers

Many educators are truly excited about the interactive whiteboard. The boards lead to a new level of interactivity with students and enable teachers to create truly interactive lessons (Criswell, 2008). This interactive approach causes students to be more engaged and retain more of what is taught. Interactive whiteboards transform teachers and teaching styles. Teacher Mike Lenowitz, as cited in Loschert (2004), stated “I think it forces better teaching...I now have to put more thought into how I organize my notes and think more carefully about what and how I present” (p. 30). Peggy Sines, a science teacher from Thomasville City Public School District in Thomasville, North Carolina said, “The whiteboard solution has opened my eyes to different ways to teach a particular idea or subject. I’m more inclined to incorporate action, audio and visual aids, and the Internet” (as cited in Byrd, 2005, p. 12). For example, science teachers can drag and drop

a picture of an animal from the resource software that comes with the board on to the screen and ask students to classify it. They are able to write directly under it on the board and work together to classify the animal (Byrd, 2005).

Transforming Classrooms

It is the hope of many educators that the interactive whiteboard will transform the classroom into a more interactive and effective learning environment. This is perhaps the area in which the interactive whiteboard could have its greatest impact. Teachers are finding new and exciting ways to teach, and IWBs are transforming classrooms with new techniques and approaches. Software allows teachers and students to interact with the boards in various ways and to run a variety of applications. With the IWB, teachers and students can display websites such as YouTube or HistoryChannel.com, run educational software, display and interact with notes, run live video from a camera, deliver PowerPoint presentations, and much more (Kennedy, 2005, March).

The many uses of the IWB have brought a new level of interactivity to the classroom. Teachers in Thomasville, North Carolina have a form of IWB that comes with individual boards for students that can be used to enter data and respond to questions from the board at their seats (Byrd, 2005). Teachers in a math class for example can give one of the hand-held boards to a student to work through a problem at their seat that would be displayed for the whole class. Other features allow teachers to create fill-in-the-blank questions that students can drag the correct answer into, display maps in geography, classify animals in science, measure distance with a measuring tool, and even take class polls (Byrd, 2005). Jen Phillips of Euclid Middle School in Littleton, Colorado uses her IWB to study photographs related to oceanography, draw shapes and define

angles, and imports content from the Internet to edit (Starkman, 2006). Phillips stated the IWB has made the teacher and students partners in the learning process.

A Tool for Special Educators

Interactive whiteboards allow teachers to make modifications or accommodations for students with special needs easier. According to Schweder, Wissick, & Mounce (2008), IWBs allow teachers to demonstrate on the board as students follow along on worksheets or in notebooks. Also, the presentations can be recorded, printed and copied for later use. This allows the student struggling to keep up in class to access the lesson at any time and as often as they wish. Also, special education teachers can make copies of the material presented to use when working with students outside of the classroom.

Interactive whiteboards are more effective for teaching students with mild learning disabilities to recognize words through observation. Someone with a learning disability is of normal intelligence or above, but often has difficulty in at least one academic area and often several, that cannot be attributed to other disorders such as mental retardation (Santrock, 2005). Research has shown that IWBs are more effective than personal computers and flashcards for teaching sight recognition of common words. According to Mechling, Gast, & Krupa (2007), three students studied went from a 0% average for connecting an object to a printed word using standard computer delivery to an 85.2% average using the Smart board. The IWB made the material more visible for the students and it increased attention to the task (Mechling, Gast, & Krupa, 2007). This mirrors the findings of a similar study done to measure the effectiveness of teaching sight words with flash cards as compared to using and IWB. Mechling, Gast, & Thompson (2008) stated both flash cards and the Smart board were effective, but the presentation of

material on the large screen was more effective for promoting observational learning of the other student's material. Observational learning was defined in this study as a student learning the words assigned to another student under both the flash cards and the Smart board. It was found that the use of the Smart board improved the rate of observational learning from a group mean of 50% with flashcards to a group mean of 89.6% with the IWB (Mechling, Gast, & Thompson, 2008).

Concerns and Considerations

There exists a wide range of concerns related to the use of the interactive whiteboard. Because of the lack of solid support of their usefulness, many question if such an item is necessary. Bettenev (2009) asserted the IWB could restrict pedagogy, or teaching techniques and practices. Too often the teacher, because of its interactive nature, is focused on the board and not the students. Also, studies cited mention the students interactions with the teacher are often very brief, 5 words or less, and that teachers speak most of the time (Bettenev, 2009). Smith, Hardman, & Higgins (2006) stated this method of whole class teaching often consists of three phases: initiation, response, and feedback (p. 444). The initiation is often in the form of a question from the teacher, the response is from the student and typically just recalling information, while the feedback often provides information to the student, though too often it is simply just an evaluation of the response and not further information (Smith, et al).

The Need for Teacher Training

One common concern noted in several studies was the need for training in order to meet the potential for the interactive whiteboard. The article titled Board Certified by

Charlene O'Hanlon (2007) discussed the importance of training in the following statement:

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 teachers to do...it is essential. School districts are increasingly recognizing this, making training compulsory before instructors are let loose with the technology. (p. 30)

Nancy Knowlton, the president and co-CEO of SMART Technologies, a leading provider of interactive whiteboards, echoed this sentiment. Knowlton, as cited in Dolezalek (2006), believes it is best to consider the IWB as new technology and not just a new way to do the same things. Knowlton says "Don't turn the whiteboard into nothing more than a fancy overhead projector by not taking advantage of what it can do" (p. 40).

In the article *Interactive Whiteboards: Real Beauty or Just "Lipstick"?* (2008), authors Slay, Sieborger, & Hodgkinson-Williams discussed the importance of proper training, but view this need as more of a change in culture in education and its use of technology. An evolution in pedagogy related to instructional technology needs to take place in order to make proper use of the whiteboards. In other words, IWBs should not be viewed as just another tool for teachers to continue to do the same things; instead, new methods and practices should be developed in order to improve teaching and the use of technology within teaching. Furthermore, this technology needs to be phased in with teachers that are interested, and not forced upon those who are not. For instance, if a district provides this equipment to a teacher that has little to no experience with technology, it may only be used to display notes. While this is one use for the IWB, it is only scratching the surface in terms of what can be done with it. Recognizing these concerns, some interactive whiteboard providers and educators have developed training

protocol to keep teachers familiar with new technology. Mishra & Koehler (2009) discussed the specialized knowledge that deals with this issue. They call it technological pedagogical and content knowledge, or TPACK (p. 15). Teachers must have a variety of skills, but with the new technology of today it has to go beyond pedagogy and content knowledge. Teachers need to be trained to use modern instructional technology in order to be truly effective with items such as the interactive whiteboard. The goal is to find the perfect blend of pedagogical (teaching methods) knowledge, content (subject matter) knowledge, and technical knowledge in order to find the best use for instructional technology. This is the essence of the TPACK framework (Mishra & Koehler, 2009).

The Focus on Whole-Class Teaching

Even if teachers are properly trained, some still see concerns regarding just how the whiteboard is used. Studies have shown, because of the draw of new and exciting presentations that are common with IWBs, there is a tendency for teachers to focus on whole-class teaching. In other words, teachers lecture to all of the students at one time, and do very little interacting on a one-to-one basis. Galton, Hargreaves, & Pell (2009) found group work is at least as effective, and sometimes more effective, than whole-class discussion or lecture. It is also their contention that group work would be more effective if teachers spent more time training students on how to work effectively in groups. Both teachers and students involved in the research by Shenton & Pagett (2007) felt more engaged and motivated when the IWB was used, but the use of the board still led to a focus on teaching to the class as a whole. Although the type of whole class teaching that is done is more interactive and interesting to the students, it still leaves little room for group work or other activities (Shenton & Pagett, 2007).

Zevenbergen & Lerman (2008) confirm this observation. Their observations revealed most teaching done with IWBs is whole-class centered and the interaction was usually limited to one student at a time. Again, this approach may not be the most effective for all learning styles. The students, however, were quite engaged by the lessons presented on the interactive whiteboard, and there were few, if any, behavioral issues that could lead to distractions. Still, there was little to no evidence of a deeper understanding of the material as a result of using the IWB when compared to results using traditional teaching methods, and none to suggest that this new device was truly transforming the classroom and education.

Summary

It is clear from the review of this literature on interactive whiteboards that they are an exciting new technology with great potential. According to Schweder, Wissick, & Mounce (2008), the IWB can be used to help make math visual by allowing the teacher to demonstrate mathematical processes a step at a time and record it for playback, display and edit Internet content, create graphs and charts that can be printed when finished, and play interactive games in just about every subject. What is not clear is just how effective they are or can be. Some evidence does exist to suggest their effectiveness, and they clearly excite both teachers and learners. For example, test scores from an advanced placement biology class at Spring Valley High School in Columbia, South Carolina that utilizes an IWB have risen 30% more than classes that do not utilize IWBs (O'Hanlon, 2007). If used to their maximum potential, interactive whiteboards could transform the classroom into an interactive learning environment.

Nevertheless, there remain some concerns with this new technology. Without proper training, IWBs are just a fancier, more expensive way to present material. A great deal of what is done could be accomplished with an overhead projector or a projector and screen connected to the computer. There is also a tendency by educators to focus on whole-class teaching due to the sensational nature of the IWB at the expense of other teaching methods. As stated in Shenton & Pagett (2007) and Zevenbergen & Lerman (2008), this type of instruction can be quite effective, but it does not address all learning styles and it tends to focus more on recall and less on understanding.

Chapter III: Methodology

Interactive whiteboards can bring excitement to the classroom, but they are an expensive item of instructional technology. The question arises as to whether or not the expenditure will pay off in student learning. Without the proper training, the IWB is just a screen and a projector that is no more effective than an overhead. This study was conducted in order to ascertain how teachers are using the IWBs and if they are having a positive impact on the students and the teachers.

Subject Selection and Description

The subjects for teacher use of the IWBs were selected based on access to the technology. Teachers from the Lancaster Community School District in Lancaster, Wisconsin who currently have Smart boards in their classroom, there were 10 district wide, were chosen to take part in the survey simply because they have access to the boards. There are 1026 students in the Lancaster school district, with 388 at the high school where the survey was conducted. The student survey was given to 85 students in United States History and 45 students in a social studies class called American and Global Issues because they represent students from each of the four grades in high school and for the ease in collecting and processing data.

The faculty members selected represented each of the levels: elementary, middle level, and secondary. They range from very experienced teachers to first year teachers. Also, there is a wide range in comfort level and knowledge of this instructional technology. This was designed to give an honest appraisal of the technology from both seasoned teachers and technology savvy individuals to beginning teachers and those who consider themselves novices in the realm of technology.

Instrumentation

Two surveys were created for this study. The first, a survey of the faculty, was developed to gain an understanding of how teachers are using the IWB in the classroom and what training needs have they discovered (see Appendix A). This survey asked teachers to rate the frequency of use of types of instructional techniques involving the IWB and to list their concerns about training on the object. The survey consisted of 12 questions overall. Six of the questions asked the teacher to quantify how often they used different IWB applications ranging from the less interactive, displaying notes, to the more interactive, student centered activities such as games or educational software. The remaining six questions were more qualitative in nature. Teachers were asked to rate the effectiveness of the Smart board and to discuss any needs they had for training on the software or hardware. Though the survey was given in a formal manner, it was more of an informal assessment. The reliance on subjective, opinion-oriented information makes the survey less verifiable, but it does give insight into the feelings of the faculty regarding the effectiveness and usefulness of the boards.

The student survey was very basic. The idea was to gauge student perception of the effectiveness of the IWB. Students were asked if both the class and the teacher were improved by the use of the IWB (see Appendix B). The survey was administered in class, and because it took place within normal educational framework and they were anonymous, no permission forms were required. The students were instructed to treat the survey like they would any test and complete their own work. No discussion was allowed until after the surveys were collected. Because the survey had simple *agree* or *disagree* answer, there was no pressure placed on the students to qualify their answers. The point

of this survey was simply to get a view of how the students felt about the use of IWBs in the classroom to gauge the possible motivational strength of the interactive whiteboard. As in Ormond (1998), motivation can determine how engaged the students are in the activity at hand and the amount of enthusiasm with which they approach the activity. It can increase the sense of self-efficacy and lead to greater academic achievement. The concept of flow, as developed by Mihaly Csikszentmihalyi, asserted people learn best when they develop a sense of mastery and are “absorbed in a state of concentration when they’re engaged in an activity” (as cited in Santrock, 2005, p. 430). Perhaps the ability of the whiteboard will help develop *flow*, thus improving the quality of learning that takes place in the classroom. This is the aspect of the IWB that seems to intrigue most educators.

Data Collection Procedures

The teacher surveys were administered to 10 teachers from the district with access to the interactive white boards. In order to see the range of use of the boards, surveys were given to those with little to no experience with the boards, teachers with one year of teaching experience using the IWB, and to the only teacher from the district with more than 1 year of experience with the device. They were sent electronic copies of the survey through email, and all ten teachers returned the finished product through email or in the form of a printed hard copy. In order to obtain an answer about what further training is needed in order to properly utilize the Smart boards, the faculty was asked to assess the need for training in a few key areas and to write comments regarding any further training concerns. In addition, observations were conducted in three classrooms district wide, one at the primary level, one at the middle level, and one at the secondary level.

Student surveys were administered to the 130 students who were in the United States History class and American and Global Issues class. 41 students were seniors aged 17 or 18. Only four of those surveyed were in grade 11, and all of them were 17 years old. Of the remaining 85 students, 39 were high school freshmen and 46 were high school sophomores. The gender of those surveyed was nearly split equally with 63 females and 67 males.

Surveys were passed to the students and they were instructed not to write their names on the papers. The point was to get their collective views of the IWB and not single out individuals. Students were instructed to look only at their papers and treat this as they would a test. They were to work alone and answer the questions to the best of their abilities. When they finished, they were instructed to place the survey on a designated table and then return to their seats. No talking was allowed during the survey.

Data Analysis

The data gathered from the surveys and observations was compiled and a set of information regarding the types of uses for Smart boards by the faculty, the frequency in which the boards are used, and the training concerns and needs of the faculty was developed. More subjective answers were analyzed to discover teachers' attitudes regarding the effectiveness of the boards. Teachers were asked to rate the perceived effectiveness of the IWB in their classroom and if they felt it enhanced the learning environment and even their teaching. This is significant in understanding the psychological boost that may occur in the classroom because of the use of the IWBs as previously stated.

Students were also asked to rate whether or not the boards improved the presentation of material and even the effectiveness of the teacher, and the data is used to judge the impact on the students' perception of the effective classroom. This is important because many times educators are fired up about a technique or a new idea in education, but when it is implemented with the students it falls flat. It is important to understand if the Smart boards engage the students or if they are just another example of a good idea that does not produce real results.

Limitations

The limitations of this study are the result of its small scale. Only ten teachers were surveyed because Lancaster School District only has ten teachers as of the 2008-2009 school year that have IWBs in their classroom. The questions were developed to gain the opinions on the IWBs and rate the frequency and types of uses of the boards, and the results may not be repeated if given a second time. This raises questions as to how valid the survey might be, but that was a secondary concern to gaining insight to the opinions and uses of the boards. Validity, as noted previously, is "the extent to which an assessment instrument measures what it is supposed to measure" (Ormrod, 1998, p. 651). Although somewhat limited in scope, the surveys did attempt to gauge how the IWBs were being utilized in the classroom and gain an understanding of faculty and student perception regarding its effectiveness. Because the student surveys were limited to the classroom of one cooperating teacher, only about one-third of the students were surveyed. As a consequence of these factors, the results may not be generalizable to other schools or situations even though the review of available literature on IWBs seems to support the findings.

Chapter IV: Results

This evaluation sought to discover information regarding two important areas of Smart board usage: how are they being used and what are the perceptions about their efficacy? This information was obtained from both the primary users of the technology, the teachers, and from those who are supposed to benefit the most from the technology, the students. In the following paragraphs you will find summaries of the data that was obtained from surveys and observations regarding these key areas of interest.

Interactive Whiteboard Utilization

One of the most important elements of this evaluation was to discover just how the teachers are using the interactive whiteboards. As previously mentioned, this relatively new technology is quite expensive, approximately \$2,500 per unit for hardware and the recommended software (SMART Technologies Inc., 2006), and if they are not used properly or other methods work just as well, then the district could spend the money on other needs. What the Lancaster school district is concerned with is that the Smart boards are being used simply to display notes or play movies, in which case more traditional methods would be more economically viable for the district.

To find out just how these boards are being used, two methods were employed. First, a survey was sent to ten teachers throughout the district that use Smart boards. Secondly, three classes were observed to see the ways in which the boards were being used. The results of this evaluation did show that the boards were used to display notes and show videos, but their usage extended beyond those basic applications to include interactive games, lessons in geography that used interactive maps and tools to measure distances, the and use of other educational software.

During observations, elementary students used the board to read text from the Internet. The Smart board has a highlighting tool that allowed the teacher to only display portions of the text for the students to read. At the middle school, students played an interactive geography game where they earned grains of rice to be donated to charity for each correct answer. At the high school, the board served as a visual aid to a guest speaker from the Wisconsin Department of Corrections. This wide range of applications taken as snapshots from the individual classrooms showed that the boards are used for more than just accomplishing basic tasks. As a result, students seemed more engaged in the presentation and were given more visuals to accompany the anecdotes from the guest speakers. Some other applications that were mentioned on the survey when the teachers were asked to list other programs they use included a geometry sketchpad and the use of blank notebook pages for student projects and notes. It was noted in at least two of the classes, students interacted with the board and seemed quite familiar with basic use of it. This demonstrates the boards have been used as an interactive part of the classroom environment.

The survey portion of this evaluation seemed to back up the observations. Although this was a limited survey, only ten faculty members, it does seem to demonstrate that the interactive whiteboards are being used for a variety of applications. The following table list the results of the six questions posed to the faculty regarding the types and frequency of use for the various applications for the interactive whiteboard.

Table 1

Faculty Uses for the Smart Board

	*	Rarely	Sometimes	Often	Daily
Displaying Notes, announcements, or other word documents		0 (0%)	0 (0%)	4 (40%)	6 (60%)
PowerPoint		2 (20%)	6 (60%)	2 (20%)	0 (0%)
Smart board Notebook presentations		2 (20%)	0 (0%)	0 (0%)	8 (80%)
Student-centered interactive activities (games, educational software, etc.)		0 (0%)	10 (100%)	0(0%)	0 (0%)
Showing videos or movies		2 (20%)	6 (60%)	2 (20%)	0 (0%)
Access the Internet or web-based Software/activities		0 (0%)	8 (80%)	0 (0%)	2 (20%)

**Note: The survey response "Never" was omitted from the table because it was not selected*

One item worth noting is the use of the Smart boards for interactive applications. This is how the boards differ from traditional methods and can bring a different component to the classroom. Almost all of the teachers (80%) answered that they use interactive software some of the time, and 60% answered that they employ Internet based activities in their classrooms. All of the teachers surveyed (100% responded *Sometimes*) have used the boards for some type of interactive, student-centered activity such as simulation or a game. All of the teachers stated that they had used the IWB to access the Internet at least sometimes (80%), but some do so daily (20%).

Staff Training Needs

Many of the teachers using the Smart boards in the Lancaster school district are newcomers to the technology. Training sessions took place at the beginning of the school year, but were only able to cover the basic operations of the boards. One of the concerns

the school board has regarding use of the interactive boards is that a lack of training may lead to the inability to use the boards to their full potential. The next portion of the survey assessed the faculty's training needs regarding the use of the interactive whiteboards and the associated hardware and software. As most teachers, nine of the ten, using the IWBs were in their first year using them, the survey was given at the midpoint of the school year so the teachers had some ideas about their needs.

In order to obtain an answer about what further training is needed in order to properly utilize the Smart boards, the faculty was asked to assess the need for training in a few key areas and to write comments regarding any further training concerns. The following table shows the responses of the faculty in three targeted areas.

Table 2

<i>Smart Board Training/In-service needs</i>				
	Definite Need	Somewhat Need	Could Benefit From	Not Needed
Notebook software	1 (10%)	2 (20%)	7 (70%)	0 (0%)
Screen Tools	0 (0%)	0 (0%)	8 (80%)	2 (20%)
A/V Applications (DVD, VCR, Audio, etc.)	0(0%)	0(0%)	6 (60%)	4 (40%)

The items in the table are all frequently used in daily Smart board tasks. Other needs listed by the faculty include the use of interactive software or games, downloading programs from the Internet, creating our own games using Notebook software, and one faculty member said it would be nice to go through the training again now that she is more familiar with the basic operation of the board, and all faculty surveyed admitted to some training needs on the Notebook software; with 10% agreeing to a definite need,

20% responding there is some need, and 70% felt they could benefit from training on the software. Notebook software is the operating system for the Smart board that allows teachers to create presentations and activities. The screen tools on the Smart board allow teachers to manipulate Internet content, take snapshots of activities, and a variety of other features including highlighting and enlarging images. Most of the teachers (80%) agreed that they would benefit from training on these tools, while 20% reported not needing any training on the screen tools. Also, 6 of the 10 teachers (60%) surveyed indicated in their comments that they would like more training regarding ways to incorporate more interactive software, while the remaining 40% felt training was not needed.

Student Views of the Technology

This part of the evaluation aims to gage the students' opinions on the efficacy of the interactive whiteboards. To find this information, a simple survey was conducted that asked the students to agree or disagree with two basic statements. This involved 130 students from Lancaster High School, or roughly one-third of the student body. The responses are noted in the following table.

Table 3

Student Views on Smart Board Effectiveness

	Agree	Disagree
The Smart board enhances the presentation of material	127 (97.69%)	3 (2.3%)
The Smart board makes the teacher more effective	100 (76.9%)	30 (23.1%)

This data is quite one-sided. Nearly all of the students (97.69%) believed the Smart board enhanced the presentation of material. Not as many (only 76.9%) felt that

the IWB makes the teacher more effective. The survey was purposely open-ended in order to get a snapshot of students' opinions. The ambiguity of the statements themselves leaves a great of room for interpretation. The point, however, was to see if students believed that the Smart boards were effective. The data clearly demonstrates that the students feel the Smart boards do make a difference.

Teacher Views of the Technology

In seeking the opinions of the teachers utilizing the IWBs as to their effectiveness, a survey that was similar to the student survey was given. As with the students' views, the psychological aspect of the technology comes into play. If the teachers feel they are more effective because of the technology, they may actually be more effective presenters of material. Unlike the student survey, the teachers were given a broader range of possible answers in order to ascertain their feelings about the Smart boards. As with the student survey, it is clear that the teachers feel that the Smart boards enhance the classroom. The following table lists the results of the teacher survey:

Table 4

<i>Teacher Views on Smart Board Effectiveness</i>	*	Neutral	Agree	Strongly Agree
The Smart board enhances student Learning		0 (0%)	5 (50%)	5 (50%)
The Smart board has enhanced the presentation of material to the students in your class		0 (0%)	1 (10%)	9 (90%)
In general, the Smart board helps you to be a more effective teacher		0 (0%)	1 (10%)	9 (90%)

**The choices "Strongly Disagree" and "Disagree" were omitted from the table because they were not selected*

All of the teachers surveyed, with 10% agreeing and 90% strongly agreeing with the statement, agreed at least to some degree that the technology is a positive in their classrooms by enhancing the presentation and improving their effectiveness. Conversely, none of the teachers thought that the Smart boards would detract from their classroom presentations. Still, only 50% of the teachers strongly agree with the statement regarding the impact on student learning, while the remaining 50% simply agree.

Chapter V: Discussion

Though this evaluation relied on a great deal of opinion and the survey given to the staff was somewhat limited in scope, several observations can be noted and conclusions can be drawn. In this section of the evaluation, there will be a discussion some of the observations, conclusions will be drawn based on the data, and action will be recommend based on these conclusions.

Limitations

The scope of this review is very limited. The survey was done only at Lancaster High School, and only ten teachers participated. While more students were involved in the student survey, the number surveyed only constitutes approximately one-third of the student population. In order to pronounce these results as generalizable, a more extensive survey and study would have to be conducted. Nonetheless, much of what was learned here at Lancaster did correspond to findings in available literature.

Conclusions

The focus of this evaluation is to determine if the interactive whiteboards, or Smart boards, are a worthwhile investment for the district. Additionally, the Lancaster School District wants to ensure teachers go beyond just basic presentations and determine whether the boards enhance the classroom environment. After analyzing the data gathered, it can be determined that the Smart boards do indeed meet these objectives. It was found that teachers used the Smart boards for a variety of meaningful applications that seek to involve the students and go beyond the basic traditional methods, such as exploring an interactive map of the battles of World War I or manipulating and graphing

shapes in geometry. Very few teachers used the boards for displaying notes every day, and none of the teachers surveyed used the IWB only for displaying notes.

Another concern was the need for training in order for teachers to utilize the boards to their full potential. Most of the teachers surveyed had a good understanding of the software applications, but all of them admitted to some training needs and concerns. Teachers training needs are geared toward developing a deeper understanding of the system software, and teachers are seeking training in new methods to make the presentations more student-centered and interactive. Since this is the first year that nine of the ten teachers surveyed have had access to the IWB, they may not fully understand the training needs at this point.

Another aspect of the survey was to gage the perceptions as to whether the interactive whiteboards were effective tools in the classroom. All of the teachers surveyed believe that use of the Smart board enhances the presentation of material and student learning. Teachers believe that the Smart boards help them to more effectively teach, and whether this can be supported with data, it can still have a profound effect on student learning. Students also feel that the Smart boards make the presentation of materials and the teachers more effective, thus producing a psychological effect that may make them more receptive in the classroom.

These conclusions support the information presented in the literature review. The main benefits of the IWBs include the effect of engaging and exciting both teachers and learners. Similar to the testimonials quoted in the literature review from Byrd (2005), teachers felt that the technology made them more effective and enhanced the classrooms. As a result of this engagement, the students could become more excited and motivated by

the lesson. The concept of flow, as developed by Mihaly Csikszentmihalyi, asserted people learn best when they develop a sense of mastery and are “absorbed in a state of concentration when they’re engaged in an activity” (as cited in Santrock, 2005, p. 430). Though the idea of flow may be difficult to measure, students and teachers alike certainly responded positively to the IWBs.

The concerns that were uncovered by the study also mirror the findings in the literature. All of the teachers expressed some concerns related to training, and none of them felt that they could utilize their board to its full potential. As noted in several sources such as Dolezalek (2006), Slay, Seiborger, & Hodkinson-Williams (2008), and Zevenbergen & Lerman (2008), without the proper training on how to use IWBs and their associated hardware and software, they will be less effective.

Recommendations

Based on the conclusions reached regarding the use of this instructional technology, certain recommendations can be made in relation to the goals of the research. First, Smart boards do enhance the classroom and should be purchased by the Lancaster Community School District if funds are available. Second, because these IWBs are a new technology and teachers need to have a strong technological base if utilizing the device, training/in-service should be made available to the staff in order to reach the full potential value of the Smart boards. To continue to understand how IWBs impact the classroom, further evaluation should be conducted, both formal and informal, regarding the use and effectiveness of the Smart boards to truly measure their impact.

This new technology can be a very effective tool for enhancing the classroom environment. The Lancaster school district has begun a transformation in the classroom

from the traditional methods to those involving cutting edge instructional tools. This is not the end all to the troubles that plague education, but use of the interactive whiteboards can go along way to enhance learning at both the primary and secondary level. The school district's investment in this new technology is paying dividends today and will continue to do so in the future.

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Appendix A: *Faculty Survey*

**Smart board Survey
Lancaster School District**

**Please circle the item below that reflects
how often you use your Smart board for the
listed activity.**

1. Displaying Notes, announcements, or other word documents:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

2. Power-Point Presentations:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

3. Smart board Notebook Presentations:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

4. Student-centered, interactive activities (games, educational software, etc):

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

5. Showing videos or movies:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

6. Access the Internet or web-based software/activities:

1	2	3	4	5
Never	Rarely	Sometimes	Often	Daily

7. List any other applications for the Smart board that you have utilized.

Training/in-service needs. Please check the item in the chart below that reflects your training needs for the various Smart board software and applications.

	Definite Need	Somewhat Need	Could benefit from	Not Needed
Notebook Software				
Screen Tools				
A/V Applications (DVD, VCR, Audio, etc)				

Please list any other training needs that you might have at this time.

Classroom enhancement. Please rate the effectiveness of your Smart board in the following areas:

1. The Smart board enhances student learning

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. The Smart board has enhanced the presentation of material to the students in your class.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. In general, the Smart board helps you to be a more effective teacher.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Appendix B: *Student Survey***Student Survey**

Circle the answer that best matches your beliefs regarding the Smart board

1. The Smart board enhances the presentation of material

Agree

Disagree

Unsure

1. The Smart board makes the teacher more effective

Agree

Disagree

Unsure