DOES USING THE INTERACTIVE WHITEBOARD ASSIST SOCIAL STUDIES TEACHERS IN INCREASING THE COMPREHENSION OF STUDENTS AND INCREASE CLASSROOM PARTICIPATION OF MIDDLE SCHOOL STUDENTS IN SAUDI ARABIA?

by

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A Master’s Thesis/Project Capstone
Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science in Education
Curriculum and Instruction in Inclusive Education
Department of Curriculum and Instruction
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Fredonia, New York

Spring 2018
We, the undersigned, certify that this project entitled **DOES USING THE INTERACTIVE WHITEBOARD ASSIST SOCIAL STUDIES TEACHERS IN INCREASING THE COMPREHENSION OF STUDENTS AND INCREASE CLASSROOM PARTICIPATION OF MIDDLE SCHOOL STUDENTS IN SAUDI ARABIA?** by HANADI BATARFI, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

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ABSTRACT

In recent years, there has been increasing interest in integrating the latest technology tools into educational field with a view to improving teaching methods as well as activating the role of students as participants in the educational process in order to develop their intellectual, social and academic skills. Interactive Whiteboard is one of these latest educational tools. After reviewing the literature, the researcher found that there are few studies on this topic in the Saudi context. The purpose of this study was to determine the effectiveness of using the IWB to assist social studies teachers in Saudi Arabia to increase the comprehension of students to the curriculum and increase classroom participation in middle schools in the Kingdom of Saudi Arabia. This study was conducted in an urban middle school in Western Saudi Arabia during the spring semester of 2018. The participants in this study were 8th grade students from the 33-middle school in Jeddah, Saudi Arabia. This study’s sample consisted of 30 female students all the aged of 14. The students were assigned at random with n=15 students in the experimental group in order to study the material by using interactive whiteboard technology and n=15 students in the control group in order to study the material in the traditional way. Also, the researcher designed a Likert-style survey to investigate students' opinions and attitudes towards of the using the IWB in the classroom. The researcher analyzed the results of her research question using direct observation and surveys. A comparison was made between the data of the two groups using statistical analysis. The mean and standard deviation were determined via the use of the SPSS program. The results from this study indicated that IWB technology has successfully contributed to increasing students’ comprehension and to increasing classroom participation. In addition, the results indicated that there were positive attitudes towards the use of IWB in the classroom. The results also indicated the ability of IWB technology to raise the academic performance of students and to give students the opportunity to participate in the educational process through the presentation of activities, educational lessons, as well as to use some advantages of IWB such as writing on the board in order to increase students’ motivation to learn and to encourage to acquire skills.
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Chapter One: Introduction

Educational technology plays an important role in the teaching and learning process; the main issue is the ways in which to effectively use educational technology in instructional practices in the classroom (Gruber, 2011). In recent years, there has clearly been a growing interest in the introduction of technology in order to improve the outcomes of the educational system and potential of teachers and students in the development of themselves and their active participation in the community. Also, whether or not to use technology in education depends on the availability of the tools and other elements, training on the use, and awareness of its importance (Alqhtani, 2015, p.1). E-leaning applications have begun to replace traditional methods in the process of education because they have flexibility in providing opportunities to locate a lot of resources, and they cater to individual differences. The teachers can use varied teaching methods such as simulations, learning through exploration, and experience-based learning. In addition, if they utilize well-designed exercises and tests, teachers will be able to diagnose the difficulties that prevent students from understanding a certain point, and the applications can provide the teachers and students with additional and alternative exercises to explain those points (Carliner, 1999).

The investigator in this study purposes to investigate the effectiveness of using the IWB to assist social studies teachers to increase the comprehension of students to the curriculum and increase classroom participation in middle schools in the Kingdom of Saudi Arabia. The investigator of this study plans to collect numerical data in order to investigate the impact of using the interactive whiteboard on students’ comprehension and participation.
Interactive Whiteboard in the Classroom

Interactive whiteboards are a relatively simple new type of technology that teachers can use in the classroom as instructional aids which improve the learning environment by engaging students in the instruction (BECTA, 2003). They are more economical than providing an individual computer system for each student; they are intended for use in direct whole class instruction; they do not require relocating students to the “computer lab”; and, they allow students to be interactive with each other, the teacher, and the board utilizing visual, verbal, and tactile modalities. They can also incorporate a range of multimedia and other digital resources to enhance content; support interactive and collaborative learning; and, foster student control of learning. Best practice literature supports interactive learning to engage students and to encourage higher order thinking and problem-solving skills, particularly for middle school students. Use of interactive whiteboards for whole class instruction combines technology integration, interactive learning, and attention to students’ developmental needs in ways that engage students, mentally and physically in the instructional process (Morgan, 2008, p.7).

Previous research stated that many schools in developed and developing countries have confidence in the capabilities of technology to improve educational processes (Mone, 2010; Thomas & Schmid, 2010; Yang & Teng, 2014). E-learning has many faces in classrooms; the interactive whiteboard (IWB), for example, is one of many tools of e-learning. The IWB is a large touch-sensitive and interactive display that connects to a computer and projector. A projector projects the computer's desktop onto the board's surface, where users control the computer using a pen, finger, or other device (Gruber, 2011). Of all the technologies being introduced to the classroom, the author finds the IWB the most promising for various reasons, among these the fact that the IWB uses all three learning styles: visual, audio and kinesthetic.
The appearance of IWBs in schools has been accompanied by research that attempts to analyze their effects on teaching and learning processes (Yanez & Coyle, 2011).

Many studies related to the use of IWBs in educational settings have shown that IWB technology can enhance presentations and develop student motivation and performance. The best use of IWBs calls for full awareness of the practices and perceptions regarding teachers’ employment of IWB technology (Isman, Abanmy, Hussein & Saadany, 2012). The Technology integration using Interactive Whiteboard can potentially increase interactivity between teachers and students, enhance student engagement, support motivation and enjoyment, and ultimately increase student achievement, and the most important factor in enhancing learning experience is the perception of the teacher on their instructional methodology. If the teacher perceives that Interactive Whiteboard could enhance instruction and interaction, then the result could be a positive influence on students’ learning (Essig, 2011, p41).

Studies of teachers and students have revealed positive attitudes toward IWB use in classroom and students, and increased student engagement, motivation, and enjoyment (Digregorio & Sobel-Lojeski, 2010; Hall & Higgins, 2005; Hennessy, 2011; Moss, Jewitt, Levaâiç, Armstrong, Cardini & Castle, 2007; Sad & Özhan, 2012). Also, using technology allows students to learn 24 a day and 7 days a week. The increasing use of technology will help to raise the process of interaction and communication between the teacher and the students to each other (Carliner, 1999). There is an increasing awareness of the need to understand the match between technology and pedagogy in the development of interactive learning supported by the IWB in schools (Glover, Miller; Averis, & Door, 2005).
Improving Teaching Methods and Enhancing Learning

The use of the IWB for instruction can serve as a catalyst for changing from traditional instruction to interactive and constructive methods. This technology could support teachers in their use of teaching methods in ways that are more contemporary and utilize various media such as texts, voices, pictures and movies that facilitate more effective learning even during routine teaching practices (Gashan & Alshumaimeri, 2015). A teacher can bring the outside world inside the classroom through the Internet. Meta-analytical review suggests a consensus that the teacher bears the main responsibility for the success of the educational process (Hattie, 2008), including the process of using the IWB (Avni, Rotem, & Ben Cehfer, 2010). In other words, the road to success is via the teacher as the leader who navigates the instruction and manages the class and the lesson in the most intelligent, beneficial way. The main challenge in this task is to design a different way to teach, in which the role of technology not only diversifies and enriches instruction and learning, but also includes promotion, support, creation, and provision of an opportunity for a different learning paradigm. According to Heywood and Norman (1988) this is due to the fact that students demand the chance to work with computers because they like them better than other teaching methods. In several studies carried out by a number of researchers in order to investigate the effectiveness of the use of interactive whiteboard in the classroom researchers concluded that the use of the IWB as an instructional tool has a beneficial effect on student engagement in classroom lessons and led to improved student behavior. Also, the use of the IWB contributes to their understanding of the content of the lesson and to the interaction between students and teachers and among the students themselves. In addition, raises the level of concentration, active participation in lessons, and increased curiosity because of the better visual presentation and multimedia use (Morgan, 2008; Schwimmer & Gutman, 2011; Sad & Özhan,
There are many teachers who overlook the use of technology in the educational process leading to students feeling bored of the traditional way, especially in teaching social studies curriculum that depends on a study of past events and stories. Also, since the technology began to emerge, many teachers have sought to employ the IWB in teaching but there are great obstacles faced by teachers in the use of technology in the classroom and especially in the case of IWB technology.

Many teachers who are incompetent in computer knowledge face some challenges. In many schools now, teachers have IWBs inside the classrooms, yet they are doing the “chalk-and-talk thing” and pen-paper based assessment (Walker, 2002, p. 2). They stand at the front lecturing instead of letting the technology do the job. Blau (2011) added the claim that success in assimilating the IWB as a teaching aid depends largely on appropriate training of the teacher. Her research showed that in lessons using the IWB that are managed by teachers who were not adequately trained, the device is perceived as a hindrance to the flow of instruction and one that reduces progress in the learning process. The use of the IWB is a boon, but when any new piece of technology enters the educational setting, it is important to look at how it will be used for teaching and learning at the same time. In fact, technology imposes some challenges. Those difficulties make the challenge for incompetent teachers even more difficult (Al-Faki & Khamis, 2014).

**Personal Interest Statement**

As a researcher, I think the reasons behind a lack of student comprehension in social studies curriculum is the teacher's use of a traditional approach. The educational problem that I would like to investigate is the lack of students’ comprehension of curricula and lack of classroom participation in the classroom. This problem is suffered by many teachers. These
elements are important in the educational process for both teacher and student. Lack of comprehension and lack of participation have a negative impact on the student in the development of his skill of thinking, analysis and discussion within the classroom. Lack of comprehension occurs when students do not respond to traditional teaching methods. Traditional methods of teaching do not meet the needs of the learner and do not take into account individual differences between learners where the teacher depends on teaching by the method of diction and the student has no an effective role in the educational process. The successful teacher should keep pace with the development of technology in order to help students to understand and to increase student’ motivation to learn and participation in the educational process. Using technology will help teachers achieve the desired goal of helping students understand in less time with less effort.

The reason for my personal interest in choosing the subject of integrating technology into education and choosing my research topic is due to my experience of learning English by interactive whiteboard when I came to study in America. I was very impressed with the ways of teaching and the alternative teaching methods through the integration of technology in education in the classroom. I have found great interest in diversity in education, interest in the delivery of information and creativity in the creation of the educational means. This has made me consider choosing my research topic on the integration of technology in education, especially interactive whiteboard technology. When I was a student in the middle school, I was hoping that my teacher would change her ways of teaching history. I was feeling bored and losing concentration, especially because the history curriculum speaks of events that occurred in the past. Many students find it useless to study. The reason for this is due to teachers failing to motivate or encourage students to search and explore. My role as a history teacher is to help students and
encourage them to interact with me inside and outside the classroom where I ask them to search for sources, stories or books related to the curricula in order to share ideas between students. This is one of the strategies of education. Integrating technology into the classroom will encourage them to search and to think about finding fun and interesting ways to figure out events that occurred in the past. This of course will achieve the desired goals.

The educational problem that I would like to investigate is the lack of students’ comprehension of curricula and lack of classroom participation in the classroom. Morgan (1999) makes the statement that “Critics have asserted that the traditional ‘stand and deliver’ style of teaching no longer does the job, that it fails to develop students’ critical thinking and problem-solving skills, and that it suppresses natural creativity and curiosity (p. 2). This problem is suffered by many teachers. These elements are important in the educational process for both teachers and students. Lack of comprehension and lack of participation have a negative impact on the student in the development of his skill of thinking, analysis and discussion within the classroom. Lack of comprehension occurs when students do not respond to traditional teaching methods. Traditional methods of teaching do not meet the needs of the learner and do not take into account individual differences between learners when the teacher depends on teaching by the method of diction and the student has no an effective role in the educational process. My research highlights the importance of using IWBs while teaching and its effects on increasing comprehension and academic achievement for students. My research aims to help teachers develop teaching methods, increase student participation, and improve overall student educational performance. Assisting in the delivery of content material to students using technology such as PowerPoint presentations, the IWB video tutorial, or other educational sites will have a significant impact in helping student understanding and comprehension. My primary
research question is: does using the interactive whiteboard will assist social studies teachers to increase the comprehension of students and increase classroom participation of middle school students in Saudi Arabia?

In the next chapter, I will review the relevant research related to the problem that I have outlined above. The following literature review analyzes what other researchers have found concerning on attitudes of teachers and students towards the use of interactive whiteboards and its role in increasing the comprehension of students and increasing classroom participation and what are the most prominent problems teachers face when using interactive whiteboards in the classroom.
Chapter Two – Review of the Literature

In the previous chapter, I introduced the educational problem that I would like to investigate: the lack of students’ comprehension of curricula and lack of participation in the classroom in traditional teaching and the effect of using interactive whiteboard (IWB) technology in increasing comprehension and increase classroom participation. This chapter is intended to review the literature on this topic and to see the findings of previous researches on this subject.

Many studies investigated using interactive whiteboards in the classroom and its impact on the teaching and learning process. (Essig, 2008, p. 23). Several studies have examined the role played by IWBS in schools worldwide (Aytac, 2013; Bakadam & Asiri, 2012; Beeland, 2002; Biro, 2011; DiGregorio & Sobel-Lojeski, 2010; Hennessy, 2011; Lisenbee, 2009; Isman, Abanmy, Hussein, & Higgins, 2006; Yanez & Coyle, 2011). These studies have concentrated on different sides of the technology in educational settings including the effect of interactive whiteboards on attitudes, pedagogical benefits, and technical issues related to the incorporation of IWB in classrooms pedagogy, motivation, interaction, perception, learning, and achievement.

For example, in a study conducted by Morgan (2008), the examined the impact of interactive whiteboard use on student engagement and appropriate at-task behaviors of junior high school students. Results indicated that use of the interactive whiteboard as an instructional tool has a beneficial effect on student engagement in classroom lessons and leads to improved student behavior. In other a study conducted by Gashan and Alshumaimeri (2015), investigated the attitudes and insights of Saudi female teachers regarding the use of IWBS when teaching English as a foreign language (EFL). It also investigated possible obstacles they may face during their
use of this novel technology. The results indicated that participations in this study demonstrated positive attitudes toward using the IWB in the EFL classrooms. The results also showed that teachers consider IWBs to be useful devices for enhancing the teaching and learning process and for designing new instructional situations.

IWB-based lessons were perceived to be more comfortable for teachers in teaching English. These effects are related to contextual factors such as teacher training, teacher confidence, school culture, technical support, lesson preparation and practice time. These factors will support the classroom learning environment, increase the student motivation, student learning, and achievement (Digregorio & Sobel-Lojeski 2009, Wallace, 2007; Turel, & Johnson, 2012; Sweeney, 2013). Turel and Johnson examine the actual usage and behaviors associated with promising IWB features in practical settings. The main goal of this study was to evaluate both teachers’ perceptions and their use of IWBs. The results showed that teachers believe that IWBs can be used for different subject domains.

For the usability theme, teachers were asked to indicate whether IWBs can be used in different contexts and ways. It is evident that teachers’ perceptions regarding to usability of IWBs in any kind of course and course content are positive (Q24) (M = 3.90, SD = 1.080). Three quarters of the teachers agreed that IWBs can be used with various instructional methods and techniques (Q26) (M = 3.95, SD = .830). These findings suggest that IWBs are not tied to a specific context. Teachers who participated in this study have positive attitudes about the usefulness and usability of IWBs. These attitudes are essential indicators in terms of the acceptance and the prediction of effective use of this technology. (p. 391)
Also, teachers believe that IWBs can be used to facilitate learning and instruction under the following conditions: 1) collaboration with colleagues, 2) training about effective instructional strategies using IWB, and 3) more frequent teacher use of IWBs to improve IWB competency. According to Turel and Johnson, if we are to expect students to improve their learning in the classroom, teachers should be able to design a social constructivist environment where students are involved in the active and collaborative learning process using IWBs and developing their technical skills and their positive attitudes through continued collaborative training and practice. (p. 392)

In a study conducted by Bakadama and Asiri (2012), the researcher examined the views of teachers of intermediate school on the use of IWB as an instructional tool in the classrooms. A questionnaire was distributed to 50 teachers and three teachers were interviewed at Prince Sultan Intermediate School in order to determine their views on the use of the IWB. Findings revealed that most teachers believe that IWBs constitute an effective and convenient way to deliver the learning content and that it increases the level of classroom interaction which in turn increases the learning experience.

It can be asserted that the IWB constitutes an effective instructional tool that has the power to engage and motivate students in the learning process. Because engagement in the lesson is an essential component for student achievement, the IWB can help improve the academic performance of learners and their behavior in class. It can be used to elicit more productive responses to classroom instruction and to stimulate active participation in class. The IWB also encourages the involvement of those students who are normally reticent and reluctant to actively participate in the group’s learning process (p. 184-185)
According to the result of the study, the majority of teachers use the IWB as an overhead projector and for Internet research but do not make use of the many other advantageous features of the IWB. Based on the fact that the teachers’ reluctance to utilize all of the available IWB features stems from their limited knowledge of all that IWB technology has to offer, the authors recommended that teachers using the IWB in class undergo more training so that they can become fully aware of how to optimize its use. There is a big gap between teachers’ practice and pedagogical framework of the Smart Board. They use teacher-centered approach and Presentation Practice Production (PPP) format of the lesson with Smartboard (Al-Faki & Khamis, 2014, p.153). They also suggested that the number of students in the classroom is reduced to allow for more interactive learning.

There are some investigations that focused on the theory of educational reform and the new digital generation. For example, the theorist of reform pedagogy especially John Dewey and Edouard Claparède developed the process of inductive pedagogy. The main idea of this process is that the student discovers knowledge independently by doing experiments and researches and drawing the consequences. Inductive learning can be enhanced by home assignments, tests and projects since most of the students have got a computer and internet connection. By assigning tasks to be made with the use of a computer at home, we can improve students’ creativity as well. The reform pedagogical movements began at the turn of the 19th and 20th centuries. In this approach, the children are not only passive recipients of information but they are active people interacting with their environment who develop as result of this interaction. The reform pedagogical approaches created the idea of the active independent child (Biró, 2011). Biró mentioned that the spread of IWB in Hungary has made students more curious, interested and motivated. Students’ ideas about the interactive whiteboard are basically positive, they like using
it, discovering the opportunities it provides, it motivates them, and it has a great influence on their interests (p. 38).

The new digital generation claims reform and besides the traditional education, they need digital material, extra knowledge since it is much easier to access extra information in connection with a particular curriculum. In this study, the researcher presented the opinion of 618 students in connection with the new device. The results concluded that students’ ideas about the interactive whiteboard were positive.

Students sum up the most important advantages of the IWB very well. Based on their positive reactions they appreciate the new equipment since it makes the lessons more interesting, more enjoyable, more fun and easier to understand the material. Students are more motivated and more interested in the material which suggests that they will deal with it at home, they will search for information on the internet, the internet helps them to enjoy the process of learning as they are keen on digital form and it does not seem to be dry, they feel that learning is fun for them. (p. 35)

The digital generation would like to study using digital devices. Also, it is the teacher’s responsibility to learn how to use these ICT devices and use them to students’ advantage because the most important aim in the new interactive learning environment is to keep up students’ attention and help them understand the material making the material interesting and exciting for them.

There are some studies that have investigated the difficulties and problems teachers face when using technology in teaching (Al-Faki & Khamis, 2014; Aytac, 2013; Gashan & Alshumaimeri, 2015) Al-Faki and Khamis, for example, investigated the difficulties that teachers experience when they use the IWB in English language classes. This study focused on the
difficulties that teachers face in the classrooms in the Saudi contexts. Those difficulties were
categorized into four groups: teachers, school administrations, technical supports and students.
Each factor entailed a number of challenges. The findings of the study revealed that there are
many challenges that teachers face when using the interactive whiteboard such as teachers’ lack
of computer competency, insufficient ongoing technical support and the gap in knowledge and
ability between teachers and students.

Jeddah Schools’ English language teachers face challenges when they use Interactive
Whiteboard (IWB) in English language classes. These challenges are due to many
reasons. Those reasons are teachers’ lack of computer competency, the breakdown in the
common understanding of the schools’ goals among those who hold the decision-making
power, ongoing technical support is insufficient and the learners are more familiar with
technology than their teachers are. Techno-savvy learners might be a challenge to
teachers, who are incompetent users of the computer. Those challenges interact to hinder
IWB integration into teaching and learning English language. (p. 153)

The study recommended that teachers need continuing pedagogical support, technical support
and training programs. “The schools’ administration should have a clear vision concerning the
smart board, providing materials and resources. The number of the team of technicians should be
increased. Moreover, teachers should be aware of digital learners’ needs” (p. 153). In a study by
Al-Rabaani (2008), the researcher aimed at examining the knowledge, skills and attitudes of
Omani social studies teachers to the use of computers in instruction. The sample consisted of 622
teachers from four regions and four stages. Data was collected by using a questionnaire. The
results showed that social studies teachers lack computer skills but had positive attitudes towards
their application in teaching. “The results show that the social studies teachers hold high positive
attitudes towards using computers in teaching. This result is encouraging because most of them did not have computer training” (p. 24-25). The study also showed that these teachers depended on themselves in developing their computer skills. Findings revealed differences in teachers’ computer skills and attitudes towards using computers according to the region and stage they teach, but there were no differences according to gender. Results also showed that half of social studies teachers did not know any websites of Social Studies Centers or journals in either English or Arabic.

Around half of the teachers benefit from the internet in updating and expanding of data in social studies textbooks and in classroom activities. This result reveals a gape in the application of information technology in our schools. This result could be due to the weakness of social studies teachers command of the English language as a possible reason for not been using in English websites. It could be also due to the limited number of Arabic professional websites in education and particularly in social studies. (p. 27)

The study also found that these teachers do not benefit from the information provided by internet search engines because of their lack of skills in using search engines. The study recommended developing teachers' computer skills and knowledge about journals and centers' websites, to benefit from them in teaching.

According to Jang (2010), many studies related to the use of interactive whiteboards (IWBs) in educational settings have shown that IWB technology can result in enhanced presentations and in the development of student motivation and student performance. However, the relationship between the use of IWBs and Technological Pedagogical Content and Knowledge (TPACK) by teachers is yet to be fully investigated and understood. The purpose of Jang’s study was to integrate IWB technology and peer coaching to develop the TPACK of
secondary science teachers in real classrooms. An IWB-based peer coaching model was
developed. Participants of this study included four in-service science teachers. The sources of
data included written assignments, reflective journals and interviews. The results displayed three
major findings. First, science teachers used IWBs as instructional tools to share their subject-
matter knowledge and to express students’ understanding. Second, the IWBs helped the science
teachers who encountered teaching difficulties in the traditional classroom better implement their
representational repertoires and instructional strategies. Finally, the proposed model of
integrating IWBs and peer coaching can develop the TPACK of science teachers. According to
Jang,

Technological Pedagogical and Content Knowledge (TPACK) represents a new direction
in understanding the complex interactions among content, pedagogy and technology that
can result in successful integration of technology in the classroom. TPACK is an
extension of PCK and is primarily achieved when a teacher knows how technological
tools can transform pedagogical strategies and content representations for teaching
specific topics. (p. 1752)

In a study conducted by Lai (2010), the author explored secondary school teachers’ perceptions
of interactive whiteboard (IWB) training workshops in Taiwan and identified potential problems
associated with the design of IWB training workshops in order to improve their effectiveness.
This research employed observations and interviews to collect research data. Observations were
made at the training sites, and interviews were conducted with six secondary school teachers
from two junior high schools located in central Taiwan. The results of this research showed that
the teachers, in general, recognized the necessity of attending IWB training workshops, as an
emerging trend has shown that IWBs will soon be an essential ICT tool in classrooms.
The research data revealed that all the teachers valued the importance of training workshops although a few teachers hesitated to participate at the beginning. Prior to the initial workshop, most teachers had not had any chance to use IWB. Attending IWB training enabled teachers to know how to operate IWB and gave them opportunities to think about the potentials of applying IWB in increasing interactions in their classrooms.

(p. 516)

The training workshops provided opportunities for teachers to physically interact with IWB hardware and software, and to consider the pedagogical aspects of IWB use. Slay and Hodgkinson-Williams (2008) argued that changing pedagogical understanding and practices is vital to making optimal use of the promising interactive technology tool. Training workshops served as a medium to help teachers to gain skills and confidence with the IWB technology that might boost their independent and self-directed learning nature, according to adult learning theory. Being self-directing can furthermore help teachers to engage in diagnosing their learning needs, planning their learning process, and evaluating their learning outcomes while learning ICT tools. The authors commented:

There is a need for teachers to be ICT literate, i.e. be able to use application software and the operating system as well as be able to connect a computer to a data projector before engaging with additional ICT equipment and its associated software such as the eBeam. Moreover, it is clear that completing ICT courses is insufficient unless the teachers continue to practice the skills acquired. Expecting teachers to be able to use the eBeam without sufficient basic computer literacy skills is counterproductive and suggests that using the eBeam to “leap-frog” the use of ICTs in the classroom is questionable.

(p.1333)
In conclusion, these studies indicate that teachers and students have positive attitudes towards the use of interactive whiteboards (IWB) in the classroom. Also, there are educational claims to improve teaching methods by integrating technology by using modern technologies such as IWB and to benefit from its advantages and benefits in the field of education. Despite the good results reached by many research papers around this subject. However, there are some obstacles and difficulties which makes many teachers reluctant to use technology, especially interactive whiteboard technology. But overall, most research has shown the importance of this technique in increasing students' comprehension of curricula, increasing their classroom participation, further improving positive behavior and help in the interaction between teachers, students, and students among them. In addition to its active role in the participation of students in the educational process. As a result of changes and in identifying of best practices in teaching and also the urgent need to improve teaching methods and develop them in the Saudi context. The researcher wanted to conduct her study on the latest technology introduced recently in the field of education in Saudi Arabia in order to be sure the effectiveness of using interactive whiteboard technology to assist social studies teachers to increase the comprehension of students and increase classroom participation. In addition, there are a few studies that investigated about the attitudes and perspectives of Saudi female students about the use of the IWB technology in the classroom. The deficiency in the literature is a matter that this study was designed to address, especially with the current directions of the Ministry of Education and the launch of the digital transformation project in a number of schools in the Kingdom of Saudi Arabia.

Therefore, the investigator in this study proposes to investigate the effectiveness of using the IWB to assist social studies teachers in Saudi Arabia in order to increase the comprehension of students to the curriculum and increase classroom participation in middle
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schools in the Kingdom of Saudi Arabia. The way to measure increasing students' comprehension and participation is through direct observation of two groups. I will also distribute a questionnaire to investigate students' opinions and attitudes towards the using the IWB in the classroom. The primary research question is: Does using the interactive whiteboard assist social studies teachers in increasing the comprehension of students and increasing classroom participation of middle schools in Saudi Arabia? The next chapter will describe how the study was conducted, the participants, setting and a description of the data collection and analysis procedures.
Chapter Three – Methodology

Introduction

In the previous chapter, I reviewed the literature concerning the effect of using the interactive whiteboard in the classrooms in several aspects. I based my review of the literature on quantitative research, qualitative research and mixed research relevant to my research topic to know the effect of the use of interactive whiteboard (IWB) in the classrooms and its role in increasing classroom participation and improving behavior. In addition, this review helped me to identify the opinions and attitudes of teachers and students towards modern technology. Finally, I explored the problems teachers face and the most important skills that teachers need when using this technique in the classrooms. In this chapter, I will discuss the methods and procedures used in the research and the ways in which the data were collected and analyzed by the ratios and tables.

The educational process is not limited to educational content alone but is also interested in searching for the best ways and methods to communicate information to learners easily. Technology is the tool that teachers can use to help students understand lessons. Technology has become a big feature in our contemporary life, especially in the educational system. The use of technology has great significance in the development of the educational process in schools. The importance of using electronic technology in classrooms has been confirmed in a number of studies (Levy, Blin, Siskin & Takeuchi, 2010; Levy and Stockwell, 2006), while others have documented the effects of IWBs as an educational tool and the role of it in increasing interaction between teachers and students and increasing the level of students' understanding and comprehension (Armstrong, Barnes, Sutherland, Curran, Mills & Thompson, 2005; Beeland, 2002; Morgan, 2008; Sad & Özhan, 2012; Schwimmer & Gutman, 2011). According to Aytac
(2013), the IWB increases the interaction between the students and their teachers and it increases the pace during courses. Ultimately, technology will contribute to the progress and academic success of students. Research has shown that using computers has a positive effect on students’ achievement compared with traditional methods (Christensen & Knezek, 2001; Lewis 1995; Sterling and Gray, 1991). The use of IWB as an instructional tool has a beneficial effect on student engagement in classroom lessons and led to improved student behavior. Teachers and students believe that IWB had a high impact on revitalizing the classroom (Manny-Ikan, Zorman & Dagan, 2011; Xu and Moloney, 2011; Yanez and Coyle, 2011). In the research, using an IWB led to a faster pace of instruction. Using IWBs led to increased student engagement, primarily because of the visual aspects of the interactive whiteboards. IWB manufacturers have documented the positive themes of student engagement, motivation, and appeal to student with different learning styles (European Schoolnet, 2006; Marzano and Haystead, 2009; Winzenried, Dalgarno & Tinkler, 2010). My research aims to help teachers develop teaching methods, increase student participation, and improve overall student educational performance. Assisting in the delivery of the content to students using technology such as PowerPoint presentations, the IWB video tutorial, or other educational sites, will have a significant impact in helping student comprehension. The overall goal of this study is to investigate the effectiveness of using the IWB to assist social studies teachers in Saudi Arabia to increase the comprehension of students to the curriculum and increase classroom participation in middle schools in the Kingdom of Saudi Arabia.

**Research Frameworks**

As we know, E-learning has many faces in classrooms; the IWB is one of many equipments of e-learning. As Odeh (2014) stated: “It is necessary to invest this technology in our
Does using the interactive whiteboard assist educational institutions in order to improve the educational process and knowledge sharing to build a generation capable of meeting challenges with a stock of scientific knowledge” (p. 1). Therefore, the relationship between use of interactive whiteboard in teaching and increase students' comprehension and participation in classroom requires a research plan that fits with quantitative methods. The research interests identified in the introduction section call for a project design based firmly on the foundational principles of quantitative research. As Williams (2011) has defined it:

Quantitative research emerged around 1250 A.D. and was driven by investigators with the need to quantify data. Since then quantitative research has dominated the western cultural as the research method to create meaning and new knowledge. What constitutes a quantitative research method involves a numeric or statistical approach to research design. (p. 66)

Demetrius & Bryan (2012) further described:

Quantitative studies provide data that can be expressed in numbers—thus, their name. Because the data is in a numeric form, we can apply statistical tests in making statements about the data. Statistical analysis lets us derive important facts from research data, including preference trends, differences between groups, and demographics. (p. 2)

Quantitative researches depend on explanations and predictions that can generate from individuals or places. These explanations and predictions contribute to establish, confirm, or validate relationships and to develop generalizations about the theories. Creswell (2003) stated that, quantitative research “employ strategies of inquiry such as experimental and surveys and collect data on predetermined instruments that yield statistical data” (p. 18). The findings from quantitative research can be predictive, explanatory, and confirming. As Johnson &
Onwuegbuzie (2004) stated: “Researchers should plan to develop a design that answers their own research questions within the constraints and boundaries of the study context” (p. 20). Quantitative research involves the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute “alternate knowledge claims” (Creswell, p. 153). According to quantitative research methodologists, experimental research is the only type of research in which hypotheses concerning cause-and-effect relationships can be validly tested. As such, proponents of experimental research believe that this design represents the apex of research (Onwuegbuzie, 2000, p. 6). Campbell and Stanley (1963) endorsed the true experimental design, which provides a higher degree of control in the experiment and produces a higher degree of validity. The true experimental designs result in a systemic approach to quantitative data collection involving mathematical models in the analyses. The experimental approach, as indicated by Esawi (1997), represents the pillar upon which scientific knowledge is built, and that this knowledge is characterized of certainty is due to experimentation and observation. Williams noted:

In the observational study method, the researcher observes a particular aspect of human behavior with as much objectivity as possible and records the data. This research method may provide an alternative to various qualitative research methods. In the survey research method, the researcher tends to capture phenomena at the moment. This method is used for sampling data from respondents that are representative of a population and uses a closed ended instrument or open-ended items. A survey research is one of the ways to gather data in the social sciences. (p. 67).

Quantitative researchers seek to measure the problem and understand its impact on research through measurable results which are objectively interpreted in order to debrief the required
information from the target audience. This approach helps researchers to obtain numerical data from a large number of population. For this reason, I decided to go with the quantitative approach because it will serve me in the investigation about the hypothesis by using the most common data collection tools in quantitative researches (observations, surveys).

**Research Setting and Participants**

This study was conducted in an urban middle school in Western Saudi Arabia during the spring semester of 2018. The 33-middle school is a medium-sized school and it is one of the best public schools in the city of Jeddah. The researcher justified choosing this school because it was suggested by the Ministry of Education of Saudi Arabia for the existence of IWB technology; it is also one of the schools that applies the Ministry of Education curriculum. It was established in 1985 and is located in the north of Jeddah. The school has three grades: first, second, and third for middle school students. All of the students are girls. The school is public with modern, big building. There are 572 students in school, 272 (47.5%) students of Saudi citizenship and 300 (52.4%) students from other nationalities and there are approximately 40 teachers, all of who are experienced and of Saudi nationality. The research was carried out on the 8th-grade. The number of 8th-grade students was about 205 female students and consisted of 6 rows. One row was randomly selected in order to teach the curriculum of social and national studies. The number of female students was 32 students, all aged 14 years. The study took place in 6 classes. I described the study to the students during the first class and I got both student assent and informed consent from their parents/guardians before the study began (see Appendix A & B). The classroom teacher was approached initially by the primary investigator to determine if she was experiencing any technical problems or educational challenges when using the technique in social studies classes. The researcher observed in five classes with a classroom teacher and some teachers
before starting the study to ascertain the ways that teachers use technology and consider problems the problems that teachers face when using technology. The participants in this study were 8th grade students from the 33-middle school in Jeddah, Saudi Arabia. The students were 14 years old. The identities of the participants were not known, so the ethnic background of these individuals could have been any of the following that made up the school’s population: Saudi citizens and residents students from various nationalities. This study’s sample consisted of 30 female students all the aged of 14. The students were assigned at random with n=15 students in the experimental group in order to study the material by using interactive whiteboard technology and n=15 students in the control group in order to study the material in the traditional way.

**Sampling Procedures**

The school I used for my research project has four social and national studies teachers for all middle school grades. There were two female teachers to teach the 8th grade: one of them has 28 years of experience and the other teacher has 7 years of experience in the education field. The researcher conducted her research with the teacher's classes who has 28 years of experience because she was a collaborator and welcomed the research study into two of her classes and also because one of her classes had fewer students less than did the other classes. The classes of another teacher had technical problems, as she mentioned to the researcher. In the beginning, the research was conducted in two different classes, with one class (the experimental group) using IWB technology and the other class (the control group) using traditional teaching. Three lessons were taught for each class, but, because of the high number of female students, there were about 36 students in one of the classes. This meant that the researcher could not write the data in the participation rubric. So, the researcher decided to do her research in one class with 32 students, in which she randomly selected n=15 students in the experimental group to study the material by
using the IWB technology and n=15 students in the control group to study the same material in the traditional way. The researcher conducted her research at the school over the course of one month.

**Quantitative Data Collection**

Because this study was based on participants from the category of the schools’ students, the researcher needed to obtain approval from the Ministry of Education in Saudi Arabia in order to conduct her research in one of their schools. Also, the researcher obtained approval from the school director in order to carry out the study in her school. The researcher started her data collection on the first day of the second semester of 2018 on Sunday, January 21, 2018. She met the students in their classes and explained the idea of her research and asked them if they wanted to participate. I told participants that it is voluntary for them to participate in this study and that they could stop at any time and it would not affect their progress in school. The researcher distributed student's assent and parents’ informed consent to students who wanted to participate. The researcher asked students to hand them to their parents, sign them and bring them during the week. The researcher received them from students before the study began. In this study, the researcher wanted to obtain numerical data using quantitative techniques. This was done through the observation tool (participation rubric) chosen by the researcher to collect numerical data from the participants in order to investigate the impact of using the IWB on students’ comprehension and participation. The experimental study was chosen because it is a good method, the researcher can see through it whether the new treatment more effective than the usual or conventional method. It also makes it easier for the researcher to determine whether one of the methods is more effective than others. DeWalt and DeWalt (2002) believe that “the goal for design of research using participant observation as a method is to develop a holistic understanding of the
phenomena under study that is as objective and accurate as possible given the limitations of the method” (p. 92). They suggested that participant observation be used as a way to increase the validity of the study, as observations may help the researcher to have a better understanding of the context and phenomenon under study. Validity is stronger with the use of additional strategies used with observation, such as interviewing, document analysis, or surveys, questionnaires, or other more quantitative methods. Participant observation can be used in order to help answer descriptive research questions, to build theory, or to generate or test hypotheses. The participation rubric contained four elements, these elements have enabled the researcher to analyze the main research question in order to produce accurate results.

The study took place in 6 classes during the 2nd and 3rd week of the second semester period of the school year 2018. At 29 & 31 of the month of January and 1, 5, 7 & 8 of the month of February of 2018. The students received instruction on the work plan before the study began, while the control group did not receive instruction about the work plan. The control group received instruction using the traditional lecture method and using worksheets. The researcher prepared lesson plans and determine educational goals and learning activities. The textbook that the researcher used is Social and National Studies, published by Ministry of Education, Kingdom of Saudi Arabia. Lessons have been prepared through the units of the book. The researcher prepared lessons, activities and other resources using the IWB for the experimental group only, while the control group received more traditional lecture/discussion teaching methods. She assigned the 30 students randomly to two groups of n=15 students each. Each group received instruction separately with different teaching methods and tools of instruction. The research plan required that I teach only 15 students for the experimental group and 15 students for the control group but the school system did not allow the division of the row or the use of alternative
treatments such as teaching in the library or sources room, which forced the researcher to teach the whole row. This made it difficult for the researcher to collect data accurately. So, the researcher decided to conduct her study in one classroom and divide the row into 30 students, with \( n = 15 \) for the experimental group and 15 for the control group and give each group three lesson from the curriculum to obtain data. The experimental group was taught Lesson 1, Lesson 4, and Lesson 6 using the IWB; the control group was taught Lesson 2, Lesson 3 and Lesson 5 using the traditional method. The period of the experimental study was two weeks at the rate of 3 classes for the first week and 3 classes for the second week. The data was collected by using the Participant Rubric, which contains 4 aspects (students' focus and their comprehension for different lessons, student participation in answering questions, engaging in class activities, and review lessons) (see Appendix C). For the experimental group, the researcher divided the instructional time into three parts: first, a 25-minute segment, during which she displayed the lesson through the PowerPoint. Then, a 15--minute segment, during which the researcher displayed activities through the IWB in order to develop their thinking, encourage them to research and learn by encouraging students on cooperative learning because the learning from peers helps to learn faster than other methods. Finally, during the last 5 minutes, I engaged students in a quick review of the content that was studied during the class.

*Description of class 1 & 2*

All of the lessons that were used in the study were prepared through a book of Social and National Studies prepared by the Ministry of Education in the Kingdom of Saudi Arabia – Second semester – student book and activity book. Before the start of the study, there was a communication between the researcher and classroom teacher and they arranged the lessons for both groups based on the grade teacher plan. The first lesson was given to the experimental
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group and the second lesson was given to the control group. Then I made a comparison of the results between the two groups.

The first lesson for the experimental group was about the Natural manifestations of the Gulf Cooperation Council (GCC) countries included some topics such as geographical location, the areas of GCC, the identify of the number of the GCC countries, the surface manifestations of the GCC countries, climate and plants, and finally the factors affecting the climates of the GCC countries. The researcher used an IWB to present the lesson by using a PowerPoint presentation, pictures, voices and applause, an alarm clock, activities through the IWB, reading some sources related to the lesson through the IWB, writing on the board and the work of groups to exchange information among students and to encourage collaborative work within the classroom.

For the experimental group, the researcher arranged the seating of the students on the left side of the class and this arrangement helped her to observe the group more effectively because the class contained 32 students and the school system did not allow the researcher to teach only the experimental group. Therefore, the researcher decided to move to an alternative solution. The solution was to explain the lesson to the whole class with a focus on the observations of 15 students in the experimental group. Throughout the quota, the researcher worked to activate the role of the students by asking questions and engaging students in activities in order to encourage students’ thinking and discussion with the classmates, writing on an IWB, and encouraging them to show their opinions and not to feel afraid that the answer was true or false. Because the researcher’s plan was to make them active participants in the educational process. The researcher worked with transparency and clarity when explaining the lesson and she chose methods of teaching that were easy and interesting for the students. The researcher divided the instructional time into three parts: first, a 25-minute segment, during which she displayed the lesson through
the PowerPoint and some questions around the lesson. Then, a 15-minute segment, during which
the researcher displayed activities through the IWB in order to develop their thinking and to
encourage them to research and learn. The researcher presented two activities by means of an
IWB.

The first activity focused on individual work and the other activity focused on
cooperaive work. The duration of the second assignment was 10 minutes. The researcher used
some of the features of an IWB such as an alarm clock and sounds in order to remind students of
the time limit. After the end of the allotted time, the researcher asked members of each group to
choose two members of the group to write their answers on the IWB in order to share them with
their classmates. Before the end of the quota, the researcher did a quick 5-minute review in
order to ensure that the students absorbed the information provided to them through the IWB.

The second lesson was given to the control group, which was about the human
manifestations of the GCC countries, including such topics as the definition of the population,
the areas in which the population lives, a comparison between the GCC countries in the past and
present, population statistics of the GCC countries over a number of years, the reasons for
increasing the population growth of the GCC countries, and other common characteristics. The
researcher used a number of teaching methods with a control group, such as writing the lesson
summary on the IWB, reading the lesson through the textbook, and using cards to read
information relevant to the lesson.

In addition to the paper activities and activities of the book, the researcher used a division
of students into groups in order to promote cooperative work. The researcher arranged the
students of the control group beforehand and made them sit on the left side of the classroom so
that she could better observe them.
Description of class 3 & 4

The researcher taught the control group the third lesson. It was about the economic activity of the GCC countries such as the most important economic resources for the GCC States, agriculture and livestock, and fishing. The researcher used the same techniques and materials that she had used in the second lesson, such as writing the lesson summary on the IWB, reading the lesson through the textbook, and using cards to read information relevant to the lesson. In addition to the paper activities and activities of the book, the researcher used the division of students into groups in order to promote cooperative work. The researcher worked on the same steps. In contrast, the experimental group was taught the fourth lesson. It was about oil and its importance to the GCC countries, mineral wealth, the factors that helped to the industry to flourish, and the most important industries existing in the GCC countries. The researcher used the same techniques and materials that she had used in the first lesson, such as presenting the lesson by using PowerPoint presentations, pictures, voices and applause, an alarm clock feature, activities through an IWB, reading some sources related to the lesson through IWB, and writing on the board and the work of groups to exchange information among students and encourage collaborative work within the classroom. The researcher worked with transparency and clarity when explaining the lesson and she chose methods of teaching that were easy and interesting for the students.

The results from Lessons 3 and 4 showed that teaching through the IWB has a stronger effect on students’ concentration and understanding of the lesson as compared with the traditional teaching methods. This is illustrated by the participation rubric model (see Table 2, p. 40). We can clearly see the positive effect of using IWB on the results of learning on the experimental group.
Description of class 5 & 6

The last lesson for the control group was the establishment of the GCC and included several topics such as the reasons for the establishment of the Council, the components of the organs of the Council, and the objectives and policies of the Council. The researcher used the same methods and materials used in previous lessons. While the last lesson for the experimental group centered on the achievements of the Council such as political achievements, military and security achievements, economic achievements, and other achievements linked to the GCC countries. In addition, she prepared some pictures for the achievements of the Council and a video on the achievements was supposed to be presented to students but because of the problem in the computer, the researcher could not open the file.

For a research project, my other goal was to collect quantitative data by identifying the opinions and attitudes of female students about the use of IWB technology in the subject of social and national studies for Saudi schools. The researcher designed a Likert-style survey to investigate students' opinions and attitudes towards the using the IWB in the classroom after reviewing previous studies and research that used the Likert-type scale. (see Appendix D) The questions were created by researching other studies with similar interests. The instrument was checked by the faculty sponsor and supervisor of the research, Dr. Robert L. Dahlgren, Ph.D. A survey instrument was chosen in order to collect facts about the phenomenon and analyze them to reach generalizations. The researcher identified three aspects of the effectiveness of using the IWB in the classroom: first, the attitudes of students towards using IWBS and the impact on for learning outcomes, the effect of using the interactive whiteboard on classroom participation and positive classroom interactions; and finally, the effect of using the IWB on learning and acquire skills. Hard copy questionnaires were distributed for one school in Jeddah/ Saudi Arabia by
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hand. Hard copy questionnaires were chosen as a way to be respectful of any participants that might be unfamiliar with online surveys or students might not have Internet access at home. The questionnaires were distributed among five classes of the 8th grade, with an n=of about 205 students. The questionnaire was distributed with the student assent form and parent informed consent form. Participants completed student assent forms and parents completed informed consent forms in order for their children participate in the study. The researcher received 100 questionnaires. At the end of the study, the questionnaire was distributed to the experimental group of 15 students in order to explore their attitudes about using the technology in the classrooms. (The total of the received questionnaires were 100). There were 21 questions written in a simple and understandable way; participants had to read the questions and determine the approval score by marking (✓) for one of the five options, “strongly agree” (1), “agree” (2), “are undecided” (3), “disagree” (4), or “strongly disagree” (5). The researcher chose number 1 to refer to strong agreement with the statement, while number 5 to refer to a strong disagreement with the statement regarding the use of the IWB in the classroom. Participants had a one week to complete and return the questionnaire.

Quantitative Data Analysis

The researcher analyzed the results of her research question using direct observation. The way to measure increasing students’ comprehension and participation was through direct observation. She observed students in 6 classes to in order see whether using the IWB would increase students’ understanding of the curriculum of Social and National Studies and thus, would increase classroom participation, and to see whether using IWB would help to facilitate the process of teaching and learning. Also, to see whether the IWB would encourage interaction between teacher and students through stimulating dialogue and discussion while presenting the
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lesson, attracting students’ attention and making focus throughout the period of a quota. To make my observations more accurate, I used a participation rubric in order to record my notes inside the class and to focus on the following points: students' focus and their comprehension for different lessons, student participation in answering questions, engaging in class activities, and reviewing lessons. The researcher will discuss the results of this inquiry in the next chapter.

Also, the researcher analyzed the results of her research question using surveys. The researcher designed a Likert-style survey in order to investigate students' opinions and attitudes towards the use of the IWB in the classroom. The researcher identified three aspects of the effectiveness of using the IWB in the classroom: first, the attitudes of students towards using IWBs and the impact on for learning outcomes, the effect of using the IWB on classroom participation and positive classroom interactions; and finally, the effect of using the IWB on learning and acquire skills. The researcher was able to obtain 100 questionnaires. The questionnaires data were analyzed in the form of ratios and tables. Each table contained a number of questions on each aspect that the researcher wanted to investigate in order to identify students' opinions and attitudes towards of the use of the IWB in the classroom. The reliability was determined (0.871) by Cronbach’s Alpha test. The mean and standard deviation were determined via the use of the SPSS program. A comparison was made between the data of the two groups using statistical analysis. The researcher designed a graph to make it easier to clarify and understand the results more clearly. The researcher will discuss the findings that she got in the next chapter in findings section.

Alternative Approaches

At the beginning of the study design process, I encountered a range of alternative approaches that helped me to formulate the right approach for my study. For example, at the
beginning of the course, I decided to use qualitative research employing interviews with teachers to find out their perceptions and perspectives towards using of IWBs. But when reviewing the literature, I found that there is a lack of research that speaks of students’ perspectives and their attitudes from the use of IWBs in Saudi Arabia. After that, I decided to go with a mixed research but retreated from using this approach because I preferred to get numerical data to answer the research question. After thinking, I decided to turn to quantitative research through using the experimental study and using surveys to measure the attitudes and views of students from the use of IWBs in the classroom. I decided to use two data collection tools - observation and survey - in order to investigate whether the use of the interactive whiteboard will assist social studies teachers to increase the comprehension of students and increase classroom participation of middle schools in Saudi Arabia.

Conclusions

In general, the tools I used during this research helped me to conduct the study in a way that enabled me to make sure of the effectiveness of using the Interactive Whiteboard (IWB) on increasing the comprehension of students of the curriculum and its role in increasing classroom participation. The observations I have made during the period in which the study was conducted allowed me to know more about the advantages of modern technology in the classroom. Also, the observations helped me to identify the problems and challenges faced by teachers when using technology within the classrooms. This study allowed me to obtain the best effective strategies for teaching the subject of social and national studies through the use of IWB in education activities, encourage students to research and think about the information and engage students in collaborative work and make them active members and participants in the process of education rather than students receiving information only.
In the next chapter, I will discuss the results obtained in this research study. The data obtained from the observations will show whether the IWB has achieved the goal of this study and its role on increasing the comprehension of students and increasing the classroom participation that is the basis of the success of the educational process in the classrooms. The data collected from direct observation was tallied and counted to compare participation rates between the two classes. Mean of participation was calculated and compared. The range of participation rates was also examined. A test was done to confirm the results. The obtained data was translated into graphs and tables in order to provide a comprehensive and easy-to-understand presentation of the final results.
Chapter 4 – Results

The experimental study described in the last chapter was carried out on the students of a middle school in Saudi Arabia in order to verify the effects of interactive whiteboard (IWB) use on the dependent variable, the increase in students’ comprehension, as the main indicator of their increased classroom participation. The results were obtained through two data collection tools: first: The researcher relied on an observational checklist of classroom behaviors (i.e., a participation rubric) for the experimental group and the control group. The participation rubric contained four axes to represent the students’ focus and their comprehension for different lessons, student participation in answering questions, engaging in class activities, and reviewing lessons. These axes helped the researcher to analyze the research question. The researcher used an Excel program in order to analyze data. The data collected were analyzed using descriptive statistics. Additionally, data were collected through a survey instrument. The researcher used the pentagram Likert-type scale in order to identify students’ opinions and attitudes towards the using the IWB in the classroom (see Appendix D). The questionnaires were distributed to female students of the school. The number of 8th-grade students was 205 students. The questionnaires were distributed to only five rows, while, in the last row, the questionnaires were distributed to only 15 students from the experimental group. The control group did not receive the questionnaires. The survey included 21 questions, which identified three aspects: first, the attitudes of students towards using IWBs and the impact on learning outcomes; second, the effect of using an IWB on classroom participation and positive classroom interactions; and finally, the effect of using an IWB on learning and acquiring skills. The researcher used the Statistical Package for the Social Sciences (SPSS) software program to analyze the questionnaires in order to obtain the values (mean and standard deviation) in the three aspects.
In the following chapter, I will detail the results that were generated from the instruments used in my study in order to determine if the IWB contributed to increasing students’ comprehension on curriculum and the thus increasing the level of interaction and classroom participation as well as to explore the opinions and attitudes of study participants regarding the use of IWB technology in the classroom in Saudi schools.

Classroom Observation Data

In this study, the researcher relied on obtaining data through an observational checklist of classroom behaviors (see Appendix C). This was recorded by the researcher for the experimental group and the control group during the experimental period. The students were taught three lessons for the experimental group and three lessons for the control group (six lessons in total). The researcher wanted to test whether using the IWB would increase students’ understanding of the Saudi Arabian curriculum of Social and National Studies and thus, would increase classroom participation. Also, I wanted to see whether the IWB would encourage the interaction between teachers and students through stimulating dialogue and discussion while presenting the lesson, attracting students’ attention and increasing their focus throughout the class period. Classroom behaviors of both groups were observed using a participation rubric. The participation rubric was built based on the investigator’s questions as the four aspects detailed above facilitated the researcher's observation process and data analysis. The researcher observed the female students and recorded her observations of interactions and classroom participation throughout the experimental period for both the experimental group and the control group. The results of this observation rubric are discussed in the following section.

Lesson Observation Results

Lessons 1 and 2
The results from Lesson 1 showed a clear difference in the participation and interaction of the experimental group throughout the study period. This was illustrated by analyzing the observational data according to the percentages of the number of participants in each axis of the observation checklist. In Lesson 1, in the experimental group, 12 of the 15 students (80%) showed a high degree of focus and comprehension of various subjects as compared with the control group. 12 of the 15 students (80%) were involved in answering the questions posed by the researcher during the quota, 11 of the 15 students (73.3%) engaged in the classroom activities that the researcher presented through the IWB, and 13 of the 15 students (86.6%) interacted with the review and mentioned some of the key ideas of the lesson, as defined by the researcher's observational rubric (see Table 1). In Lesson 2, in the control group, 6 of the 15 students (40%) displayed a high degree of focus and comprehension of various subjects. For example, 6 of the 15 students (40%) were involved in answering the questions posed by the researcher during the quota, 9 of the 15 students (60%) engaged in the classroom activities, and 5 of the 15 students (33.3%) interacted with the review and mentioned some of the key ideas of the lesson. Table 1 indicates the participation rubric data results for the experimental and control groups in Lessons 1 and 2.

Table 1

Participation Rubric data results for Experimental and Control groups

<table>
<thead>
<tr>
<th>Classroom Action</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students’ focus and their comprehension for different lessons.</td>
<td>15 12 80%</td>
<td>15 6 40%</td>
</tr>
</tbody>
</table>
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In Lesson 3, in the control group, 7 of the 15 students (46.6%) indicated a high degree of focus and comprehension of various subjects. 8 of the 15 students (53.3%) were involved in answering the questions posed by the researcher during the quota, 10 of the 15 students (66.6%) engaged in the classroom activities, and 5 of the 15 students (33.3%) interacted with the review and mentioned some of the key ideas of the lesson, as defined by the researcher's observational rubric (see Appendix C). In Lesson 4, in the experimental group, 12 of the 15 students (80%) exhibited a high degree of focus and comprehension of various subjects. 9 of the 15 students (60%) were involved in answering the questions posed by the researcher during the quota, 13 of the 15 students (86.6%) engaged in the classroom activities that presented through the IWB, and 12 of the 15 students (80%) interacted with the review and mentioned some of the key ideas of the lesson. Table 2 displays the participation rubric data results for the experimental and control groups during Lesson 3-4.

Table 2

<table>
<thead>
<tr>
<th>Student participation in answering questions.</th>
<th>Control group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>12</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engaging in class activities.</th>
<th>Control group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>11</td>
<td>73.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Review lessons.</th>
<th>Control group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>13</td>
<td>86.6%</td>
</tr>
</tbody>
</table>

Lessons 3 and 4

Table 2

Participation Rubric data results for Experimental and Control groups

<table>
<thead>
<tr>
<th>Class 3 - 4</th>
<th>Control group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Action</td>
<td>N</td>
<td>Number of students of % students</td>
</tr>
</tbody>
</table>
Lessons 5 and 6

As we see in table 3, teaching by the IWB contributed significantly to the increased comprehension of students and their understanding of the lesson. 12 of 15 (80%) of the students in the experimental group showed a high level of comprehension, while, in the control group, only 5 of 15 (33%) students exhibited this high degree of comprehension. 10 of the 15 students (66.6%) in the experimental group were involved in answering the questions posed by the researcher during the quota, while only 5 of the 15 (33.3%) in the control group did so. For the experimental group, 15 students (100%) were actively engaged in the classroom activities, while only 9 of the 15 students (60%) in control group were actively engaged in the lessons. Finally, 12 of 15 (80%) in experimental group interacted with the review and mentioned some of the key ideas of the lesson in contrast to 7 of 15 (46.6%) in control group. Table 3 shows the participation rubric data results for the experimental and control groups during Lesson 5-6.

Table 3

Participation Rubric data results for Experimental and Control groups

<table>
<thead>
<tr>
<th>Students' focus and their comprehension for different lessons.</th>
<th>15</th>
<th>7</th>
<th>46.6%</th>
<th>15</th>
<th>12</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student participation in answering questions.</td>
<td>15</td>
<td>8</td>
<td>53.3%</td>
<td>15</td>
<td>9</td>
<td>60%</td>
</tr>
<tr>
<td>Engaging in class activities.</td>
<td>15</td>
<td>10</td>
<td>66.6%</td>
<td>15</td>
<td>13</td>
<td>86.6%</td>
</tr>
<tr>
<td>Review lessons.</td>
<td>15</td>
<td>5</td>
<td>33.3%</td>
<td>15</td>
<td>12</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 5 – 6</th>
<th>Control group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Action</td>
<td>N</td>
<td>Number of students</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Further Data

In addition to the results of the observations presented by the researcher in the three tables, the researcher concluded her study by preparing a test for both groups in the lessons that were taught. As with the observational protocol data above, the experimental group that received instruction through an IWB received a higher score on this assessment than did the control group. Students in the experimental group answered 7 questions of 10, while the students in the control group answered 5 of 10 questions. The results of the test supported the first item of observation checklist, which included student focus and comprehension of different lesson content. Figure 1 summarizes the results obtained from the checklist for the three lessons for both groups and analyzes them graphically.
Figure 1. Participation summary over 3 lessons

The above diagram gives us a more detailed picture about the results where we find that there is a clear difference between the experimental group and control group in all 4 items listed in the checklist for the three lessons. There was a significant difference between mean scores (6.00) of students' focus and their comprehension for different lessons and mean scores (3.67) of engaging in class activities, also there was another significant difference between mean scores (4.00) of answering questions and mean scores (6.67) of reviewing the lessons between the experimental and control group. (see Appendix E).

Survey Results

According to the participants’ responses, which were measured by the survey elements, there was a positive attitude towards the use of interactive whiteboard in the classroom. This is illustrated by the analysis of survey questions and the selection of participants for items referring to either “strongly agree” or “agree.” The item with the highest mean, which shows the neutrality of participants’ views regarding the statement of the use of IWB in the classroom was item 4,
“My teacher doesn’t use IWB effectively in lessons.” 34% (34 of 100) of participants were undecided regarding this statement. Findings also indicated a high score of responses of participants on item 3, which stated that, “Lessons become more enjoyable when IWB is used in the teaching-learning process.” 72% of the respondents strongly agreed with this statement. The results of all survey data are summarized in table (see Appendix F).

The attitudes of students towards using IWBs and the impact on for learning outcomes

A set of survey questions explored students’ opinions and attitudes towards the use of IWB in the classroom. The survey items that addressed this topic included the following: Item 3, 4, 6, 7, 9,10,12,13,14,16,18, and 21 (see Table 4 below).

Table 4

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3- Lessons become more enjoyable when IWB is used in the teaching-learning process</td>
<td>100</td>
<td>1.40</td>
<td>.73855</td>
</tr>
<tr>
<td>4- My teacher doesn’t use IWB effectively in lessons</td>
<td>100</td>
<td>3.51</td>
<td>1.15902</td>
</tr>
<tr>
<td>6- My teacher uses IWB in teaching activities and I benefit of them a lot</td>
<td>100</td>
<td>1.75</td>
<td>.96792</td>
</tr>
<tr>
<td>7- Using the IWB improves the students’ learning progress during class</td>
<td>100</td>
<td>1.59</td>
<td>.87727</td>
</tr>
<tr>
<td>9- The Students can understand the content well through the IWB</td>
<td>100</td>
<td>1.84</td>
<td>1.05141</td>
</tr>
<tr>
<td>10- I learn faster and easier when IWB is used in the classroom</td>
<td>100</td>
<td>1.88</td>
<td>.94580</td>
</tr>
</tbody>
</table>
12- My attention disperses in lessons because of the technical problems we have while using IWB calibration settings, sensitive problem, lack of pen tool etc.  
13- Using IWB in teaching-learning process - increases my academic performance  
14- Using IWB increases students' motivation to learn  
16- My teacher encourages me to write and solve the activities by using interactive whiteboard  
18- Using IWB doesn’t increase collaboration and communication with my friends in classroom  
21- Using IWB helps to build a good relationship between teacher and student

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage Agreeing</th>
<th>Mean Score</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>12- My attention disperses in lessons because of the technical</td>
<td>100</td>
<td>2.87</td>
<td>1.38283</td>
</tr>
<tr>
<td>problems we have while using IWB calibration settings, sensitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>problem, lack of pen tool etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13- Using IWB in teaching-learning process - increases my academic</td>
<td>100</td>
<td>1.93</td>
<td>1.05653</td>
</tr>
<tr>
<td>performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14- Using IWB increases students' motivation to learn</td>
<td>100</td>
<td>1.76</td>
<td>.95473</td>
</tr>
<tr>
<td>16- My teacher encourages me to write and solve the activities by</td>
<td>100</td>
<td>2.21</td>
<td>1.34311</td>
</tr>
<tr>
<td>using interactive whiteboard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18- Using IWB doesn’t increase collaboration and communication with</td>
<td>100</td>
<td>3.60</td>
<td>1.39262</td>
</tr>
<tr>
<td>my friends in classroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21- Using IWB helps to build a good relationship between teacher</td>
<td>100</td>
<td>2.02</td>
<td>1.24706</td>
</tr>
<tr>
<td>and student</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The item that received the highest percentage of agreement was “Lessons become more enjoyable when IWB is used in the teaching-learning process,” where 90% of the participants agreed with the statement and the mean score for this statement was 1.40. Another item showed that 62% of the participants strongly agreed that the IWB was a useful tool and that it improves the student learning progress during class. Item 10 showed that 45% of the participants strongly agreed that they learn faster and easier when an IWB is used in the classroom; this item had a mean response of 1.88. Additionally, Item 14 showed that 50% of the participants strongly agreed that using IWB increases their motivation to learn; this item had a mean response of 1.76. Most participants had different responses in some items. In Item 4, for example, approximately 34% were undecided and the item had a mean response of 3.51. Also, in Item 18, about 37% (37 of 100) strongly disagreed with this statement and the item had a mean response of 3.60.

**Effective of using the interactive whiteboard on classroom participation and positive classroom interactions**
In this aspect, a set of questions were included in order to explore the effectiveness of using the IWB on classroom participation and positive classroom interactions. The researcher created 5 survey questions for this aspect. The survey items that addressed this topic included the following: Item 1, 2, 5, 8, and 11 (see Table 5 below).

Table 5

The Participants’ Responses on Effective of Using the Interactive Whiteboard on Classroom Participation and Positive Classroom Interactions

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Using Interactive whiteboard facilitates my participation in class activities</td>
<td>100</td>
<td>1.63</td>
<td>.83672</td>
</tr>
<tr>
<td>2- Using Interactive Whiteboard improves my attitude towards participation.</td>
<td>100</td>
<td>1.85</td>
<td>.96792</td>
</tr>
<tr>
<td>5- Using the interactive whiteboard helps me understand the lessons</td>
<td>100</td>
<td>1.87</td>
<td>.99143</td>
</tr>
<tr>
<td>8- Using IWB increases the incidence of positive behavior and decreases negative behavior</td>
<td>100</td>
<td>2.03</td>
<td>1.07736</td>
</tr>
<tr>
<td>11- Using IWB provides a cooperative learning environment in the classroom</td>
<td>100</td>
<td>1.69</td>
<td>.93954</td>
</tr>
</tbody>
</table>

In this aspect, the item that received the highest percentage of agreement was “Using Interactive whiteboard facilitates my participation in class activities,” where 84% of the participants agreed with the statement and the mean score for this statement was 1.63. Furthermore, Item 8, “Using IWB increases the incidence of positive behavior and decreases negative behavior” showed the biggest difference in mean responses, with 41% (41 of 100) of
participants responding “Strongly Agree;” this item had a mean response of 2.03. The other items showed that the participants had positive responses when asked about their opinions on the effect of using the IWB on classroom participation and positive classroom interactions.

**The effect of using the IWB on learning and acquire skills**

In the last aspect, a set of questions were included in the survey in order to explore the effect of using IWB on learning and acquire skills. The researcher created 4 survey questions for this aspect. The survey items that addressed this topic included the following: Item 15, 17, 19, and 20 (see Table 6 below).

Table 6

*The Participants’ Responses on Effective of Using the IWB on Learning and Acquire Skills*

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>15- Using IWB contributes in acquisition of new skills for students</td>
<td>100</td>
<td>1.77</td>
<td>1.02351</td>
</tr>
<tr>
<td>17- Using IWB encourages to develop thinking processes and solve problems</td>
<td>100</td>
<td>1.92</td>
<td>1.09802</td>
</tr>
<tr>
<td>19- Using IWB make me express opinions, argue, debate, negotiate, and ask questions</td>
<td>100</td>
<td>2.21</td>
<td>1.18317</td>
</tr>
<tr>
<td>20- Using IWB gives self-confidence and improves communication skills</td>
<td>100</td>
<td>2.22</td>
<td>1.25191</td>
</tr>
</tbody>
</table>

Fifty-seven percent (57 of 100) indicated that they "Strongly Agree" with item 15, “Using IWB contributes to the acquisition of new skills for students” and had a mean response of 1.77. In item 17, 50% (50 of 100) strongly agreed with this statement “Using IWB encourages to develop thinking processes and solve problems” and had a mean response of 1.92. In item 19, “Using IWB make me express opinions, argue, debate, negotiate, and ask questions” 37% (37 of
100) strongly agreed with this statement and had a mean response of 2.21 while item 20 showed
the biggest difference in mean responses, however, as 41% (41 of 100) strongly agreed and had
a mean response of 2.22. The items showed that the participants had positive responses when
asked about their opinions about the effect of using the IWB on learning and acquire skills and
had the highest mean response in this aspect of 2.22.

Conclusions

The results of the data collected showed that the use of IWB led a significant improvement
in the academic performance of students which contributed to increase classroom interactions
compared to traditional teaching. It was found that the effective use of the interactive board
helped to motivate students and encourage them to participate and learn as well as the feeling of
pleasure and curiosity where IWB offers visual presentations that help to deliver content to
students in an interesting manner. Beside that the availability of many other IWB features such
as audio, image and digital media, which in turn contribute stimulating the focus process of the
students. The success of using interactive whiteboard technology in the classroom depends on
the teacher’s ability to employ it effectively as teachers who plan lessons that engage students in
learning are the most successful teachers because the effective use of this technology contributes
to achieving the desired objectives. In addition, the results of this data collected provided me
with an interesting insight into the views of participants toward the use of IWB in the classroom.
The results of this study are consistent with the results of previous studies that investigated on
the effectiveness of using IWBs in many areas such as motivations, behavior, interaction,
attitudes, challenges, problems, skills, learning environment and others the subjects.
In the next chapter, the researcher will discuss the relationship among the literature review and the results of this study, the limitations of the study, implications for further research and conclusions.
Chapter 5 – Discussion

Interactive Whiteboards (IWBs) are becoming more common in classrooms in Saudi Arabia. Also, in view of the growing interest of the Ministry of Education in Saudi Arabia regarding the integration of technology into education, the Ministry started a project to shift towards digital education, which has now been applied to three regions and will be applied to all regions in the Kingdom during the next two years. The Digital Transformation Project aims to take advantage of modern technology, keep abreast of evolution, and expanding teaching and learning processes within and beyond the classroom and school environments. This study is one of the studies that is looking at the field; the researcher thus wanted to explore whether the IWBs are efficient in the subject of Social and National Studies in middle schools in Saudi Arabia. By analyzing the observational checklist data and survey data collected during the study, I found that this investigation achieved its main goal and answered the main inquiry question: does using the interactive whiteboard assist social studies teachers in increasing the comprehension of students and increasing classroom participation in Saudi Arabia schools?

The following chapter will discuss the significance and limitations of the study, and opportunities for further investigation.

Relationship of Literature Review and the Results

The results from this study indicated that IWB technology has successfully contributed to increasing students’ comprehension and to increasing classroom participation. The researcher was able to ascertain the effectiveness of this technique in teaching by conducting an experimental study on two groups and comparing the results obtained from both groups. In addition, the analysis of survey data identified the opinions and attitudes of participants regarding the use of IWB technology in the subject of social and national studies for Saudi
schools. The results indicated that there were positive attitudes towards the use of IWB in the classroom. The results also indicated the ability of IWB technology to raise the academic performance of students and to give students the opportunity to participate in the educational process through the presentation of activities, educational lessons, as well as to use some advantages of IWB such as writing on the board in order to increase students’ motivation to learn and to encourage to acquire skills.

The first lesson showed that the IWB had a positive effect on increasing students’ comprehension, which had an impact on the increased classroom participation and positive interactions compared with that of the control group. Each lesson included the activities, questions, and information related to the lesson with the only difference being the methods of teaching and materials used to explain lessons for both groups. When comparing the results, we find that the experimental group throughout the study period obtained the highest numbers of all existing investigation items in the participation rubric, compared with that of control group. The average of students' focus and their comprehension for different lessons were 80% for the experimental group, while the control group in this axis got 40%, as shown in the table (see Table 1, p. 39). On the other hand, the average of engaging in class activities for the three lessons for the experimental group was 86.6%, as compared with the control group, which got 60% in this axis. Data analysis indicates that there was a high level of concentration and comprehension in the various topics presented in the class. Also, interaction and participation were more pronounced within the experimental group. For example, in the first lesson, I noticed that students were more interactive and enthusiastic about the content that was displayed by the IWB. I also noticed that students were positively engaged in classroom activities when I asked them to solve the activities and to write them on the IWB. The reason for that was the use of some IWB
DOES USING THE INTERACTIVE WHITEBOARD ASSIST

features such as colors, pictures, and sounds, which gave students the motivation to participate and facilitate their understanding of the content in less time and less effort as compared with the traditional classroom, in which I needed to repeat the content more than once and had to use several ways to make sure it was delivered to students.

These results are quite consistent with previous research reviewed in Chapter 2 that showed that the IWB constitutes an effective instructional tool that has the power to engage and motivate students in the learning process and it can help improve the academic performance of learners and their behavior in class (Aytac, 2013; Bakadam & Asiri, 2012; Beeland, 2002; DiGregorio, & Sobel-Lojeski, 2010; Lisenbee, 2009; Morgan, 2008; Smith, Hardman, & Higgins, 2006). Results in this study showed the effectiveness of the use of IWB and its impact on the achievement level of the students of the experimental group where this technology contributed significantly to the increased level of academic achievement in addition to the increased classroom participation. This can be explained by the many advantages available in IWB technology. This technology has the potential to support teachers in using teaching methods in ways that are more contemporary and in utilizing various media such as texts, voices, pictures, and movies that facilitate more effective learning, even during routine teaching practices. The teacher can add some effects, such as sound and image, to enrich the scientific material in order to encourage students to learn, aroused their interest in various subjects, and meet their educational needs. This result is consistent with the scholarship of Isman, Abanmy, Hussein and Al Saadany (2012) and Yáñez and Coyle (2011).

In Figure 1 (see p. 43) we find that there is a clear difference between the experimental group and control group in all 4 items listed in the checklist for the three lessons. These differences were translated to numbers by the calculation of the mean for both groups.
There was a significant difference between mean scores (6.00) for students’ focus and their comprehension for different lessons and mean scores (3.67) of engaging in class activities between the experimental and control group. This indicates that the use of IWB had a clear impact on increasing students’ comprehension and content reinforcement. Additionally, the use of the IWB in activities stimulated students to work and to participate, as compared with the control group. Therefore, the results of the study confirmed that the students who were taught by a teacher using IWB had greater interaction with activities and better understanding of the content, as compared with their colleagues in the control group. These results indicate that teaching through the IWB helped students to understand the content of the curriculum, which contributed to increased focus, increased classroom participation, and desired interactions between students, such as talking with classmates, sharing information, writing on the IWB, participating in the educational process and answering questions even if they were not certain of the answer. All of these behaviors indicated by the researcher confirmed that students found pleasure and educational benefits when they were taught through the IWB. These results are totally consistent with the previous studies (Aytac, 2013; Bakadam and Asiri, 2012; Biró, 2011; Essig, 2011; Hennessy, 2011; Morgan, 2008; Yáñez & Coyle, 2011).

Some studies caution that that heightened motivation correlated with IWBs may be due to the novelty factor and may decrease over time especially if IWB is overused (Lan & Hsiao, 2011; Schroeder, 2007). But other researchers have suggested that the motivation of learners has improved while using IWB over a long period (Weimer, 2001). The perception of student learning can be attributed to a novelty factor, as students may learn more because the IWB is new and exciting for both the teacher and the students. This result is consistent with the scholarship of both Essig, (2011); Glover, Miller, Averis, and Door, (2004); and Glover et al.
In general, participants had positive attitudes towards the use of IWB in the classroom. This is in line with many studies that have investigated students' attitudes about using of IWBs (Digregorio & Sobel-Lojeski, 2010; Hall & Higgins, 2005; Hennessy, 2011; Moss, Jewitt, Levaâiç, Armstrong, Cardini & Castle, 2007; Sad & Özhan, 2012). The analysis of the participants' responses to the items listed in surveys indicated the benefits of using IWB and its role in contributing to understanding lessons and improving students’ attitudes toward participation in classroom activities where participants believe that the use of IWB contributes greatly to the acquisition of skills, encourages thinking, research and discussion within the classroom and improves communication skills. Morgan commented: “Students recognize that technology use can enhance instruction by incorporating a wider variety of instructional methodologies, and they expressed this as a positive outlook towards IWB use. They were more receptive, excited, and participative in classroom lessons, demonstrating the interactive whiteboard’s value in instruction” (pp. 61-62). In my study, with regard to the views of middle school students on Item 4, approximately 34% were undecided about the statement that “My teacher doesn’t use IWB effectively in lessons,” and the item had a mean response of 3.51. The students’ viewpoint towards the IWB was consistent with the research of Xu & Moloney (2011); Lisenbee, (2009); and Morgan, (2008), which indicates that the students will have a positive attitude if the teachers use IWB in an effective way.

Through my observations, I found that teachers lacked training and the ability to use IWB technology effectively. Moreover, some of the teachers lacked the roles of technological leadership where the teacher depends on the student in the process of connecting the laptop to the main device, manage presentations in the row, find solutions to the problems, and download software, which adversely affected the views of some students on the use of the IWB. This may
be due to the modernity of this technology, in situations in which the school has recently begun to adopt IWBs. In addition, there are difficulties related to managing the students while applying such technologies in the classroom, lack of appropriate curriculum content for IWBs, lack of time and lack of support to fix technical problems. All of these issues make it difficult for the teacher to use IWB technology effectively. These findings are in line with those of Gashan & Alshumaimeri, (2015) and Yanez and Coyle, (2011). Additionally, study of Bakadam and Asiri (2012) concluded that there is a critical need for training teachers with the employment of IWB.

Limitations

While I have discussed the significance of the findings above, there are many limitations related to this study. First, the study was conducted within one school in one place – Jeddah City in the Kingdom of Saudi Arabia. As a result, the researcher was unable to compare the results of the current study with those other educational institutions in the region or other regions. Second, there are not many schools in the Kingdom that currently use IWB technology. After searching, the researcher obtained the names of only four schools from the offices of education departments in Jeddah. Third, the sample size of the study was relatively small, with n=30 participants assigned to the experimental and control groups. A larger sample might have yielded more comprehensive and more valid results. One of the significant limitations of this study was the research plan. The researcher only taught 15 students in the experimental group and 15 students in the control group. Yet, the school system did not allow the researcher to divide the rows of students or to use alternative treatments such as teaching in the library or sources room, which forced the researcher to teach the whole row. The results might have been more accurate if the researcher had been allowed to work with the group specified and to teach 15 students in each lesson, as specified in the research plan. Fifth, the educational system in the Kingdom of Saudi
Arabia is teaching each sex separately. Because of that, there are no mixed classes, so the results obtained may have been biased because of sex segregation. Also, due to this, the results cannot be generalized to male students. In addition, this study was limited by the timing of the study. Because the researcher obtained the approval from the Ministry of Education very late, the length of the study was short. The study period was two weeks during one semester and therefore this period did not allow the researcher to conduct a comprehensive evaluation to ascertain the results. Perhaps if the study period had been longer, the results might be better.

**Implications for further research**

Although the study achieved the purpose and objectives for which it was built and answered the research question in terms of ensuring the effectiveness of the interactive whiteboard and its impact on increasing student's comprehension and classroom participation. There are many topics related to the use of interactive whiteboards as a modern educational tool that needs to be investigated. Here are some suggestions for further studies in the future: First, this study focused on the effect of interactive whiteboard on students' behaviors and on academic performance for a sample of 15 students from one school and one class. Future studies should be conducted on a larger sample that includes two or more classes using the same methodology used in this study as the study period increases. Second: Future studies need to conduct research in other areas in Saudi Arabia to ensure the effectiveness of technology and its role in improving the educational process. Third, there may be other factors that have a stronger effect on the efficient use of the interactive whiteboards must be investigated such as the curriculum and their relationship to the effective use of technology, effect of teacher training programs on learning outcomes and their impact on student academic performance, the benefits of using the IWB in classroom settings and the reduction of negative behaviors, and the use of interactive whiteboard
and its role in building an enriching and interactive environment in the long term. Fourth: Expand the scope of studies to cover many subjects such as mathematics, science, Arabic language, arts, languages etc. Fifth: Future studies should focus on the long-term impact of learning using the IWB technology. This can be achieved by increasing the experimental period and monitoring the performance of both experimental groups and the control group for two semesters or more. Sixth, the participants in this study were female only. Therefore, future studies should include studies for both genders and determine the differences between males and females when using IWBs in the classroom. Finally, the Ministry of Education in Saudi Arabia should when implementing the second phase of the Digital Transformation Project which will be applied to 1500 schools by conducting further research to identify the advantages and disadvantages of the digital transformation project implemented in three regions in the first period, this can be achieved through surveys or interviews with teachers, students or parents in order to highlight the most important challenges and problems facing education and what future recommendations will contribute to reducing these challenges and to achieve the objectives of the project.

Conclusions

The purpose of this study was to investigate the effects of using IWB technology on increasing the comprehension of students of the curriculum and the increase in classroom participation in middle schools in the Kingdom of Saudi Arabia. The researcher chose her study topic about using IWBs in Saudi Arabia in line with Ministry's interests regarding the integration of technology in education in order to achieve its goals in developing teaching methods and improving the quality of education. This study will add to the field, especially as there is little literature that has investigated the effects of using the IWB on the classroom. Also, the opinions
and attitudes of students toward the use of IWB technology in Saudi Arabia is important and
timely, especially with the launch of the Digital Transformation Project in Saudi Arabia.

The results of this study will have valuable implications in the educational field in Saudi
Arabia. Currently, the Ministry of Education is implementing the Digital Transformation Project.
This earns the results of my studies importance because there are a few studies that have
investigated this topic in Saudi Arabia, especially in the Social and National Studies curriculum.
The results of my study emphasized the effectiveness of using IWB technology in order to
increase students’ comprehension and its positive impact on increasing student participation,
because of the IWB features in terms of visual and multimedia content that support the learning
process. Educational officials need to look at recent research in order to employ the latest
findings of researchers and to look at the problems related to modern devices; the formulation of
educational content in line with modern technologies can be used to provide educational clips,
programs, and resources related to the lessons in order to facilitate the teacher use them in the
educational environment. Also, the provision of workshops and training courses for teachers will
be useful because the teacher is primarily responsible for the success of the educational process.
Teachers need professional development in order to employ modern technology within the
classroom properly and meet the needs of learners, to ensure the success of the digital
transformation project in all regions of Saudi Arabia.
References


Appendices

Appendix A

Parents Consent Form

a. Research Statement

Along with a faculty advisor, Robert L. Dahlgren, the State University of New York at Fredonia, I am conducting a study on the use of interactive Whiteboards in classrooms. I will be completing a research study over the next two weeks to address the research question, “does using the interactive whiteboard will assist social studies teachers to increase the comprehension of students and increase classroom participation of middle school students in Saudi Arabia?”

Increase the comprehension and Classroom participation have a positive impact on the student in the development of thinking and verbal skills. Also, participation of students has an impact on the teachers who give them moral support and enhance their educational performance. Student involvement in the teaching and learning process has various advantages: it motivates students, makes their study interesting, maintains a dynamic class, allows students to learn from each other, promotes learning, and builds confidence and trust among students This proposal examines the influence of using the interactive whiteboard in teaching Social and National Studies to increase the comprehension of students and increase classroom participation.

b. Purpose of the study

The purpose of this study is to investigate the impact of using the IWB in teaching of the curriculum of Social and National Studies and to know its effect on increase the comprehension of students and increase classroom participation. I want to investigate to see whether using the IWB will increase students' understanding of the curriculum of Social and National Studies and thus, will increase their classroom participation and to see whether using IWB will help to facilitate the process of teaching and learning. Also, to see whether the IWB will encourage students to interaction with their teacher through stimulating dialogue and discussion while presenting the lesson, attracting students’ attention and making focus throughout the period of a quota. I will use a participation rubric to record my notes inside the class and focus on the following points: students' focus and their comprehension for different lessons, student participation in answering questions, engaging in class activities, and review lessons.

I want to investigate modern technology tools that will increase students' motivations to participate in the classroom. Therefore, it may be that the use of the IWB will increase students' understanding thus, increase students' participation.

For that, I decided on my research project to focus on this problem to find solutions to this issue through using of IWB that would increase comprehension of students and increase classroom participation.

c. Study Design
This study is based on an experimental model. The study will take place in 6 classes during the week of 14th and 15th of December 2017 from the first semester period of the school year. I will divide the students into two groups randomly. I will give lessons to the experimental group using an interactive whiteboard (IWB) with its existing features; the control group will receive lessons without the use of an IWB. The students will receive instruction on the work plan before the study begins, while the control group will not receive instruction about the work plan. The control group will receive instruction in the traditional lecture method and using worksheets. I will prepare lesson plans and determine educational goals and learning activities. The textbook I will use is Social and National Studies, published by Ministry of Education, Kingdom of Saudi Arabia.

I will prepare the lessons through one of the units book, based on the unit that I will choose from the book. I will prepare lessons, activities and other resources using the IWB for the experimental group only, while the control group will receive more traditional lecture/discussion teaching methods. I will assign the 30 students randomly two groups of 15 students each. Each group will be taught separately with different teaching methods and tools of instruction. The study sample will consist of 30 female 8th grade students aged 14 enrolled in a middle school in the Kingdom of Saudi Arabia.

For the experimental group, I will divide the instructional time into three parts: first, a 20 minutes segment, during which I will display the lesson through the PowerPoint. Then, a 10 minute segment, during which I will display relevant sources such as an instructional video, articles or short film. Finally, during the last 15 minutes, I will display activities through the IWB in order to develop their thinking, encourage them to research and learn. Finally, I will engage students in a quick review of the content that was studied during the class.

d. Length of student involvement

Students will meet with the researcher to do the study between 40 and 45 minutes for each class.

e. Risks and benefits of participation

This study is based on an experimental model. I will assign the 30 students randomly for two groups, (15) students in the experimental group to study the material by using interactive whiteboard technology and (15) students in the control group to study the same material in the traditional way. Each group will be taught separately with different teaching methods and tools of instruction. There may be risks for participants in this study, because I will be taught each group separately with different teaching methods and tools of instruction. This may affect the order of the classes and giving the lessons to both groups in a timely manner. Also divide students into two groups that will confuse school system where I have to give the lesson to each group separately thus, one of the groups will leave the class in each lesson will give to the other group.

Alternative treatments may be as follows: either I teach the first group after obtaining the permission of the school members in the resource room or library, if the interactive whiteboard is available in it. Or will be selected two rows from 8th grade students randomly, one row will be teaching them by interactive whiteboard and another row will be teaching them by traditional way. Will be selected this status, if no place is available at the school to give the lesson to each
DOES USING THE INTERACTIVE WHITEBOARD ASSIST

The benefits of this study for experimental group may be enhanced understanding of the material through increased class participation as a result of their involvement in this study. In the other hand, the benefits of this study for control group perhaps their involvement may help teachers improve teaching methods if the technique proves successful in improving the teaching and learning process and this of course will benefit them.

g. Confidentiality

Your child’s name will not be included with any of the data reported. Each child will be assigned a number or a pseudonym and their participation rubric will be coded with this number or name. I will keep a master list of the names and numbers on my computer, which is password protected. The final report will not include your child's name or that she was in the study. I will keep the data secure for five years after which time I will destroy it. You can ask questions about the study at any time. If you have questions or decide you want your child to withdraw from the study, please contact Hanadi Batarfi E-mail: bata2773@fredonia.edu or the other personnel listed at the bottom of this consent form.

h. Voluntary participation

Participation in this study is voluntary. Your child has the right not to participate at all or to leave the study at any time. Deciding not to participate or choosing to leave the study will not result in any penalty or loss of benefits to which your child is entitled, and it will not harm her relationship with the teacher. If your child decides to leave the study, your child's data will be removed from any papers or projects published.

i. Contact information

If you have questions regarding your rights as a research subject, you may contact Hanadi Batarfi. Phone: 716-410-6153. Email: bata2773@fredonia.edu
Robert L. Dahlgren, Associate Professor and Department Chair Department of Curriculum and Instruction, State University of New York at Fredonia, (716) 673-3701, dahlgren@fredonia.edu
Judith Horowitz, Human Subjects Administrator and Associate Provost for Graduate Studies, Sponsored Programs and Faculty Development. Phone: 673-3335; email: judith.horowitz@fredonia.edu
You may also contact her about any problems, complaints, or concerns related to this research study.

Permission for a Child to Participate in Research

-------Yes, as parent or legal guardian, I authorize____________________ (child’s name) to become a participant in the research study described in this form.
Parent or Legal Guardian’s Signature                      Date

--------------------------------------No, as parent or legal guardian, I DO NOT authorize--------------------------------------

(Child’s name) to become a participant in the research study described in this form.

Parent or Legal Guardian’s Signature                      Date

Please return this completed form to Hanadi Batarfi at the school
Appendix B

Student Assent Form

I am a student like you. For a research study or project that I am doing for school. My study based on investigating to see whether using the IWB will increase your understanding of the curriculum of Social and National Studies and thus, will increase your participation in classroom. I would like to observe you to see whether using IWB will help to facilitate the process of teaching and learning. Also, to see whether the IWB will encourage the interaction between you and your teacher through stimulating dialogue and discussion while presenting the lesson, attracting your attention and making focus throughout the period of a quota. I will use a participation rubric to record my notes inside the class and focus on the following points: your focus and your comprehension for different lessons, your participation in answering questions, your engaging in class activities, and review lessons.

It will take about 40 to 45 minutes for us to do my study. Your participation in this study is voluntary and you can stop and say you don't want to continue whenever you feel like it. If you decide to stop, no one will be disappointed and it won't affect your grades at all. There are no risks to participating in this study, and there are no benefits to you, personally, either. Your name won't be mentioned in the participation Rubric because I will call you by a number or a pseudonym that only I will know.

If you have any questions about this project, I am happy to answer them. If you want to be part of this research you can mark yes below. If not, you can mark no. Thank you for considering being part of this study.

---------Yes I am willing to participate Mrs. Batarfi study. I understand I can stop participating whenever I want and it will not affect my school work or grades.

---------No, I do not want to be part of this project.
Appendices C

Participation Rubric

Teacher: Hanadi Batarfi
Year: 2018
Period: 1\21\2018 – 2\21\2018
Class: Social studies

<table>
<thead>
<tr>
<th>Participation</th>
<th>1- Students’ focus and their comprehension for different lessons.</th>
<th>2- Student participation in answering questions.</th>
<th>3- Engaging in class activities.</th>
<th>4- Review lessons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 3</td>
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</tr>
<tr>
<td>Student 4</td>
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<tr>
<td>Student 5</td>
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<td>Student 6</td>
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<td>Student 7</td>
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</tr>
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<td>Student 9</td>
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</tr>
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<td>Student 10</td>
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<td>Student 13</td>
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</tr>
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<td>Student 14</td>
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<td></td>
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</tr>
<tr>
<td>Student 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices D

Students’ Questionnaire

Students’ opinions and attitudes towards the use of IWB in the classroom

Read the following statements and indicate whether you strongly agree (1), agree (2), are undecided (3), disagree (4), or strongly disagree (5) with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>strongly agree (1)</th>
<th>agree (2)</th>
<th>undecided (3)</th>
<th>disagree (4)</th>
<th>strongly disagree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Using Interactive whiteboard facilitates my participation in class activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2- Using Interactive Whiteboard improves my attitude towards participation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- Lessons become more enjoyable when IWB is used in the teaching-learning process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4- My teacher doesn’t use IWB effectively in lessons.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- Using the interactive whiteboard helps me understand the lessons.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6- My teacher uses IWB in teaching activities and I benefit of them a lot.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7- Using the IWB improves the students’ learning progress during class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8- Using IWB increases the incidence of positive behavior and decreases negative behavior.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9- The Students can understand the content well through the IWB.

10- I learn faster and easier when IWB is used in the classroom.

11- Using IWB provides a cooperative learning environment in the classroom.

12- My attention disperses in lessons because of the technical problems we have while using IWB calibration settings, sensitive problem, lack of pen tool etc.

13- Using IWB in teaching-learning process increases my academic performance.

14- Using IWB increases students' motivation to learn.

15- Using IWB contributes in acquisition of new skills for students.

16- My teacher encourages me to write and solve the activities by using interactive whiteboard.

17- Using IWB encourages to develop thinking processes and solve problems.

18- Using IWB doesn’t increase collaboration and communication with my friends in classroom.

19- Using IWB make me express opinions, argue, debate, negotiate, and ask questions.
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20- Using IWB gives self-confidence and improves communication skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21- Using IWB helps to build a good relationship between teacher and student.</td>
<td></td>
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<td></td>
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Appendix E

Average Participation over Three Lessons

<table>
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<tr>
<th>Classroom Action</th>
<th>N</th>
<th>Experimental group Mean</th>
<th>N</th>
<th>Control group Mean</th>
<th>Difference between experimental group and control group</th>
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<tr>
<td>1- Students' focus and their comprehension for different lessons.</td>
<td>15</td>
<td>36</td>
<td>12</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>2- Student participation in answering questions.</td>
<td>15</td>
<td>31</td>
<td>10.33</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>3- Engaging in class activities.</td>
<td>15</td>
<td>39</td>
<td>13</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>4- Review lessons.</td>
<td>15</td>
<td>37</td>
<td>12.33</td>
<td>15</td>
<td>17</td>
</tr>
</tbody>
</table>

FIGURE 1. AVERAGE PARTICIPATION OVER THREE LESSONS

- Experimental group
- Mean
- Control group
- Mean
- Differences
### Appendix F
Survey Data Results for the Participants

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>1- Using Interactive whiteboard facilitates my participation in class activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
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<td>28</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1.63</td>
<td>.83672</td>
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<tr>
<td></td>
<td>(56%)</td>
<td>(28%)</td>
<td>(14%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2- Using Interactive Whiteboard improves my attitude towards participation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>45</td>
<td>33</td>
<td>16</td>
<td>4</td>
<td>2</td>
<td>1.85</td>
<td>.96792</td>
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<tr>
<td></td>
<td>(45%)</td>
<td>(33%)</td>
<td>(16%)</td>
<td>(4%)</td>
<td>(2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- Lessons become more enjoyable when IWB is used in the teaching-learning process.</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Participants</td>
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<td></td>
<td>(72%)</td>
<td>(18%)</td>
<td>(9%)</td>
<td>(1%)</td>
<td>(0%)</td>
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<tr>
<td>4- My teacher doesn’t use IWB effectively in lessons.</td>
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<td>Participants</td>
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<td>34</td>
<td>26</td>
<td>24</td>
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<tr>
<td></td>
<td>(7%)</td>
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<td>(34%)</td>
<td>(26%)</td>
<td>(24%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- Using the interactive whiteboard helps me understand the lessons.</td>
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<td></td>
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<tr>
<td>Participants</td>
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<td>26</td>
<td>22</td>
<td>3</td>
<td>2</td>
<td>1.87</td>
<td>.99143</td>
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<tr>
<td></td>
<td>(47%)</td>
<td>(26%)</td>
<td>(22%)</td>
<td>(3%)</td>
<td>(2%)</td>
<td></td>
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</tr>
<tr>
<td>6- My teacher uses IWB in teaching activities and I benefit of them a lot.</td>
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</table>
### DOES USING THE INTERACTIVE WHITEBOARD ASSIST

<table>
<thead>
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<th>4</th>
<th>2</th>
<th>1.75</th>
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</thead>
<tbody>
<tr>
<td>(52%)</td>
<td>(29%)</td>
<td>(13%)</td>
<td>(4%)</td>
<td>(2%)</td>
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</table>

#### 7- Using the IWB improves the students’ learning progress during class.

<table>
<thead>
<tr>
<th>Participants</th>
<th>62</th>
<th>21</th>
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<th>1.59</th>
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<tbody>
<tr>
<td>(62%)</td>
<td>(21%)</td>
<td>(14%)</td>
<td>(2%)</td>
<td>(1%)</td>
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<td></td>
</tr>
</tbody>
</table>

#### 8- Using IWB increases the incidence of positive behavior and decreases negative behavior.

<table>
<thead>
<tr>
<th>Participants</th>
<th>41</th>
<th>26</th>
<th>26</th>
<th>3</th>
<th>4</th>
<th>2.03</th>
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<td>(41%)</td>
<td>(26%)</td>
<td>(26%)</td>
<td>(3%)</td>
<td>(4%)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### 9- The Students can understand the content well through the IWB.

<table>
<thead>
<tr>
<th>Participants</th>
<th>49</th>
<th>29</th>
<th>15</th>
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<th>1.84</th>
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<td>(3%)</td>
<td>(4%)</td>
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<td></td>
</tr>
</tbody>
</table>

#### 10- I learn faster and easier when IWB is used in the classroom.

<table>
<thead>
<tr>
<th>Participants</th>
<th>45</th>
<th>28</th>
<th>21</th>
<th>6</th>
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<th>1.88</th>
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<tbody>
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<td>(28%)</td>
<td>(21%)</td>
<td>(6%)</td>
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<td></td>
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</tr>
</tbody>
</table>

#### 11- Using IWB provides a cooperative learning environment in the classroom.

<table>
<thead>
<tr>
<th>Participants</th>
<th>57</th>
<th>23</th>
<th>15</th>
<th>4</th>
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<th>1.69</th>
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</tr>
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<tbody>
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<td>(15%)</td>
<td>(4%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>21 (21%)</td>
<td>21 (21%)</td>
<td>26 (26%)</td>
<td>14 (14%)</td>
<td>18 (18%)</td>
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<tr>
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</tr>
</tbody>
</table>

13- Using IWB in teaching-learning process increases my academic performance.

<table>
<thead>
<tr>
<th>Participants</th>
<th>45 (45%)</th>
<th>28 (28%)</th>
<th>19 (19%)</th>
<th>5 (5%)</th>
<th>3 (3%)</th>
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</thead>
</table>

14- Using IWB increases students' motivation to learn.

<table>
<thead>
<tr>
<th>Participants</th>
<th>50 (50%)</th>
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<th>9 (9%)</th>
<th>7 (7%)</th>
<th>1 (1%)</th>
<th>1.76</th>
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</tr>
</thead>
</table>

15- Using IWB contributes in acquisition of new skills for students.

<table>
<thead>
<tr>
<th>Participants</th>
<th>57 (57%)</th>
<th>16 (16%)</th>
<th>22 (22%)</th>
<th>3 (3%)</th>
<th>2 (2%)</th>
<th>1.77</th>
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</table>

16- My teacher encourages me to write and solve the activities by using interactive whiteboard.

<table>
<thead>
<tr>
<th>Participants</th>
<th>45 (45%)</th>
<th>16 (16%)</th>
<th>21 (21%)</th>
<th>9 (9%)</th>
<th>9 (9%)</th>
<th>2.21</th>
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</thead>
</table>

17- Using IWB encourages to develop thinking processes and solve problems.

<table>
<thead>
<tr>
<th>Participants</th>
<th>50 (50%)</th>
<th>20 (20%)</th>
<th>20 (20%)</th>
<th>8 (8%)</th>
<th>2 (2%)</th>
<th>1.92</th>
<th>1.09802</th>
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</table>

18- Using IWB doesn’t increase collaboration and communication with my friends in classroom.

| Participants | 12 (12%) | 11 (11%) | 19 (19%) | 21 (21%) | 37 (37%) | 3.60 | 1.39262 |
19- Using IWB make me express opinions, argue, debate, negotiate, and ask questions.

<table>
<thead>
<tr>
<th>Participants</th>
<th>37</th>
<th>23</th>
<th>28</th>
<th>6</th>
<th>6</th>
<th>2.21</th>
<th>1.18317</th>
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</thead>
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<td></td>
<td>(37%)</td>
<td>(23%)</td>
<td>(28%)</td>
<td>(6%)</td>
<td>(6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20- Using IWB gives self-confidence and improves communication skills.

<table>
<thead>
<tr>
<th>Participants</th>
<th>41</th>
<th>17</th>
<th>28</th>
<th>7</th>
<th>7</th>
<th>2.22</th>
<th>1.25191</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(41%)</td>
<td>(17%)</td>
<td>(28%)</td>
<td>(7%)</td>
<td>(7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21- Using IWB helps to build a good relationship between teacher and student.

<table>
<thead>
<tr>
<th>Participants</th>
<th>50</th>
<th>18</th>
<th>18</th>
<th>8</th>
<th>6</th>
<th>2.02</th>
<th>1.24706</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(50%)</td>
<td>(18%)</td>
<td>(18%)</td>
<td>(8%)</td>
<td>(6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix G: IRB Human Subjects Approval

19 December 2017

Hanadi Abdullah Batarfi
c/o Robert Dahlgren, Ph.D.
Curriculum and Instruction
College of Education
Thompson Hall
The State University of New York at Fredonia

Re: Hanadi Abdullah Batarfi—Does Using the Interactive Whiteboard Assist Social Studies Teachers to Increase the Comprehension of Students and Increase Classroom Participation of Middle Schools in Saudi Arabia?

Your research project using human subjects has been determined Category 1, Exempt, under the United States Department of Health and Human Services Code of Federal Regulations Title 45 Public Welfare, Part 46 Protection of Human Subjects, 46.101, Subpart A (b) (1) and/or (2). This document is your approval and your study titled “Does Using the Interactive Whiteboard Assist Social Studies Teachers to Increase the Comprehension of Students and Increase Classroom Participation of Middle Schools in Saudi Arabia?” may proceed as described, beginning on December 19, 2017 and ending on May 18, 2018.

Thank you for keeping the high standards relating to research and the protection of human subjects under the auspices of the State University of New York at Fredonia.

Sincerely,

Judith M. Horowitz, Ph.D.
Associate Provost, Graduate Studies, Sponsored Programs and Faculty Development
Human Subjects Administrator
Appendix H: Citi Human Subjects Training

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Hanadi Batari (ID: 6274307)
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Email:** bata2773@fredonia.edu
- **Institution Unit:** College of Education
- **Phone:** 7164109922
  - **Curriculum Group:** Human Research
  - **Course Learner Group:** Group 1.
  - **Stage:** Stage 1 - Basic Course

- **Record ID:** 28338979
- **Completion Date:** 08-Apr-2017
- **Expiration Date:** 08-Apr-2019
- **Minimum Passing:** 80
- **Reported Score:** 96

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<th>DATE COMPLETED</th>
<th>SCORE</th>
</tr>
</thead>
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<tr>
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<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<tr>
<td>Defining Research with Human Subjects - SBE (ID: 491)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>The Federal Regulations - SBE (ID: 502)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Assessing Risk - SBE (ID: 503)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Informed Consent - SBE (ID: 504)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Privacy and Confidentiality - SBE (ID: 505)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<tr>
<td>Research with Prisoners - SBE (ID: 506)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<td>Research with Children - SBE (ID: 507)</td>
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</tr>
<tr>
<td>Research in Public Elementary and Secondary Schools - SBE (ID: 508)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>International Research - SBE (ID: 509)</td>
<td>08-Apr-2017</td>
<td>4/5 (80%)</td>
</tr>
<tr>
<td>Internet-Based Research - SBE (ID: 510)</td>
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<td>5/5 (100%)</td>
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<td>Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)</td>
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<td>4/4 (100%)</td>
</tr>
<tr>
<td>Conflicts of Interest in Research Involving Human Subjects (ID: 488)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<tr>
<td>SUNY Fredonia State College (ID: 267)</td>
<td>08-Apr-2017</td>
<td>No Quiz</td>
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</table>

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: [www.citinrrogm.com/vortify/7k132818a5-a71c-4coh-b29-5767db92vb64-22838979](http://www.citinrrogm.com/vortify/7k132818a5-a71c-4coh-b29-5767db92vb64-22838979)

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5629
Web: [http://www.citinrrogm.com](http://www.citinrrogm.com)
**DOES USING THE INTERACTIVE WHITEBOARD ASSIST**

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**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)***

**COMPLETION REPORT - PART 2 OF 2**

**COURSEWORK TRANSCRIPT**

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**NOTE:** Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Hanadi Batarfi (ID: 6274307)
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Email:** batali27773@fredonia.edu
- **Institution Unit:** College of Education
- **Phone:** 7164109922

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1.
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 22838979
- **Report Date:** 04-May-2018
- **Current Score:** 96

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### REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES

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<th>Module Description</th>
<th>Most Recent</th>
<th>Score</th>
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</thead>
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<td>History and Ethical Principles - SBE (ID: 469)</td>
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<td>5/5 (100%)</td>
</tr>
<tr>
<td>Defining Research with Human Subjects - SBE (ID: 491)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Belmont Report and Its Principles - SBE (ID: 1127)</td>
<td>08-Apr-2017</td>
<td>2/3 (67%)</td>
</tr>
<tr>
<td>SUNY Fredonia State College (ID: 587)</td>
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</tr>
<tr>
<td>The Federal Regulations - SBE (ID: 502)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Assessing Risk - SBE (ID: 503)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<td>Informed Consent - SBE (ID: 504)</td>
<td>08-Apr-2017</td>
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<tr>
<td>Privacy and Confidentiality - SBE (ID: 505)</td>
<td>08-Apr-2017</td>
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<tr>
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<td>08-Apr-2017</td>
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<td>Conflicts of Interest in Research Involving Human Subjects (ID: 488)</td>
<td>08-Apr-2017</td>
<td>5/5 (100%)</td>
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<tr>
<td>Avoiding Group Harms - U.S. Research Perspectives (ID: 140810)</td>
<td>08-Apr-2017</td>
<td>3/5 (60%)</td>
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</table>

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Verify at: [www.citiprogram.org/verify/2k1332291e5-a71e-4c0f-b219-57877b92e664-22838979](http://www.citiprogram.org/verify/2k1332291e5-a71e-4c0f-b219-57877b92e664-22838979)

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**Collaborative Institutional Training Initiative (CITI Program)**

- **Email:** support@collitiprograms.org
- **Phone:** 866-529-9929
- **Web:** [https://www.citiprograms.org](https://www.citiprograms.org)