THE EFFECT OF INTERACTIVE WHITEBOARDS ON SECONDARY STUDENTS’ ACADEMIC ACHIEVEMENT IN SOCIAL STUDIES

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CHAPTER ONE

INTRODUCTION

Technology is constantly evolving and increasing in schools all over the world. Governments and school districts spend billions of dollars every year in order to keep up with the latest technology advancements in education. The sale of the Interactive Whiteboard (IWB) and other forms of interactive multimedia technology has increased tremendously and more schools are interested in research about its effectiveness in the classroom.

Many studies have showed evidence that technology use positively affects the learning process. According to Wood and Ashfield (2008), technology used as a resource in the classroom positively increases interaction and enjoyment of lessons. By using computers and technology, students are interactive, responsible, and engaged (Hsieh, Cho, Liu, & Schallert, 2008). It takes more than paper and pencil to motivate students, because they are often engaged in interactive websites, video games, and other forms of technology that constantly keep them stimulated when they are at home.

When students are motivated while they are learning, they actually enjoy the lesson. According to Hennessy, Wishart, Whitelock, Deaney, Brawn, la Velle, McFarlane, Ruthven, and Winterbottom (2007), technology is such a powerful tool that it supports exploratory learning, while addressing prior knowledge in order to help students understand the theories of their content areas. This type of learning attempts to build on the learning that students have already acquired in order to help them build a deeper
understanding of the content they need to master, while making the learning process more enjoyable.

When a topic is enjoyable and lasting to a student it helps him/her to better understand the information, thus helping them to retain more information. Hennessy, Wishart, Whitelock, Deaney, Brawn, la Velle, McFarlane, Ruthven, and Winterbottom (2007), insists that because students are learning to explore through the use of technology they are more likely to understand and remember what they are taught. Once this occurs, students are more likely to attend class and their classroom achievement increases. This study has shown that technology positively affects students’ achievement (Liao, 2007).

The IWB is the latest phenomenon in many educational institutions. According to Schmid (2008), The IWB is “a touch-sensitive presentation device that is used in connection with a computer and a digital projector” – This direct quote is fine. There are several different brands of IWBs, but they are all touch sensitive and able to be manipulated with an individual's hand or a special pen created by its manufacturer. The IWB is connected to a projector and a computer, in which the computer screen is projected onto the IWB's screen. The focus has shifted from overhead projectors and PCs to the elaborate and sophisticated IWB, because it has the ability to increase motivation and interest in the classroom. It also helps students by keeping them interested and excited because it uses a large flat screen, which is visually appealing. The ISB also has the ability to be easily manipulated through touch, which also assists in increasing motivation and interest in the classroom.
Teachers are often excited when they find a tool or resource of this magnitude, because of the excitement and attentiveness elicited from their students. According to Schmid (2008), in the UK alone IWBs have increased from 48% in 2003 to 63% in 2004 in primary schools, and from 82% to 92% in secondary schools. Smith, Hardman, and Higgins (2006) stated that IWBs bring classes together through the use of strong visuals, thus promoting an interactive classroom.

**Theoretical Framework**

When investing time and money into technology tools, educators must be sure that the investment will improve academic achievement and attendance. Some educators feel that schools must stick to traditional methods, while others believe that computer-assisted instruction will help to transform education and improve achievement. Slay, Sieborger, and Hodgkinson-Williams (2008) concluded that there are some drawbacks to purchasing IWBs, including imposing them on teachers without proper training and gradual time for implementation. However, based on research conducted by Sins, van Joolingen, Savelberg, and van Hout-Wolters (2008), using a computer-based model caused deep processing while in turn causing an increase in achievement. When IWBs are used effectively, however, academic achievement can be improved.

**Statement of the Problem**

Since the first IWB was introduced in 1991, it has been a major investment for educational institutions. Billions of dollars have been invested to purchase this technology, and educational institutions must determine if the use of these purchases are
benefiting students. There are mixed opinions about the effectiveness of IWBs and interactive technologies. Slay et al. (2008) stated that "disruptive effects occur when technology is not fully understood or used optimally." According to Wood and Ashfield (2008) all of the individuals interviewed and observed in their research study expressed that the IWB had enhanced teaching and learning. The solution to improving academic achievement does not rely simply on purchasing an IWB or any other technology tool. Teachers must be sure that they are using technology as it was intended, as a “tool” to enhance and improve the learning experience.

When schools invest in the IWB, it is usually assumed that the IWB will correct problems with pedagogy and achievement. Educators often write grants and solicit funds to constantly keep up with technological advances deemed necessary for education. There is evidence in research that technology tools are a necessary resource when they are used effectively. This includes the IWB. Teachers who are trained to use IWBs understand how to use the tool to engage students. Armstong et al. (2005) found students’ learning was maintained and improved when IWBs were fully integrated into their daily classroom activities. Educational institutions must take a deep look into research to determine if technology does improve academic achievement.

Hypothesis

Secondary students who receive instruction with an IWB in Social Studies will yield higher test scores on a unit post-exam than secondary students who do not receive instruction using an IWB in Social Studies.
Purpose for the Study

Schools, school districts, and governments have invested large sums of money into the installation of IWBs in many schools across the world. According to Hall and Higgins (2005), Australia has spent $4.3 billion on interaction technologies, and the U.S. Department of Education has spent $700 million on education technology, and the British government has directed 50 million pounds towards IWBs. When making a large purchase, governments must be sure that students will benefit from the investment. To analyze the worth of the investment in IWBs, the answer to its effectiveness lies in academic achievement. The purpose of this study is to examine the effect of IWB implementation on rural secondary students’ academic achievement in Social Studies.

Significance of the Study

This study is significant and should be conducted for various reasons.

First, this study will help to verify the billions of dollars used to purchase IWBs in education across the nation. The results of this study will help school districts determine the cost-effectiveness of purchasing IWBs for students.

Second, this study is significant because a major issue in many schools is academic achievement. State governments and school districts are held accountable for students' achievement by the federal government. This puts pressure on states and districts, in which they must show evidence or proof that what they are doing to improve student achievement is working. If there is a solution to the major problem of making sure that students achieve, teachers should be made aware of it. There must be research
conducted to determine if IWBs are the solution to making sure that students are achieving in education.

Lastly, this research study is significant because there is very little research that shows how the uses of IWBs affect academic achievement in rural school settings and in Social Studies classrooms. In order to understand how these variables relate to one another, there must be research that looks at the results of IWB implementation on academic achievement in rural secondary students in a Social Studies course. The focus on current research has been on English, Math, and Science in urban schools.

Definition of Terms

Interactive Whiteboard

“The IWB is a touch-sensitive presentation device that is used in connection with a computer and a digital projector. The computer images are displayed on the board by the digital projector, where they can be seen and manipulated via touching the board, either with your finger, or with an electronic pen/stylus” (Schmid, 2008, p. 339).

Academic Achievement

“An atmosphere where students learn to love learning for learning’s sake, especially insofar as it evolves into academic achievement, is a chief characteristic of an effective school” (Renchler, 1992, p. 3). Similarly, this study will define academic achievement as test scores collected from a post-exam in a Social Studies class.

Limitations Delimitations and Assumptions

Limitations of the Study
There are three limitations that may work against this study.

The first limitation is the teacher’s fear of technology use. Many teachers who have the capabilities to use IWBs and other technology tools are not using their resources due to fear of technology use. This may create a problem for this study when recruiting study participants who will actively use the IWB in their classroom.

The second limitation that may work against this study is the fact that many teachers will not want to end their use of technology with one class for the sake of research. Many teachers who are comfortable using technology may feel that the only way they can be successful is to continue its use. Having a teacher discontinue the use of technology in one class may cause that teacher to lack enthusiasm or motivation in the course. This could also cause a lack of motivation and enthusiasm in the students.

The third limitation that may work against this study is the fact that it will be difficult to find a teacher who will continue to commit throughout the entire research study with all of the other obligations that educators have. There are many commitments that teachers are already dedicated to, which is why an educator may become frustrated during the study and not commit to the duties of the research study.

Delimitations of the Study

There are three delimitations that confine this study.

The first delimitation is the easy accessibility of the sample. The students and teachers are all in the same location, making them readily available for study throughout the course of the research study.
The second delimitation is pre-existing data available at the school. There is data on academic performance and attendance before the implementation of the IWBs at the school. This data provides information about the previous condition of the students’ learning before implementation. The researcher can use the data to ensure both groups are equivalent in terms of students’ prior knowledge in Social Studies.

Assumptions of the Study

There are two assumptions that are unique to this particular research study.

The first assumption is that the use of the IWB in the classroom will be the main factor in affecting students’ academic achievement. There could be other factors in the study that affect academic achievement, but the researcher must assume that IWB implementation is the main factor in affecting student achievement.

The second assumption unique to this study is that the teacher involved in this study is assumed to have the same level of knowledge and skills in integrating IWB in the classroom as other Social Studies teachers. If this assumption is not established, the researcher cannot conclude the difference in the achievement test scores between the experimental group and the control group with all IWB users. Teachers’ knowledge and skills could also be a factor affecting students’ achievement scores.

Summary

As technology evolves, classrooms and education will also evolve in the direction of technology integration. Schools are constantly competing to keep up with technological advances. The IWB has taken a seat in many classrooms, and its benefits...
are astounding. There is a need to conduct a study using secondary students in a rural high school, because most of the attention has been placed on urban secondary students. There is also a need to conduct research in the subject area of Social Studies, because most of the research targets students in English, Math, and Science. In order to better analyze the use of IWBs in education, there must be research conducted among rural secondary students in the Social Studies classroom. Therefore, the purpose of this study is to examine the effect of IWB implementation on rural secondary students’ academic achievement in Social Studies.
Technology is constantly evolving and increasing in schools all over the world. Governments and school districts must keep up with the latest technology advancements, in order to ensure that they are providing their students with the best possible education. The sale of the IWB and other forms of interactive multimedia technology has increased tremendously and more schools are interested in research about its effectiveness in the classroom. Studies have shown evidence that technology use positively affects the learning process. According to Wood and Ashfield (2008), IWBs enhance the learning experience by appealing to multiple senses. Through the use of many senses, learners are able to experience learning at a different level. Wood and Ashfield (2008) also explain that through the use of IWB technology that appeals to multiple senses, learners are interacting more in the classroom through the use of deep discussions and questioning. The research conducted by Wood and Ashfield (2008) suggested that technology used as a resource in the classroom positively increases interaction and enjoyment of lessons. Not only do Wood and Ashfield (2008) explain how IWBs increase discussions and questions, they also explain how the uses of IWBs enhance whole-class teaching.
practices. Wood and Ashfield (2008) explain that more resources were easily available to
the teacher and they were able to appeal to many different types of learners, through
visuals, sounds, and fun, motivating learning. IWBs provide teachers with many
resources, through the software that is provided with the board. Teachers are able to
combine all elements of their lessons, for example text, sound, visuals in one central
location, through the use of the IWB.

By using computers and technology students are interactive, responsible, and
engaged (Hsieh, Cho, Liu, & Schallert, 2008). It takes more than paper and pencil to
motivate students, because they are often engaged in interactive websites, video games,
and other forms of technology that constantly keep them stimulated when they are at
home. Students today are called 21st century learners, because they are growing up in a
world much different than their parents and grandparents. With more advancing
technologies in learners’ homes, innovators are coming up with more advanced
technologies for the classroom.

When students are motivated while they are learning, they actually enjoy the
lesson. According to a research study conducted by Hennessy et al. (2007), technology is
a powerful tool that supports exploratory learning by appealing to the learner’s prior
knowledge of the content, in addition to enhancing their understanding. When a topic is
enjoyable and lasting to a student, it helps them to better understand the information, thus
helping them to retain more information, according to research by Ke (2007). Ke (2007)
explored how the use of interactive learning, through math game drills, assisted students
in creating more positive feeling about math. With more positive feeling about a subject,
learners are able to attempt the subject in a more positive manner. Once students are more
positive about a subject and are motivated to learn, they may be more likely to attend class, and their classroom achievement increases. Studies conducted in the United States and developing countries have shown technology positively affects students’ achievement (Liao, 2007).

IWB is the latest phenomenon in many educational institutions. According to Schmid (2008), The IWB is a presentation device that is touch-sensitive, and uses a digital projector and a computer. There are several different brands of IWBs, such as Promethean, Smart, and Mimio for example, but they are all touch sensitive and can be manipulated with an individual's hand or a special pen created by the manufacturer. The IWB is connected to a projector and a computer, which allows the content of the computer screen to be projected onto the IWB's screen. The focus has shifted from overhead projectors and computers to the elaborate and sophisticated IWB because it has the ability to increase motivation and interest in the classroom. This device is interesting and exciting because users are able to manipulate its large flat screen, which is visually appealing, in addition to its ability to be easily manipulated through touch.

Teachers are often excited when they find a tool or resource of this magnitude. They prefer this type of resource because of the amount of excitement and attentiveness elicited from their students. According to Schmid (2008), in the UK alone IWBs increased from 48% in 2003 to 63% in 2004 in primary schools, and from 82% to 92% in secondary schools. Smith, Hardman, and Higgins (2006) stated that IWBs bring classes together through the use of strong visuals, thus promoting an interactive class.

_Academic Framework of Technology Use_
When investing time and money into technology tools, educators must be sure that the investment will improve academic achievement. Since the first IWB was introduced in 1991, it has been a major investment for educational institutions. Large amounts of money have been invested to purchase this technology, and educational institutions must determine if these purchases are benefiting students. Some individuals feel that schools must stick to traditional methods, while others believe that computer-assisted instruction will help transform education and improve achievement. Slay, Sieborger, and Hodgkinson-Williams (2008) concluded that there are some drawbacks to purchasing IWBs, including imposing them on teachers without proper training and gradual time for implementation. However, based on research conducted by Sins, van Joolingen, Savelsberg, and van Hout-Wolters (2008), using a computer-based model caused deep processing, while also causing an increase in achievement. When IWBS are used effectively, academic achievement improves. Sins et al. (2008) found a correlation between self-efficacy and goal orientation in computer-assisted instruction. Through the use of technology, students are able to improve academic achievement in a more positive and rewarding learning environment.

There are mixed opinions about the effectiveness of IWBs and interactive technologies. Slay et al. (2008) stated that technology was disruptive to the success of the class. However, according to research by Wood and Ashfield (2008), all of the individuals participating in a study of IWBs were interviewed and they felt that the IWB had enhanced whole-class teaching and learning. The solution to improving academic
achievement does not rely simply on purchasing an IWB or any other technology tool. Teachers must be sure that they are using technology as it was intended, as a “tool” to enhance and improve the learning experience.

When schools invest in the interactive whiteboard, it is usually assumed that the IWB will correct problems with pedagogy and achievement. Educators often write grants and solicit funds to constantly keep up with technological advances deemed necessary for education. There is evidence in many research studies that technology tools, including the IWB, are necessary resources when they are used effectively. Teachers who are trained to use IWB understand how to use the tool to engage students. Armstrong et al. (2005) found students’ learning was maintained and improved when IWB was fully integrated into the daily classroom activities. Educational institutions must take a deep look into research to determine if technology does improve academic achievement.

**Background and Development of Technology Use in Schools**

In order to fully understand the logic behind the IWB and how it affects teaching and learning, it is necessary to look at the background of computer-assisted instruction in comparison to traditional instruction, in addition to educational attainment, implementation, and the outcomes of this interactive way of teaching. Computer-assisted instruction or the use of IWBs in the classroom incorporates many different forms of media, which usually makes learning more interactive. This type of instruction combines many different methods; whereas traditional instruction simply uses lecture, paper, and text. There is no way to deviate from the norm in the traditional classroom.
Computer-assisted instruction uses many different types of multimedia. In Taiwan, a meta-analysis study of computer-assisted instruction was conducted. Liao (2007) concluded that computer-assisted instruction had a positive effect on student achievement. He found that different instructional approaches were used in computer-assisted instruction. Liao also stated computer-assisted instruction had a more positive impact on student achievement than traditional instruction. This research provides evidence that with different types of media and methods used in computer-assisted instruction, there are more improved levels of student achievement. These results were not only seen in Taiwan, but also in the United States.

Instruction using computers and IWBs is not simply the act of using websites or PowerPoint presentations. Examples of media used with IWBs include various types of simulations and computer gaming. These interactive resources, which include sound, multimedia interactive websites and visuals, are used with IWBs as instructional support tools. These interactive tools are not necessary, but there has been research that shows their success in computer-assisted instruction.

Yaman, Nerdel, and Bayrhuber (2008) stated that with the use of various forms of media to create rich learning environments, teachers are able to appeal to the senses of their learners. Yaman et al. also stated that this type of learning makes the classroom more interactive. This interactive classroom replaces the traditional lecture that does not appeal to all of the senses of learners. Various learners are able to comprehend information through different senses, which means that teachers must be able to appeal to these different senses so that each student is given a fair chance to succeed. The results of Yaman et al. provided evidence that even in courses normally disliked by students, with
the use of simulations in an interactive learning environment, students showed increased interest.

Multimedia and the IWB were also believed to be a solution to assisting teachers and students in difficult courses. Before the use of IWBs and multimedia in the classroom, students completed paper and pencil exams and sometimes used a computer to type reports or locate information. In a study conducted by Hwang, Chen, and Hsu (2006) provided evidence that students were more satisfied when using the multimedia whiteboard system in a mathematics course than the traditional methods of learning math. One of the subjects in this study stated that “The multimedia whiteboard system is just amusing. It is easy to record oral explanation such that others can easily understand the thinking of your solutions” (p. 116). Students feel positive about the use of the IWB, even in subjects like mathematics that they may normally find different or satisfying.

In a study by Hennessy et al. (2007), teachers carefully designed multimedia simulations to use in a science classroom, and the results of this study suggest that the use of simulations and animations are successful compared to traditional lab experiments. There is no need to always attempt to repeat traditional methods used in the classroom. These methods may have worked for many years, but there is no proof that this is the only way for success in the classroom. Teachers must be open to new and exciting technologies that research has proven to have success in the classroom.

Mixed-method approaches were used in a study conducted by Ke (2008). Ke studied an elementary school where web-based computer games were used. The results of this study suggest that students did not realize they were learning. They felt as though
they were having fun. The students were on task without much effort from the teacher because the learning process was interactive and involved multiple methods.

Schmid (2006) noticed a struggle between school faculties regarding how the IWB should be implemented. The teachers in Schmid’s study did not establish communication, which the researcher felt was a vital part of implementing the IWB into a school setting. There should be communication between all school stakeholders so that teachers are not simply using traditional teaching methods in addition to using the IWB. Smith, Hardman, and Higgins (2006) explained that when researching the IWB, they noticed teachers merely using the tool as a presentation device and continuing to use traditional learning methods. Through training as part of the implementation process, this challenge could be avoided.

Traditional teaching methods have always been a concern in education. Many administrators and teachers want to use only what is included in the learners’ textbooks, but learning is far beyond what is printed in a textbook. Learning is about the students and their interest and ability to learn the information. If all learners do not grasp the concepts and knowledge in the same way, teachers must employ teaching methods that combine a mixture of strategies, including the use of multimedia and the IWB.

*Educational Attainment and IWBs*

Educational attainment is the highest level of education a person completes. This level of attainment affects a person’s well-being and the amount of money they are able to earn in their lifetime. Thompson and Flecknoe (2003) believe that intrinsic motivation through the use of the IWB may increase educational attainment among learners.

Educational attainment is a major concern, and in order to improve educational
attainment in the United States of America, teachers must utilize different teaching methods so that all students reach their maximum potential. There are many elements that affect how much education individuals are able to complete, which include motivation, school climate, achievement, and attention, according to research by Thompson and Flecknoe. With the help of IWBs, schools are able to improve the educational attainment of today’s learners.

There is research that shows how educational attainment is affected by the amount of resources available at a school. According to Good, Burross, and McCaslin (2005), there is a need for schools to invest in programs that help students improve language and reading performance. Good et al. also included that the need to increase students’ achievement should be a goal for school reform. With school reform, there is a need to invest in technologies, such as the IWB, to assist with reading performance and student achievement in all subjects.

Thompson and Flecknow (2003) researched the use of the IWB and its ability to raise attainment. The focus of this study was reading and math, which are two vital subjects. Thompson and Flecknow concluded that the use of the IWB was very successful by improving classroom instruction and increasing educational attainment. They also felt that with more use of IWBs teachers would advance in using them and they would prove to be worth the investment.

According to Lei and Zhao (2007), technology uses that had positive impacts on students’ achievement were those meaningful to the students. The students need to be able to find a purpose in what they are learning. It is up to the teacher to use technology as a resource in order to relate their learning to today’s digital world. The focus is to use
structured, reformed instruction with technology as a resource to increase educational attainment.

Sin et al. (2008) researched motivation and student achievement of learning in a computer-assisted learning environment. Motivation is an important part of students’ ability to achieve certain learning objectives. Sin et al. concluded that when computer-assisted instruction is used to promote mastery and self-efficacy, student achievement improves. Multimedia and IWBs provide a resource for teachers and students that have the ability to expand far beyond the typical paper resources that compliment textbooks. These technology resources motivate and entertain students, while increasing educational attainment.

Implementation of IWB

With any new resource or classroom tool comes challenges. Before IWBs can be successfully implemented, teachers and school leaders must understand that there will be challenges. Some of these challenges include individual perceptions about the new tool, quality of technology, and knowledge of technology and its use. According to a study conducted by Hall and Higgins (2005), students viewed the IWB in a negative way only when they had technical trouble. This could be due to many issues within the technology used to operate the IWB. Hall and Higgins did not view these complaints as long-term issues. They felt as though these problems were minor, but they could lead to a great problem if no one solves the issues that the students are having. This creates a stumbling block in the use of the IWB if students are not assisted in correcting problems that they are having. They will continue to view this and other technologies as a negative resource in the classroom.
In Hall and Higgins’s study (2005), teachers were very confident about this technology, however, when looking at the results of a study conducted by Slay et al. (2008), most teachers viewed their IWBs as a large flat screen. When teachers do not understand the importance of a resource or its purpose, this may become a problem. If they feel that the only reason they have this product is because it has a large screen, they will not see the other valuable abilities that it is capable of because they will continue to use it for this one quality. Teachers need to be aware before implementation of all of the aspects of the IWB that make it a wonderful resource for the classroom.

Hsieh, Cho, Liu, and Schallert (2008) focused their study on student achievement and motivation in the middle school classroom, and they concluded that by creating learning environments that foster collaboration, students are reassured that they are able to access help from others. This motivates the students, and they are more likely to succeed in the classroom. Hsieh et al. also felt that through this type of learning environment students are able to receive support from the teacher, their peers, or the computer. This strong support base makes it easier to implement IWBs into the classroom, because students are successful due to the resources available to them.

Even though the IWB is a great motivator in the classroom, teachers must have some knowledge of how it functions for its use to be completely successful. Armstrong et al. (2005) explored case studies to express that teachers must be familiar with the software that they need to use with their IWBs, and they must also be aware of how to use the IWB in their classroom so that it allows interactive learning. Armstrong et al. also used examples from their case studies to demonstrate how important it is for teachers to understand the focus of their interactive lessons. Teachers must be able to align their
objectives and academic standards with what they are teaching so that they understand
the focus of the lesson for the students.

Educational resources are an important part of the implementation process,
because with the IWB, teachers are able to use many different types of educational
resources. The amount and quality of resources available at a school not only affects
educational attainment, but also immediate student achievement. Archibald (2006)
concluded in her research of middle school students that spending amounts for each
student had an effect on how much students were able to achieve on standardized tests.
This was related to the amount of resources the school was able to purchase due to the
amount of funding they received for each student. The more the school was able to
purchase in order to enhance the learning of the students, the better the students were able
to perform on standardized tests. Archibald also explained that resources are important
when schools are interested in increasing student achievement on standardized tests, but
schools must be sure that the resources they are investing in will benefit the students in a
way that it improves their academic achievement.

With new technologies and resources, comes a shift in pedagogy and learning.
Gallini and Barron (2001) used an interactive multimedia course to explore how teachers
and students perceived the pedagogy and learning in this type of course. Gallini and
Barron reports that a small amount of participants felt that a teacher-directed approach to
learning was more beneficial. The majority of the participants felt that the instructor and
the students were more engaged in this type of learning environment. Gallini and Barron
explained that this type of learning leads toward new pedagogy where there is a mixture
of student-directed and teacher-directed, and most teachers felt that this learning environment changed their way of teaching.

IWB Research Among Different Grade Levels

Research to determine IWB effectiveness has been done in different grade levels. There is some research at the primary, middle, secondary, and adult levels. Martin (2007) focused on research in the primary grades, in which the researcher studied learners at the age of ten. Martin used a random sample of learners in order to determine how the use of the IWB had affected their learning. The primary students in Martin’s research were studying writing and other language skills. Martin concluded the study by explaining that the learner’s improved in their writing skills as a result of the use of the IWB. The students in Martin’s study explained that they liked the lesson.

Hall and Higgins (2005) also studied students in the primary grades and how they perceived the IWB. The students in the study conducted by Hall and Higgins expressed that they enjoyed the use of multimedia, such as color, sound effects, music, and voice recording in the IWB lessons. These students also expressed an interest in the flexibility of lesson materials and instruction the IWB allowed. One student in Hall and Higgins (2005) explained, “It’s like better than the normal whiteboard because on that whiteboard all you can do is write and draw like boring pictures but on that one (IWB) you can do loads of different kinds of stuff and you can play games on it” (p. 106). The researchers argue that children learn best through all of their senses, in which they believe the IWB is able to appeal to all of the senses of the learners. The primary learners in the research study by Hall and Higgins explained that the IWB made learning more fun and enjoyable.
The only time that they had a complaint about the IWB was when there were technical problems with the technology.

Thompson and Flecknoe (2003) also studied the use of IWBs with students in the primary grades. The results of Thompson and Flecknoe showed that the students’ scores improved as a result of IWB instruction. Using a “tracking sheet,” to show a change in behavior, Thompson and Flecknoe also reported a difference in the learners’ behavior as a result of the use of the IWB. Learners reported that the use of the IWB helped them to think, in addition to making learning faster. The researchers concluded their study with findings that suggest that the use of the IWB in primary grades helps students to understand and grasp the information much faster than with the use of traditional teaching methods without the use of the IWB.

In addition to research focusing on primary grades, there is also research available in middle and secondary schools. Lei and Zhao (2005) focused on learners at the middle school level and how technology affected their achievement. They found that when technology was related to the subject area, it was more likely to contribute to improving academic achievement. Lei and Zhao also found that technology use assisted in improving middle school learner’s attitudes and self-esteem. With better attitudes and self-esteem students are able to produce better learning outcomes; therefore, improving their academic achievement.

Glover, Miller, Averis, and Door (2007) focused their research on students in the secondary school setting and how the IWB influenced their education. Glover et al. observed and analyzed 50 different lessons taught by secondary teachers using IWBs. When viewing the lessons, Glover et al. found that teachers appeared more aware of the
learners’ different styles of learning. The teachers in the research study felt that they were able to give clearer examples to the learners through the use of color and clip art. The teachers were able to get their kinesthetic learners to move around more during the lesson to complete assignments at the IWB, while more colorful visuals were able to be used for the visual learners. Glover et al. also found that the activities used with the IWB encouraged interactivity and active thinking among the secondary learners.

Hennessy, Wishart, Whitelock, Deaney, Brawn, la Velle, McFarlane, Ruthven, and Winterbottom (2007) also focused their research on secondary learners and how computer-assisted technology supports the learning process. Hennessy et al. found that through the IWB, teachers used more interactive and visual presentations, and provided learners with more immediate feedback. They also found that the use of the IWB assisted teachers with the improvement of communication in the classroom. The IWB also assisted teachers with creating opportunities for learners to explore and participate in the learning process through simulations and manipulations. Hennessy et al. concluded that when IWBs are used to guide instruction at the secondary level, the IWB aided in enhancing understanding of the learning concepts.

Not only has there been research at all levels of K-12 education, there has also been research in settings with adult learners. Schmid (2006) conducted a study to examine IWB technology and how it affected learners who ranged from ages 20-36 years old. In the research study by Schmid, the IWB technology allowed the teacher to incorporated peer discussions, and students were encouraged to engage in these discussions. Schmid found that the IWB technology allowed the adult learners to express
themselves and reflect on their own learning. Also, the learners were more interested in participating in the lessons, due to the use of the new technology.

**IWB Research among Different Type of Learners**

In addition to the use of IWBs among various grade levels, there is also research about different types of learners, such as alternative or problematic students, special education students, and international students. Zyngier (2007) studied engagement among problematic students and found that in order to assist all students, including those that teachers may describe as “difficult,” teachers must connect the lesson to the learners, learners should be able to take ownership of their learning, students should be able to respond through their own real-life experiences, and students should feel empowered.

Thompson and Flecknoe (2003) found that in order to empower or engage these “difficult” students, teachers should use the IWB, because it motivates students to remain on task. When studying students with behavior problems, Thompson and Flecknoe tracked their behavior patterns and found that the IWB lessons assisted learners in correcting their own behavior problems. Even students who were deemed as “difficult” learners were able to achieve through the use of the IWB as an educational tool.

Martin (2007) studied interactive whiteboards and focused one part of their research on students with additional support needs. One of the students the researcher studied was a study who was diagnosed with autism. The researcher explains that in order to reach the student the teacher must differentiate instruction in order to teach to the learners’ different style of learning. Martin found that the student was more aware of what was going on in the classroom through the use of the IWB. The student rarely asked what had to be done or what the teacher required. The learner felt that it was much easier
for him after the teacher started using the IWB in the lessons. The learner in Martin’s research study also explained that the IWB helped him to pay attention, and the sound, touch screen, and pictures helped him to understand what the teacher was teaching.

In addition to studying students with behavior problems and students with additional learning needs, there is also a large amount of research on international students. Liao (2004) completed a research study on students in Taiwan and how technology affects their achievement. Liao found that through the use of computer-assisted instruction, students in Taiwan showed an improvement academically. This research could be used to support the fact that computer-aided instruction is better for students’ achievement, than traditional instruction. International learners in Taiwan were able to show an improvement academically through the use of computer-assisted instruction.

*IWB Research in Different Subject Areas*

When trying to locate research on IWBs in education, most research available on multimedia learning and IWBs leaned toward English, science, and mathematics. Research is limited to English, science, and mathematics but there are other subjects that are taught that teachers use IWBs in, which makes research in other subject areas valuable to the field of education. Through the research that is available, researchers are able to explore the value of IWBs and their effectiveness in English, Science, and Mathematics classrooms. Schmid (2008) chose to focus on English and IWBs; while Wall, Higgins, and Smith (2005) focused on how IWBs work in the mathematics classroom.
English or Language Arts must be taken by all students throughout their time in grade school and beyond. These subjects are extremely important in learning. One research study conducted by Schmid (2008) made certain suggestions about English language learning and the IWB. Among the suggestions were that teachers balance the amount of multimedia so that they do not burden the students and to encourage active engagement so that students are able to process the content. These suggestions provide for teaching an effective English lesson, using the IWB. Martin (2007) also researched the IWB and its effectiveness in English, and her research showed an increase in motivation through the use of the IWB in the English classroom. There was no evidence in this research that the IWB increased achievement, but there was an increase in motivation which is often correlated with student achievement.

Mathematics is also a very critical subject in schools, because many people feel that math is a difficult subject. Wall, Higgins, and Smith (2005) examined how students viewed the IWB in different classroom subjects, and the subject that received the most positive comments was mathematics. In the study conducted by Wall et al. (2005), students also reported that they had more understanding of the course content. This is extremely helpful in all courses, but especially in mathematics because it requires more critical thinking. Through the students’ ability to think more critically and understand mathematics more efficiently there must be a connection between IWBs and mathematics achievement.

Glover, Miller, Averis, and Door (2007) explored the use of IWBs and the mathematics classroom, where they observed and analyzed recorded lessons. Glover et al. felt that the IWB allowed for more immediate feedback, activities to encourage higher
order thinking, and the ability for teachers to explain topics in different ways. Glover et al. concluded that the teachers felt more control over what occurred in the classroom and appeared to be more aware of students’ different learning styles. In all subjects the ability for teachers to provide feedback, encourage higher order thinking, and teach to students’ different learning styles is extremely important in ensuring academic achievement.

Science is also a course that requires higher order thinking skills and the ability to problem solve. Zyngier (2008) focused his research on student engagement and how it affects learning among students in a science course. Zyngier explained that there is a link between student engagement and academic achievement. Academic achievement is gained through the use of IWBs, because they support learning in a way that it engages students in the lessons. Zyngier (2008) explored how teachers were able to make lessons more interactive and exciting through the use of the IWB. Hennessy et al. (2007) also explained that technology integration in the science classroom enhances’ student learning through support of scientific theories.

**Outcomes of IWB Use**

The IWB and multimedia learning affect academic achievement if properly implemented. Ertl, Kopp, and Mandl (2008) explored the outcomes of collaborative, interactive learning. Ertl et al. concluded that if learners are given resources that provide instructional support they will benefit and have better learning outcomes. IWBs provide this type of support and through proper implementation students are able to use the resources of the IWB to increase academic success. Ertl et al. also explain that through the use of these resources learners are motivated to work more effectively, therefore
increasing their achievement level. Ertl et al. reported that the learners were more interested in participating in the learning activities through the use of the IWB.

More learner satisfaction is also an outcome of the use of the IWB and multimedia learning. Lim, Kim, Chen, and Ryder (2008) explored different learning environments to determine their effect on student achievement and course satisfaction. Lim et al. concluded that students in learning environments where technology was used had higher achievement level than those in the traditional setting. Lim et al. also found that students in learning environments rich in technology had higher levels of satisfaction in their courses. There is a need for learners to be satisfied in their courses, and with multimedia learning environments, such as those using IWBs, students are able to experience more satisfaction than those in traditional courses.

In addition to the increase in learner satisfaction, IWBs also assist with increasing the amount of interactivity in the classroom. This assists teachers with student motivation and their attention to the subject matter. Schmid (2008) found that through the use of the IWB in conjunction with its other resources, there was an increase in interactivity. They also felt that the technology supported higher levels of learning that encouraged more interactivity. When students are challenged they are able to interact and engage in classroom activities, which is important at all levels of learning. With IWBs and multimedia technology students are able to succeed through increased interactivity and motivation.

**Summary**

The IWB is a fairly new technology, and more research is needed to discover its effectiveness. There is research available on the effectiveness of IWBs at various grade
levels. There is also research that is available about the IWB that shows that it has been effective in English, mathematics, and science. There is no research on how the IWB affects students in social studies. Much of the research available about the IWB shows that there are some challenges in implementing the IWB. Certain perceptions misguide the use of the interactive whiteboard, and the quality of technology has an effect on its use in the classroom, in addition to the teacher’s knowledge of technology. Research shows that the IWB is a valuable tool that allows teachers to combine many other resources in conjunction with its normal functionality. The IWB and multimedia technology has created a shift in pedagogy and the learning process. Teachers and learners must adapt to these new methods in order to reap the benefits of the IWB. Through the use of the IWB and these new teaching methods, learners will experience increased motivation and engagement, thus improving academic achievement, student satisfaction, and educational attainment.

Educational leaders must make important decisions in order to determine what is best for the students in their facilities. One of those important decisions is determining which resources would provide the best possible educational experience for students. When choosing to purchase resources in education, leaders must be sure that they are using research to influence these financial decisions. These decisions must be made at state, district, and local levels of education. Some educational leaders have decided to include IWBs in their educational settings. With these purchases, educators and stakeholders are concerned with the effectiveness of these resources on the academic achievement of their learners.
CHAPTER THREE

METHODOLOGY

The purpose of this study is to examine the effect of interactive whiteboard on secondary students’ academic achievement in Social Studies. The independent variable in the study is interactive whiteboard implementation. There will be two groups used in this study, in which the experimental group will receive instruction using interactive whiteboards, while the control group will receive instruction without the use of interactive whiteboards. The independent variable is expected to affect the dependent variable. The dependent variable is student academic achievement. This chapter will include an explanation of the research design, description of participants, sampling strategy, ethical standards, independent and dependent variables, data collection, data analysis, and a summary of the chapter.

Design

To test the hypothesis, a pretest-posttest control group experimental design will be employed. Study participants will be randomly assigned into two groups; the experimental group students will be given instruction using interactive whiteboards while the control group will be given instruction without using interactive whiteboards. The same curriculum and Holt, Rinehart, and Winston’s textbook, United States History: Beginnings to 1877 will be used to provide the instruction. Pre test will be administered before the instruction in order to ensure group equivalence in terms of prior knowledge. At the end of the instruction, post test will be administered to measure students’ achievement.
The pretest-posttest control group experimental design will be appropriate in this study because this research design will eliminate any threats of internal validity. List the type of threats and explain how you will prevent those listed threats. See the textbook for the list of threats of “internal validity” and “external validity”.

All of the students in the classes will have an equal chance of being selected. So in other words, your sampling strategy is a random sampling strategy. Out of all students who turn in their permission forms stating they are able to participate in the study, twenty will be selected for each group. So total of 40?

These groups will also receive the same instruction and use the same materials, which will not interfere with their regular class schedules. This research design will show if there is any significant difference between the experimental group and the control group by comparing post test scores.

Participants

The participants in this study will be secondary students from West St. John Elementary School in St. John the Baptist Parish. This is a rural elementary school located in Edgard, LA, which has a population of 2,637. West St. John High Elementary School has approximately 285 students, who are 98% African American. This school services students in grades Pre-K through 7th grade. West St. John Elementary School is considered a Title I school, because most students receive free or reduced lunch and live in low-income homes. It has recently received millions in funding for the integration of technology, due to its rural location and economic need.

The participants will be recruited from two Social Studies’ courses. Twelve students will be selected from one section of Social Studies where interactive
whiteboards are not used, while twelve students will be selected from a section where interactive whiteboards are being used. You said “twenty in each group” earlier. Both of these groups of participants will be selected from courses taught by the same teacher, in which the same material will be covered in the same time frame.

All of these students will be African American and there will be 12 be consistent. Use twelve, not 12, students in each group, which will include a mixed number of genders of the students. The participants range in age from 13 - 15. No special education students will participate in this study.

Sampling Strategy: => revise this section. Not consistent with previous sections.

Twenty-four students taking the same Social Studies course, twelve in one section and twelve in another section, will be selected for this study. The groups are already created by the school, so cluster sampling will be used. explain what procedure you will follow to use the cluster sampling. In the section above, your plan was a simple random sampling, which is not consistent with your sampling strategy in this section. Make sure you explain ONE sampling strategy consistently.

The experimental group and the control group will be determined randomly. The researcher will place both groups in a box and draw the group names out of the box to conclude that the first group will be the experimental group, while the second group will be the control group. The first twelve students to turn in their permission forms to participate in the study from each class (you stated “taking the same social studies course”. Are there more than one course? will be chosen to participate. The researcher will simply use two intact groups, one class with IWB as the experimental group, and the
other without IWB as the control group. If you plan to use two intact groups, why do you need to select 12 students from each class? Why not use all of the students? The participants will not be aware of which group they are participating in for this study and will be comparable to one another. How would you ensure this? Any strategy? They will both be in the same grade level and both taking the same course for the first time. All students will be participating in the school’s regular curriculum, without any modification or accommodations. All students in both classes will take a pre-test to determine that they all have the same knowledge of the subject being taught. Here you said “all students” not “12 selected students”.

**Ethical Standards**

St. John the Baptist Parish requires that all minor participants provide informed consent forms to participate in education research. Researchers must also gain consent from their administrators and faculty members who are involved in any way in the research study in order to further conduct educational research. Parents will receive a form that will inform them of the research conducted, using their child as a participant. They will also be informed that their child will not be harmed or placed in any danger during this research study. The needs of this study will never be placed above the need to maintain the well-being of all participants.

This research must also be approved by the Northwestern State University Human Subject Institutional Review Board (IRB), which requires an in-depth application before granting the researcher permission to begin the research process. This research study does not interfere with the regular operation of any class schedules or curriculum, which means that the learning of the participants will remain the same. The teacher will cover
the same objectives and will use the same teaching methods with both groups, so that one
group is not at an advantage to the other. Both groups will never meet during the same
time, and will be kept completely separate. All research materials will be kept in a locked
filing cabinet and will be completely confidential. Confidentiality is extremely important,
because it is an ethical right that all participants must be granted.

Participants will not be deceived in any way during this study. To ensure that they
are aware of the research study, there will be an assembly held a month before the
research study will begin where all students and their teacher will receive full details of
the study by the researcher. During this time a principal letter to parents concerning the
proposed research study, in addition to parental consent and assent forms (Appendix A,
B, and C) will be sent home by all students. This form will provide information to parents
about the details of the research study and will inform that that their child will be treated
fairly at all times. They will also be informed of the confidentiality of this study. The
teacher will also complete a written consent form (Appendix D) at the time of the
meeting. The teacher will be made aware of the confidentiality of her classroom activities
and results of the research of her students as well. At the completion of the study
debriefing forms (Appendix E) will be provided to all participants.

**Variables**

*Independent Variable*

The independent variable in this study will be interactive whiteboard
implementation. There will be two groups consisting of twelve participants in each group,
which is a total of twenty-four students. Both of these groups will receive instruction in
Social Studies from the same teacher. The experimental group will receive instruction
using the interactive whiteboard while the control group participants will receive
instruction without the use of the interactive whiteboard. Both groups will receive the
same instruction, using the Louisiana Comprehensive Curriculum.

The interactive whiteboard will be used daily with the experimental group. The
teacher will use the interactive whiteboard as an additional resource, in which students
will interactively participate in various classroom activities. The teacher will post
assignments on the interactive whiteboard, in addition to using the interactive whiteboard
to allow student participation using various interactive websites and templates. These
websites and templates will be aligned with the Louisiana Comprehensive Curriculum
and the lesson objectives.

Some examples of websites and resources that the teacher will be able to use
include, World Book Encyclopedia (www.worldbookonline.com), LPB Cyberchannel
(http://streaming.discovereducation.com), and Promethean Planet
(www.prometheanplanet.com). The teacher may deviate from these resources, but World
Book Online and LPB Cyberchannel are two free resources that are provided by the state
and are aligned to the state curriculum and standards. The interactive whiteboard will
only be used as an additional resource in order to help the teacher reinforce what is being
taught. All other material will remain the same between two groups. The experimental
group participants will be taught using various lessons using the IWB as the center of the
instruction, while the control group will have to rely on Holt, Rinehart, and Winston’s
textbook, United States History: Beginnings to 1877 and resources and other paper and
crunch resources.

Dependent Variables
The dependent variable of this study is student academic achievement. Student academic achievement will be measured using a post-test that participants will take at the conclusion of this study. The post-test will cover the objectives that the students should have mastered between the pre-test and post-test research period. All individuals in the student will be given the same pre-test and post-test instruments. The assessment will consist of 40 multiple choice, 10 short answer items taken from Holt, Rinehart, and Winston’s Progress Assessment Support System. These questions are also suggested in the Louisiana Comprehensive Curriculum. All objectives covered during the research study will be assessed using the same assessment. How they will be graded using the GEER? Explain. Also provide 1-2 sample items.

Data Collection

This study will take place over a six-week period. Academic achievement will be measured to determine if interactive whiteboard implementation affected the dependent variable. Students from two intact classes will be used in this study. One class student will be the experimental group and the other class will be the control group.

Each week both groups of students will participate in the same learning objectives, as outlined in the Louisiana Comprehensive Curriculum. Then, participants will be given a pre-test that will be created using items from the Louisiana Comprehensive Curriculum. These items will be the same for both groups. The pre-test will be used to make sure that the level of prior knowledge between two group participants is not significantly different. After the pre-test is given, the students in the...
experimental group will be given instruction with IWB and the students in the control
group will be given instruction without IWB.

After the pre-test, students will continue with the normal daily activities and
lessons outlined in the Louisiana Comprehensive Curriculum. The whiteboard
implementation group will receive daily instruction using the interactive whiteboard,
while the control group will receive traditional instruction, without the aid of technology
resources. All activities and class assignments will take place in a similar classroom
environment and with the same teacher. The only difference will be that they will be
taking part in the course at a different class period.
The Social Studies teacher and the researcher will administer and supervise all activities.
The same amount of time, fifty minutes, will be allowed for all learning activities and the
same allotted time, fifty minutes, will be given between activities for both groups of
participants.

Following all learning activities, participants will be given the same post-test
assessment. This post-test will assess the objectives taught over the six-week period. The
post-test will be created items taken from the Louisiana Comprehensive Curriculum. The
assessments will be graded and compared to determine if there is an academic
achievement difference between the two groups.

Data Analysis

Pre-tests and post-tests will be used in this study. The results of all data will be
computed and stored in an EXCEL spreadsheet. EXCEL will be used, because of its ease
of use and viewing, which will help in accurately logging and comparing information.
In order to determine the statistical significance of the score differences between two groups, an independent samples t-test will be conducted using Statistical Package for the Social Sciences (SPSS). Student’s pretest scores between two groups will be compared using independent samples t-test. The purpose of the pretest comparison is to ensure group equivalence between two groups in terms of prior knowledge level. If pretest scores are found to be significantly different, the prior knowledge will be considered as a covariance, and Analysis of Covariance (ANCOVA) will be conducted when comparing posttest scores between two groups. If pretest scores are found not to be significantly different, another independent samples t-test will be conducted by only comparing posttest scores between two groups without a covariance. The alpha level for this study is 0.05.

Summary

The purpose of this study is to examine the effects of interactive whiteboards on student academic achievement in a secondary Social Studies class. The independent variable used in this study will be interactive whiteboard implementation. There will be dependent variable is student achievement. The participants chosen for this study will be middle school students from West St. John Elementary School located in Edgard, LA in the school district of St. John the Baptist. There will be a total of 24 participants, of which 12 will be in the treatment group and 12 in the control group. So are there only 12 students in each class? Cluster sampling will be used to choose the participants, because the researcher is using two intact classes. Permission will be received from the school district, administration, parents, and faculty before research will begin. All parents of minor participants will receive a principal letter, parent informed consent letter, and
assent form. Permission will also be granted from the IRB at Northwestern State University before research will begin. All participants will be informed of the research study before any research will begin. Ethical standards will be upheld and the safety and privacy of all participants will be protected. Over a six-week period, the participants will receive the same instruction using the Louisiana Comprehensive Curriculum and Holt, Rinehart, and Winston’s textbook, *United States History: Beginnings to 1877*. The only difference between two groups will be the use of the interactive whiteboard. EXCEL will be used to manage and record data from both groups. A t-test for independent samples will be used to analyze pre and post-test data using SPSS.
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