The Integration of Interactive Whiteboard Technology Into Regular Lesson Instruction

By

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A research paper proposal submitted in conformity with the requirements
For the degree of Master of Teaching
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Ontario Institute for Studies in Education of the University of Toronto

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Abstract

This research project focused on looking into whether or not teachers were integrating interactive whiteboards into regular lesson instruction. I wanted to learn from current teachers as to how they were using interactive whiteboards whenever they had access to one. I am interested in seeing how this piece of equipment is perceived by teaching staff and learning whether or not they have seen a difference in student academic learning.

My main reason for looking into this is because I noticed interactive whiteboards being used quite often while I was teaching full-time in South Korea. As I mention later in Chapter 1, I am cognizant that this may be a bias I have in relation to the use of interactive whiteboards in the classroom. However, I do recognize that this is not the reality in North American classrooms and I was mindful of this throughout my research. I felt a need to look into this to learn more about how this piece of equipment could be used in a classroom and to understand its' benefits as well as limitations as perceived by teachers who have actually had experience using interactive whiteboards.

My research and findings have shown that interactive whiteboards could potentially be beneficial in classrooms, however there are still some limitations. My participants have noticed increased engagement in students during lesson instruction, and teachers felt enjoyment increased when they taught with the assistance of an interactive whiteboard as well. These can become positives for the use of interactive whiteboards in classrooms, but I also recognize this study was very small and my sample of participants do not represent all teachers across the province. This study is only a start of potential future studies related to the integration of interactive whiteboard technology in regular lesson instruction.
Acknowledgements

"Have I not commanded you? Be strong and courageous. Do not be afraid; do not be discouraged, for the Lord your God will be with you wherever you go" - Joshua 1:9

I would like to take this time to thank my Primary Junior Cohort 131 classmates and colleagues. You have been an amazing group of people to journey with through this entire program. Your thoughtful insights and strong encouragement has helped me get through these past two years. I truly appreciate the real friendships I have made over the course of this program. I would also like to thank Clare Brett, my supervisor, who provided feedback on my research throughout the year. Your help has been much appreciated and thank you for helping me through this process. I would like to send a big thank you to my participants. You have both shown me a lot about interactive whiteboards, but also taught me a lot as a colleague during my practicum blocks. Thank you so much for your help and your support. A big thank you to OISE and all my professors over the past two years. I have learned a lot and I am thankful for the time you have spent in guiding us through this program. A huge thank you to someone close to my heart, IC. You have been such a huge comfort this year. Thank you for your amazing support and encouragement to help me get to the end. I greatly appreciate it, love you lots! Finally, I would like to thank my family and friends, love you! You have been a huge part of my life and I've always been able to count on you being there to give me strength whenever I needed it. Hugs and Kisses!
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Chapter 1: INTRODUCTION

Research Context and Problem

We are a part of the technological period where children are starting to learn how to use technology at a much younger age (Preston and Mowbray, 2008). As a result, some researchers suggest that education needs to change in order to prepare students for living in the twenty-first century (Luterbach and Brown, 2011). There has been an increasing call for teachers to integrate new technology and instructional methods into their teaching (Luterbach and Brown, 2011). The rationale for this change is that technologically enhanced teaching will be more relevant and meaningful for students in the twenty-first century.

There are many different types of technologies that can be integrated into a classroom. Computers have been in schools for many years now and are helpful for students who benefit from the assistance of computer-based instruction (CBI) (Gast, Mechling, and Thompson, 2008). Tablets, like the iPad, are starting to become used more frequently by people of all ages (Siegle, 2013). Another piece of technology that is becoming more frequent in educational facilities is the interactive whiteboard.

The interactive whiteboard (IWB), is an important piece of technology that could be helpful in a classroom. Preston and Mowbray describes it “as a whiteboard displaying the image from the computer monitor with the surface operating as a giant touch screen” (2008). Teachers can enhance their lessons through the use of an interactive whiteboard. Some examples include, showing simulations and graphics, pre-recording sounds, and saving notes from previous lessons for later use (Preston and Mowbray, 2008). Using a whiteboard enables a teacher to show videos that can be helpful for students. It also allows the teacher to save notes or lessons that can be
used in the future. The ability to save things can be very helpful because it takes less time for the teacher to set up the following lesson since they no longer need to rely on writing things on a blackboard. Saving notes can also be very useful because teachers and students can save the class notes from the lesson discussion and in future lessons, these notes can be referred back to if necessary. Therefore, this piece of technology can be very beneficial in the classroom.

Although there are many positive responses towards the use of interactive whiteboards in the classrooms, there are still some problems affecting the use of this technology. Some teachers have mentioned that it is difficult to get technical support and that they lack the time needed in order to learn and explore the uses of interactive whiteboard technology (Lu and Overbaugh, 2009). It has also been noted that some teachers might find this technology to be a distraction for students in the classroom, limiting its effectiveness because only small groups can use the board at one time (Preston and Mowbray, 2008). Therefore, there are issues to address in relation to this piece of technology that influences how frequently it is used in classrooms. Limitations will be discussed further throughout this research study.

**Research Questions**

I believe that integrating interactive whiteboard technology into teaching will enhance the work experience for the teacher, and enhance the school experience for the student. There are some important questions I plan to use in my research in order to understand how interactive whiteboard technology can be successfully integrated into daily use in schools. The most important question I want to know is are teachers integrating interactive whiteboard technology into their lessons in a student-centred way? I also want to look at what observations those teachers have noted regarding the impact an interactive whiteboard has had on student academic learning. These observations would be things the teacher perceives to be happening to his or her
students when being taught through the use of an interactive whiteboard. It would be useful to research what kind of strategies teachers use when teaching with an interactive whiteboard.

Other questions to guide this research project include, does this technology enhance their job as a teacher? How much time does it take to plan lessons that integrate interactive whiteboard technology? What do teachers think are the pros and cons of using interactive whiteboard technology in regular lessons? Also, have teachers seen a difference in student-teacher and student-student interaction through the use of an interactive whiteboard? Through looking at these research questions, it enables me to understand whether or not the use of interactive whiteboard technology in the classroom is as effective as I perceive it to be.

**Preview of Research Methodology & Design**

In order to complete this research paper, I will be looking at literature related to technology in the 21st century, to technology and education, and literature that describes teacher experiences with an interactive whiteboard. Literature depicting programs or strategies teachers have used in their classrooms will also be useful for the purpose of this paper. A literature review is necessary to situate my research question within the overall research that has already been done in this area.

Three interviews will be conducted to obtain data for this study. Two full-time TDSB elementary school teachers who have experience with integrating the use of an interactive whiteboard into their lessons will be interviewed. I am interesting in learning techniques teachers have used on interactive whiteboards to help make lesson instruction more engaging for their students. It is required that these teachers are working full-time and that they have used an interactive whiteboard in order to provide more accurate data for this research. The two teachers will be recruited through networking. They will be teachers who have worked with other
colleagues who have witnessed a teachers’ use of interactive whiteboard technology in their lessons, and teachers who I know through past practicum placements.

Through reviewing literature and interviewing teachers who fulfill all requirements, the research questions will be discussed. Interviewing teachers can provide concrete ways that interactive whiteboards can be integrated into the classroom. It will also help support the importance of incorporating new technologies into regular teaching. Using data collected from the interviews, it will be analyzed with ideas from the literature review. The important findings will be discussed before I make a final conclusion at the end of the study.

**Positioning Statement addressing “Reflexivity, Research, Relationship”**

At this time, my position on this study is that interactive whiteboard technology has the potential to become a very useful tool in the classroom. I see it as a tool that can help the teacher enhance his or her lessons. It is also a tool in which the teacher can use to reach out to more multiple intelligences at one time. An interactive whiteboard can also enhance the learning experience for students in the classroom.

I believe that this technology can become one of the most important tools in a classroom because of my past experience using it while teaching English as a second language in South Korea. I have worked with a smart board for three years overseas. Every lesson I taught was with the assistance of an interactive whiteboard. I made countless PowerPoint Presentations that would be projected unto the board. It created opportunities for a more interactive class. I found it useful because I was able to have all my lessons in a file on the computer. This is helpful because I did not need to worry about writing everything on a regular whiteboard. I also found that students really enjoyed using an interactive whiteboard. It was not available for use in regular classrooms. The only classroom with an interactive whiteboard was my English room. When I
taught students with an interactive whiteboard, they liked to be at the front of the classroom, assisting me with changing slides and moving images around on the board. It made the class more inclusive and more engaging. Teaching English as a second language is different from teaching core subjects, however, I believe the same techniques can be applied to regular classrooms.

Due to my past experience, I realize I might have a biased view of the use of an interactive whiteboard in the classroom. I also understand that a second language classroom is a very different environment from a regular classroom. I know that techniques used to teach English as a second language is also very different from techniques used to teach core subjects in a North American classroom. As I conduct research for this study, I will keep in mind of my possible bias and keep a clear mind. Questions asked during interviews will be neutral to the topic and will not reflect my position on the purpose of this study. Although I had conversations with my own students about the use of an interactive whiteboard, student voices will not be presented in this research, only observations of student academic learning by the three participants of this study will be included. My experience will not be resounded in this research paper.

**Significance / Contribution**

The purpose of this study is to look at how teachers can adapt their lessons in a way to make learning relevant to the information technology era that we now live in. It is a significant study because we can no longer continue to teach without incorporating current technology into daily use. When we discuss skills needed in the 21st century, information technology skills are a significant component (Saavedra and Opfer, 2012). Therefore, this study is relevant for both teachers and students.
It is relevant for teachers because it is a tool that can be used to strategically give instruction to a class of different learners. Using an interactive whiteboard can enhance instruction and it can be beneficial for teachers. One benefit is that it allows teachers to plan ahead and save these plans on the computer. When it is time to teach the lesson, teachers can pull up the file from the computer and connect it to the smart board. This way, lesson planning can be enhanced because teachers have easy access to change or add items to their lessons. Also, they no longer need to worry about notes from previous lessons being erased from blackboards.

In the same way, this is beneficial for student academic learning because this technology can be very interactive. I believe that learners who benefit from kinaesthetic activities can benefit from working on an interactive whiteboard. Also, for students who benefit from working one-on-one with the teacher, this technology presents a good opportunity. If teachers can save lessons on file, they can plan and have lessons ready ahead of time. That provides an opportunity for teachers to focus on one-on-one time with each student. I think that an interactive whiteboard can also be a helpful tool for students who learn visually or musically. It is a tool that offers the opportunities to display large images related to a lesson. Students can see these images, move them around and maybe even press around for sounds these images make - for example, a lesson on farm animals, students can press on the image of a cow and hear the noise it makes.

Therefore, through this study I hope to encourage more teachers and schools to implement smart board technology into every classroom. I understand there are costs, however, I believe that through careful planning and over a span of time, every classroom can become equipped with an interactive whiteboard. By the end of this study, I hope to show how useful and beneficial this technology can be for a classroom, how it can enhance the work experience for
teachers, and the perceived effects it has on student academic learning through teacher observations.
Chapter 2: THE LITERATURE REVIEW

In this chapter, I will go over literature that relates to each of my four themes. The first theme discusses the benefits of the use of interactive whiteboard technology in the classroom. The second theme will discuss the techniques that teachers have used on interactive whiteboards. The third theme discusses perceived impacts on student academic learning when lesson instruction is done with the assistance of an interactive whiteboard. Finally, the last theme discusses the limitations and shortcomings of the use of an interactive whiteboard in the classroom. Through these four themes, I hope to address the research problem.

Benefits of Interactive Whiteboard Use

Incorporating a smart board into regular classroom instruction can be beneficial for both the teacher and the students. Muhanna and Nejem believe that smart boards can be more beneficial than computers (2013). Smart boards provide an opportunity for whole-class engagement rather than individual engagement (Muhanna and Nejem, 2013). Mechling, Gast and Krupa also wrote that one benefit of the smart board is its ability “to present information...on a large interactive touch screen within a group arrangement” (p.1879). Providing an opportunity for students to engage as a class is beneficial because they can learn from each other. It encourages student involvement, deeper thinking and it creates an inclusive space within the classroom. Computers are useful, however they can only be used individually rather than as a whole-class. An interactive whiteboard can be used by the whole class at the same time. Muhanna and Nejem also note that the “interactive quality of a smart board lends itself to a degree of student participation not offered by other presentation methods” (p.374). I think that if an interactive whiteboard is used properly, students can be more engaged because the teacher will become a
smaller figure during a lesson. By smaller figure, I mean that students will take more control of
discussion around a certain topic and the teacher can take a step back and act more as a
facilitator, which brings this discussion to the next benefit.

An important benefit of using an interactive whiteboard for lesson instruction is that it
can create a more student-centred environment. The interactive whiteboard should not be used
only by a teacher. I, myself am guilty of using interactive whiteboards improperly. In my
experience using an interactive whiteboard, half the time I would still be the teacher standing at
the front by the board rather than my students. This only makes this whiteboard technology a
replacement for a traditional whiteboard. Instead of what I did, the teacher should be able to take
a step back from being at the front of the class to allow their students to come to the board and
take over (Maher, 2012). This allows the teacher to become a facilitator in the classroom while
students take more responsibility for their own education. It also enables more critical thinking
for deeper discussions among the students on a given topic. Being able to create such an
environment can be one of the most beneficial features of incorporating a smart board into
regular classroom routine. My personal experience with misunderstanding the proper use of an
interactive whiteboard makes me wonder whether or not teachers are properly trained and
educated to understand how this technology should be used? This is something that I think is
important to consider throughout the study.

Interactive whiteboards not only allows for a whole-class discussion, it allows students to
interact through the touch screen feature. This can have a positive effect because “smart boards
are seen as fun” (Preston and Mowbray, p.52), and therefore, more engaging for students. I
observed this engaging feature in my South Korean English language classroom. Students paid
attention to the lesson and volunteered to come up to manipulate objects on the interactive
I noticed that students were curious, including those who would normally keep their heads down. Also, majority of the students in my classes wanted to try touching the screen or try moving things around the screen. However, this brings up a concern for me of what happens after the novelty of an interactive whiteboard passes and it becomes a regular classroom tool that students use? Will it still be as engaging for them? Or will it gradually become less “fun”?

Projecting a computer screen on a wall might be helpful however an interactive whiteboard can take this idea to the next level. Preston and Mowbray explain that a smart board allows a user to “write on the interactive whiteboard’s large touch-sensitive surface with the electronic pen, drag-and-drop images or text, interact in many ways such as pressing icons to hear pre-recorded sounds, engage with educational multimedia activities, watch simulations and view graphics, capture text or areas of screen and annotate with the pen, save notes, drawing or annotations for future use” (p.50). These interactive features define the difference between projecting a computer screen unto a wall and projecting it onto an interactive whiteboard surface. Students and teacher do not need to walk back to the computer to change things on the screen instead it can be done at the screen either with our fingers or with the electronic pen. Maher found that smart boards “allowed students to easily see and manipulate each group’s ideas” (p.147). By providing students with this experience, they can share ideas and modify or combine them to create something better. For example, if the class was asked to design a draw bridge pulley system, we could give each group an opportunity to share their design and to discuss and offer an opportunity to students to combine their designs in order to create something that might be even better than their original designs.

Xin and Sutman found that smart boards can help increase engagement among students who have autism spectrum disorders (ASD) (2011). It is helpful for these students to see images,
touch the images on the board, and hear sounds the image makes or to touch the images to find the correct answer. For students with ASD, it is helpful to learn appropriate behaviour through the smart board because they can “observe their own images that demonstrate the desired behavior in particular social situations” (Xin and Sutman, p.24). Being able to interact with the board will create more engagement and presenting information using a computer program “appears to motivate the student to learn” (Xin and Sutman, p.24). Therefore, interactive whiteboard technology can be useful for engaging many students of different needs and encouraging students to learn.

I think there is more to learn about how this technology can assist special needs educators. My short experience with students who have different needs taught me how interactive I needed to make my lessons in order to keep students engaged. Unfortunately, I did not have access to an interactive whiteboard, which meant I had to create everything using printed images and cut-outs. Everything I created can be easily done using software for interactive whiteboards, for example, Microsoft PowerPoint. Personally, it would have saved me a lot of time, and it would have enhanced my lessons because I could have added a sound component. For example, my unit was on animals and their habitats. I could have had students sorting animals into their habitats and include sounds that these animals make and sounds they would hear in that specific habitat. Some of the students in my class would have benefitted from having the extra sound effects. Therefore, this leads to my concern that technology in general is not yet readily available in every school.

This whiteboard technology is built around the idea of creating more interactive engagement and such action replaces note-taking. Rather than taking notes, students are listening and paying attention to what is happening on the board. (Muhanna and Nejem, 2013). This can
be beneficial because students might be able to absorb more from the lessons rather than being too focused on writing down everything they hear the teacher saying. Students will no longer need to take notes because everything is done on the smart board or typed in from the keyboard that is connected to the smart board. This is helpful because now the class can have a discussion on a topic and they can be entering new notes as they discuss the topic further. These notes can be saved on the computer which can come in handy in future lessons. Maher notes that “having all previous and current texts clearly accessible allowed for continuity between lessons” (p.148). The class can review notes and texts from previous lessons to add to their current topic of discussion. Pulling up the notes on the screen would be easier than asking students to pull it out from their folders. Notes that are recorded and saved through the smart board also enables teachers “to send the notes to the students at a later time so that they can review on their own” (Muhanna and Nejem, p.374). Encouraging students to review notes on their own time will internalize a sense of responsibility in each student. They will learn to not only rely on learning from the teacher in class, but also the importance of continuing their own learning outside of class.

However, I am sure that teachers will still find some students having trouble reviewing their notes at home. One problem could be that students may not have access to internet from home. With this in mind, I think that instead of sending notes to students, teachers can print notes for students to keep in their folders. This ensures that students all receive the notes and the teacher knows that each student has a printed copy in their folder. Another problem could be students who do not complete their homework on a regular basis. Therefore, it is important to keep in mind that sharing the notes with the students will not necessarily ensure that every student will review on their own time.
Techniques Used on an Interactive Whiteboard

Martineau has suggested that technology creates opportunities for students to engage, “to teach (and reinforce) basic lessons and advanced concepts” (p.14). There are many ways to incorporate an interactive whiteboard into regular lesson instruction. English language classrooms around the world have been using interactive whiteboards for language instruction. Oommen supports the use of PowerPoint Presentations (2012). Oommen writes that PowerPoint presentations are “attractive to learners, and it appeals to learners’ diverse learning styles, such as visual, auditory, kinesthetic, and creative by employing multimedia methods, such as sounds, images, color, action, design, and so on” (p.54). Combined with an interactive tool, PowerPoint presentations can be “an effective pedagogical tool in the classroom” (Oommen, p.54). Preston and Mowbray also found that PowerPoint presentations can be useful when teachers use it to show step-by-step instructions for activities that students will do in class (2008). It is visual, it is in large print and it is clear to the students as to what steps to take in completing their activity or assignment. This can appeal to many learners in the classroom, including English Language Learners. Oommen encourages teachers to understand our students and their learning needs (2012). This might include adding variety into our lessons. Oommen suggests that we should “incorporate the use of technology to teach as a way to add variety into classroom procedures so learners get encouraged and motivated and do not get bored” (p.59), and also that it doesn’t act only as a motivator for our students but also for ourselves as teachers (2012). Incorporating an interactive whiteboard into lesson instruction can help in providing variety to our students. One example is the ability to create PowerPoint games that relates to the lesson being taught. I used countless PowerPoint games in South Korea. I understood the play culture in Korea and I found that students kept engaged in the lesson when they knew there would be a game at the end. They
needed to know the lesson material in order to win the game. This example can be one technique when combining the use of an interactive whiteboard and PowerPoint.

Another technique used on interactive whiteboards was mentioned earlier in this paper. Xin and Sutman found that teaching autistic students social stories through the use of a smart board is beneficial (2011). In their study, they used images of the students self-modeling appropriate behaviour in different social situations. They found that teaching students with ASD in this way “will reinforce their learning by involving the students with the computer-assisted activity using a Smart Board” (Xin and Sutman, p.24). Oommen found that “PowerPoint is an ideal tool for teaching and learning the English Language” (p.59). Xin and Sutman also notes that teachers created files for self-modeling by using PowerPoint presentations to show images of each student displaying the desired behaviour (2011). Although some suggest the use of PowerPoint presentations, there are other programs that can be used on a smart board. It can be a versatile tool. Teachers can adapt the program of their choice to use on the smart board, for example, Microsoft PowerPoint or Prezi. For the purpose of this study, it will be important to look at what programs teachers choose to use when integrating an interactive whiteboard into their lessons.

An interesting way that kindergarten teachers can use an interactive whiteboard is to assess their students. There are “designed interactive activities that enable children to show their understanding of concepts and recall of experimental procedures without the need for highly developed reading and writing skills” (Preston and Mowbray, p.52). Assessment in the kindergarten years can be difficult for teachers because many do not write at a high enough level to have typical written assessments. However, with an interactive board, Preston and Mowbray found that teachers can assess their students with one single lesson (2008). English Language
Learners can also be assessed in a similar way because interactive features on this technology provide students with the opportunities to show what they know and what they understand.

Preston and Mowbray also discuss how a smart board can be incorporated into science curriculum instruction (2008). An interactive whiteboard is useful when introducing a new topic and it can be useful in helping the teacher assess prior knowledge. One method to assess prior knowledge for a given topic is to ask students to sort images or words into their proper category (Preston and Mowbray, 2008). It can also be used to help student predict what happens next. For example, children can see a plant on the board and they would have to predict what could happen to the plant if it does not get watered (Preston and Mowbray, 2008). Giving students a starting visual can help student create a similar visual in their mind, in this case, how this plant would look if it is not watered. After children recreate their prediction on paper, the teacher could move to the next slide showing a plant that has not been watered, or the teacher can actually play an animation to show what happens to a plant when it is not watered. An interactive whiteboard can be used in many other ways to give students an opportunity to visualize and manipulate concepts and investigations through interacting with the screen.

**Perceived Student Impact**

As interactive whiteboards become more widely used, there might be more speculation on whether or not it actually helps student academic learning in the classroom. As mentioned before, Xin and Sutman would argue that a smart board can in fact, help those who have autism (2011). Students with autism were found to benefit from learning desired behaviour through learning social stories on the smart board and they learned how to engage socially with other classmates (Xin and Sutman, 2011). It is important to provide these students with an opportunity to learn and socialize with the rest of the class because it creates a safe environment and a sense
of inclusion. When it comes to learning acceptable behaviour in different social situations, it is important to ensure that the whole class understands what is acceptable and that these lesson are not only provided to students with ASD. Fonkert believes that computers can enhance communication among students, increase opinions and explorations of different concepts (2010). In a similar way, Xin and Sutman found that smart boards can help to enhance communication among students of different learning abilities through the teaching of social stories (2011).

Although Fonkert wrote on the use of computers, an interactive whiteboard is an attachment to a computer system therefore, this whiteboard technology might have an increased positive effect on student learning. We can see that the study Xin and Sutman conducted showed that ASD students learned to communicate with their peers and learned how to interact in certain social situations (2011). Therefore, interactive whiteboards are taking computer technology to the next level when it comes to how it can impact student academic learning.

Mechling, Gast and Thompson did a study on the effectiveness of using a smart board compared to using flash cards for instruction (2008). They found that both methods were “effective in teaching target sight words to students with moderate intellectual disabilities” (Mechling, Gast and Thompson, p.43), and that there was not a huge difference in impact on student learning for either method. However, they find that presenting material on a large screen to be more effective in “promoting observational learning of other students’ information” among those who participated in their study (Mechling, Gast and Thompson, p.44). In relation to perceived student academic learning impacts, flash cards might be enough. However, from their study it suggests that the form of delivery of material could matter. Seeing images on a large screen ensures that all students in the classroom can see it at the same time. In the study by Mechling, Gast and Thompson, students were able to see words that their classmates could read.
or recognize (2008). Being able to see what others knew, students can observe and learn from their peers. This study also confirms what Preston and Mowbray said about a smart board being perceived as fun (2008). Some student participants in this study found learning from a smart board to be “fun” (Mechling, Gast and Thompson, p.43), which could be a contributing factor to higher student engagement with learning material.

A benefit mentioned before in relation to the use of an interactive whiteboard in the classroom is that it can create a student-centred environment. Maher found that through experiencing the role of the teacher, students began to appreciate that role more (2012). Students now have the opportunity to take the leading role in the classroom. Students at the front will take on more responsibility for discussion than those at their tables (Maher, 2012), however, students can rotate such roles and everyone helps to lead discussion. Maher notes that having the teacher step back and away from the front of the room allows the teacher to see things from a different perspective (2012). In a similar way, allowing students to be up at the board and leading discussion might give them a chance to see things from a different perspective which can help them learn how to think from different perspectives.

Maher also found that when the teacher acted as facilitator, more students interacted and the length of such interactions, were longer and more open-ended in comparison to when the teacher led discussions (2012). Having the teacher step back from the front of the room can made students feel more comfortable with sharing their ideas in the class discussion. Therefore, an interactive whiteboard could present a positive impact on student learning because it allows for students to take over discussion in the lesson and teachers can facilitate from the back of the room while another student manipulates the lesson materials on the interactive board, for example, a student recording ideas that are discussed. This brings up the question of how a
discussion around an interactive whiteboard differs from one around a regular whiteboard. I think that the difference is a teacher can plan his or her lesson around the expectation of having a discussion. It can either be different topics on the board, or a map of where a discussion could lead. By adding interactive features to a map on the board, students can discuss the topic and move in the direction that the discussion is going. If they click the next area on the map, they can find another question that the teacher would like to discuss as a class. This creates an interactive discussion for students and it can be easily led by students rather than the teacher.

Limitations and Shortcomings

Although regular use of a smart board in a classroom can be greatly beneficial for student academic learning, there are still some areas that need improvement before it can be smoothly incorporated into regular lesson instruction. Preston and Mowbray note quite a few issues with smart board integration (2008). Smart boards are costly and technical set-ups in a classroom can also be difficult. If a school is situated in a rural community, it might also be difficult to find technical help when needed. A teacher noted that smart boards can be found to be distracting to the students and that majority of the class sits at tables while one or two students are using the smart board which makes it less desirable than assumed (Preston and Mowbray, 2008).

Preston and Mowbray also warn of a danger in regards to smart board use (2008). Muhanna and Nejem also note that “teachers face many challenges in the classroom because of lack of training on the right way to use it and due to lack of clear information of the benefits of using a smart board” (p.378). It is important to understand how to use the smart board to enhance lesson instruction. Teachers must understand that the “smart board itself does not enhance teaching and learning, it is the way that it is used” (Preston and Mowbray, p.53) that does help enhance. It is incorrect to think that a smart board is here to replace the traditional chalk board. If a teacher
uses the smart board more than allowing students to use it to manipulate images, it will not be more effective in impacting student academic learning in comparison to a chalk board. In order to encourage more teachers to use it the proper way, we need to make sure they understand how a smart board can benefit student academic learning.

Another problem that Muhanna and Nejem have found is that smart board users find it frustrating when they accidentally walk into the projector light during a presentation (2013). Stepping into the light poses a problem because it creates a shadow on the screen, obstructing the view for the audience. It also becomes a problem when you try to write on the screen. When the presenter steps in the way of the projector light, your writing will not show up clearly on the board when you create a shadow on the board (Muhanna and Nejem, 2013). Muhanna and Nejem also note that letters tend to look wavy and are not as clean and crisp as the writing on a chalk board or a dry erase board (2013). Writing on a smart board might be difficult when you first start using it, however, over time and with practice, writing on the smart board will become easier.

Although Microsoft PowerPoint has been suggested as a good program to use on the smart board, Oommen notes that “it is very easy for teachers to give too much information in one class” (p.56). This means that it could potentially do the opposite of enhancing student academic learning. If we overload our lesson instructions with too much material, we might cause confusion or cause learners to feel overwhelmed by the information being taught to them. Therefore, teachers need to be careful of how much information is being packed onto their presentations before teaching a lesson to the class. Teachers also need to pay attention to the information they are providing on their PowerPoint presentations to make sure that it is accurate and relevant for student academic learning.
Although there are many benefits to incorporating a smart board into regular lesson instruction, there are still limitations to it that need to be discussed further or improved. It is expected that by the end of this research paper, all benefits, techniques, perceived impacts, and limitations will be considered during interviews with selected teachers.
Chapter 3: THE RESEARCH METHODOLOGY

Throughout this chapter, there are a few things that will be discussed. I will start off with an overview of the study. In this section, I will discuss the research approach, framework, and methods. I will also briefly discuss participants in this study. Another section will be a further discussion on the participants chosen for this study. In this section I will go into more detail as to requirements and how I came to find my three participants for this study. Ethical considerations are also discussed. Included in this section are risks and benefits of this study. Following ethical considerations, I will discuss some limitations of this study. Finally, this chapter ends with the strengths of this study and why I feel it is an important area to research.

Overview of Study Design

This research was a qualitative study. Data used to complete this research study was collected through a combination of a review of literature and three interviewees. The literature reviewed for this topic include general literature about technology and education, techniques used on interactive whiteboards, success of interactive whiteboards in classrooms, how students have been impacted through interacting with whiteboard technology in class, and the limitations and shortcomings of integrating interactive whiteboard technology into regular classroom use.

There were three semi-structured interviews conducted to collect data for the following interview protocol:

i. In your opinion, why is it important to integrate technology into regular classroom instruction?

ii. What is your rationale for choosing to use an interactive whiteboard on a regular basis?
iii. What are some examples of strategies you use on the interactive whiteboard to engage students?

iv. How do you use the interactive board when teaching lesson material to students?

v. What impacts have you observed on student academic learning in relation to learning with a smart board?

vi. Has the interactive whiteboard enhanced your lesson instruction?
   a. If yes, how has it enhanced it?
   b. If no, have you run into any problems with integrating it to every lesson? What problems?

**Participant Sampling Criteria & Procedures**

Data was also collected through face-to-face interviews with a small sample group of teachers selected for this study. This group consisted of teachers from the Toronto District School Board (TDSB). I chose to focus on one school board because these were teachers I have previously worked with and teachers who were suggested to me by my colleagues within the board. They are all full-time elementary school teachers and they regularly use an interactive whiteboard for instructional purposes in their lessons in a student-centred way. These teachers were selected because this research requires that a teacher uses an interactive whiteboard consistently, not occasionally.

In order to complete an accurate study, these teachers were contacted through colleagues who have worked closely with them. This ensures that these teachers regularly use an interactive whiteboard for lesson instruction and that this technology is being implemented using proper techniques in the classroom. I also asked that these teachers had at least two to five years of
teaching experience. I did not specify that these teachers should have been giving instruction through the use of an interactive whiteboard for their entire experience. I did this to create a better understanding of whether or not these teachers found that this piece of technology enhanced their job.

The small sample group of teachers had to meet the following three requirements:

i. Full time elementary level teacher from TDSB
ii. At least two to five years of teaching experience
iii. Currently uses interactive whiteboard technology for regular lesson instruction

Ethical Considerations

For this research study, I followed the ethical review approval procedures for the Master of Teaching Program. Each participant signed a consent letter prior to the interview. It was also made clear that participants have the right to pull out of the study at any time and that they can ask to take something out from what they mentioned in their interviews prior to publishing. Participants were also told they could contact me any time to go over anything related to the interview and the research. The three teachers interviewed also understood that everything mentioned in their interviews are to be kept confidential, coding will be used in the research analysis and that all recordings of the interviews will be kept private in a safe place for up to at least five years. After the five years, the recordings will be properly handled and destroyed. Their real names and their school names will be kept confidential, as well as any student they mention in their interview.

A risk considered for this research was the part on teacher perceived impacts on student learning. Due to the fact that students’ voices were not heard in this study, these are strictly only
INTEGRATION OF INTERACTIVE WHITEBOARD TECHNOLOGY IN REGULAR LESSON INSTRUCTION

observations the teachers have noted. It may not actually reflect the feelings of the students and some perceptions can be different depending on what perspective the teacher is taking.

Benefits of this study include discovering the potential this interactive tool can have in a classroom. It is new and therefore more engaging for the students. This study also proves that it has a potential to enhance the job of a teacher, especially in relation to the wide range of learners in the classroom. Therefore, integrating an interactive whiteboard into regular lesson instruction can benefit both the teacher and the students.

Limitations of Research Study

A limitation to this study is that many teachers are unaware of the proper usage of a smart board. Many teachers use it as a replacement for chalk boards, misunderstanding that it is the interactive features of this technology that make it an enhancement for student academic learning. This shows that more education and training of how to integrate this technology into a classroom is needed. It also shows that it might be a good idea to include this training in pre-service teaching programs. If we include it as a part in teacher’s college, new graduates will be entering the workforce with the knowledge of how to successfully integrate this piece of technology into regular lesson instruction.

We should also keep in mind that this research was conducted using a very small sample group. The three teachers interviewed for this research paper do not represent the general teaching population. Also, the teachers interviewed were only from an elementary/junior teaching level. The three participants chosen for this study may also have a biased opinion regarding the integration of interactive whiteboard technology into regular lesson instruction. This is a possibility because it is required that they use it regularly, and if they chose to use this
piece of technology regularly, it might mean they personally enjoy using the interactive whiteboard, not that it is actually enhancing their job as a teacher.

As mentioned before, there are no student voices represented in this research. The only data related to student academic learning are observations noted by their teachers. As a result, we cannot fully understand what students think of this technology. Many people perceive it to be fun for students therefore engaging, but we cannot be sure of that as there are no definitely answers from students in this research. Therefore, we should keep in mind that the way teachers perceive it to impact students may not actually represent the voices of students.

Another limitation is the time period this research spanned over. It was a very short period to complete interviews and analyze it with literature collected. It only breaks the surface of how interactive whiteboards can be integrated into regular lesson instruction. I believe that with more time and a larger sample group, a more thorough understanding of how this piece of technology can truly benefit teachers and students will be discovered. Also, with a larger sample group, we can also learn more ways to integrate this into regular lesson instruction.

**Strengths of Research Design**

The importance of this research paper lies in the fact that technology is advancing every day. It is often said that we need to make education relevant to students born and raised in the twenty-first century (Luterbach and Brown, 2011). As mentioned in the literature review, teachers need to learn how to use interactive whiteboards in an engaging way to attract interest from students (Muhanna and Nejem, 2013). In conducting research for this paper, we learned and can now understand ways in which teachers are using interactive whiteboards to engage their students. We discussed techniques and perceived impacts on student academic learning with
teachers who regularly use the smart board as a teaching tool. Through the interviews with the small sample group of teachers, we learned things that they have tried on the smart board with their own class. Results from this paper can be combined with other ideas or modified to show how adaptable the smart board can be for each teacher with their own teaching styles.

This is also an important and innovative research study because as time goes, technology will continue to develop further. Understanding this, we need to start to realize that teachers can no longer teach using traditional methods. It is hard to say for sure, but soon we could be facing even younger generations who are raised with more advanced technology and who find it difficult to learn using traditional methods. We need to build interest in our students when we teach them new concepts and ideas. We also need to create a space where they can come and take more responsibility of their own education. An interactive whiteboard can provide such space in that the discussions can be led by students and students can be the ones to manipulate objects on the screen in order to learn and understand the purpose of it. Once teachers understand how to integrate it into regular lesson instruction properly, students all over the province can benefit from the use of an interactive whiteboard.

I believe schools are here to prepare students for the future, to prepare them to enter the workforce with necessary skill sets. No one can guess how advanced technology can become ten years from now, but it something more advanced than an interactive whiteboard or interactive table might be developed. Therefore I believe that training teachers to integrate this piece of technology into their lesson instruction will provide students with opportunities to learn from an early age as to how to use such technology. If students are being raised with the understanding of how to use current technology, it is likely that they will continue to learn advanced pieces of technology and know how to use it when they grow up and enter the workforce. In other words,
integrating this piece of technology into regular lesson instruction not only benefits teachers and current students, but it will benefit all of us in the long run and might create a chance for students to become more innovative in what technology can do in the future.
Chapter 4: FINDINGS

This chapter looks at data collected from two interviews that were conducted to look at whether or not teachers are integrating interactive whiteboard technology into their regular lesson instruction. This section is organized into themes. The four themes from chapter 2 are continued here and each theme is discussed through a number of sub-headings.

As one of my participants pointed out, teaching a lesson with the assistance of an interactive whiteboard allows you to efficiently teach a lesson that targets all the multiple intelligences while adding some excitement to your classroom environment. More benefits of interactive whiteboards are discussed below. However, before going into the themes of this chapter, there are two items to define in order to ensure understanding of the findings. Two types of interactive whiteboards are used by my participants, the SMART Board by SMART Technologies, and the Mimio. Each type of interactive whiteboard is defined below. Following the definitions, this chapter also includes a discussion of the benefits, techniques used on interactive whiteboards, perceived student impacts, and limitations of interactive whiteboards.

Definition of the SMART Board Technology

In my findings, one of my participants, Melanie, speaks about using a SMART Board in her lessons. By "SMART Board," she is referring to a specific interactive whiteboard technology that is developed by the company SMART Technologies.

Here is a photo of this piece of technology to help you visualize what this would look like:
Definition of the Mimio Interactive Whiteboard Technology

Owen speaks about the Mimio, which is a piece of technology that looks like a bar. This bar is portable and can be attached to any magnetic surface. This bar comes with a USB that you attach to your computer or laptop device in order for the bar to connect to your desktop display and project it onto the whiteboard or surface you attach it to. The bar will turn any surface into an interactive screen.

Here is an image of the Mimio to help you visualize how this is used:

Theme 1: Benefits of Interactive Whiteboards

My research participants both suggested that interactive whiteboards can potentially bring great benefits to the classroom. There were some commonalities in the issues discussed by each participant. Both participants mentioned similar areas in which they have observed benefits such as increased attention during a lesson, better organization, personal professional development, and increased opportunities for student learning. These will be described in more detail in the following sections.
Student Engagement

Participants observed that student engagement increased through the integration of an interactive whiteboard. This piece of technology is not always widely used in every school, although many schools may have them. As a result of this, learning from an interactive whiteboard can be something new for many students. For students, it can be new, interesting, or fun. Melanie explained that,

They can use the manipulatives on the board, they can move it. It's so engaging for them. They wait for their turn because they get to use the Smart Board, right? And if they are not focusing, they miss their chance. They could increase their attention span. When there is movement involved and they are focused on it, and they can click on the word and they can hear the word.

Through the assistance of a Smart Board, Melanie is able to keep her class engaged throughout a lesson. She finds that her students can stay focused longer because they watch what others do on the board and they wait for their turn to work at the board. Melanie’s situation is different from my other participant, Owen, in that Melanie teaches a special education program at her school. Recognizing the different needs in her classes, it was interesting to learn that her students’ attention span may expand with the use of a Smart Board during the lesson.

Owen used the Mimio and observed a similar increase in student engagement in his classes. Students were intrigued with moving things around on the whiteboard and controlling the computer screen from the whiteboard. Owen found that,

the kids really started to like it. They were able to move numbers around, move boards around, therefore they were better connected to the content that was being taught. They were now engaged.

By interacting with the lesson content, students are more engaged with what is being taught. While Owen teaches his lesson, he finds that students connect better when they are able to move items he is displaying through the Mimio. Similar to Melanie, Owen noted that students were
engaged, that they started to like it. Considering student enjoyment while planning lessons can help teachers create more interesting ways for students to learn content. In this case, using an interactive whiteboard in teaching a lesson can create more interest among the students in the classroom.

Owens' experience is encouraging because this is an example of how any interactive whiteboard technology can be beneficial in the classroom, not simply the popular brands of interactive whiteboard, particularly those from SMART Technologies. The Mimio is actually very flexible as it can turn any surface into an interactive whiteboard, it is small, portable, and can be an outlet for teachers to use to create more interactive lessons for their classes. It is different from the Smart Boards by SMART Technologies because the Mimio is a bar that is 14.8 inches in height, 2.7 inches in width, and 1.5 inches in depth. This device comes with a USB key that will create a wireless connection when you plug in the USB to your computer or laptop device. The size of the Mimio makes it easier to carry around the school compared to rolling around the Smart Board that is the size of a regular whiteboard. The images provided under the definitions of each type of interactive whiteboard earlier in this chapter can help define the size differences.

**Classroom Management and Planning**

Interactive whiteboard technology seemed to be of the most benefit to my two participants for tasks concerning classroom management and planning. While both participants mentioned this, Owen also added that he thought interactive whiteboards support the education of multiple intelligences (cite either Gardner or research in the classroom that has actually used MI).
Owen believes that students learn in different ways and recognizes that as a teacher, it can be tough to cater to all the students in his class because class periods are short and curriculum is dense. For Owen, other than creating an exciting classroom, he finds that this can be,

an opportunity to kind of efficiently bring together the multiple intelligences in teaching. It allows you to efficiently bring together many of the multiple intelligences in a quick way. Instead of having a day for kinaesthetic learners, one day for auditory, another one for visual. You can just bring it all together in one day. And you can do that over and over if you want, and if there's some that still aren't getting it, you can teach to their knowledge very efficiently.

Often times, it can be difficult to teach to several intelligences at one time, and there is a possibility that sometimes this is not done very effectively. However, as Owen suggested, using an interactive whiteboard when teaching a lesson can be helpful in teaching to many of the different learners in your classroom at one time. With the touch features on the board, you can include words and images and create buttons where student can press them to learn more or even to hear sounds from the board. Overall, Owen found the interactive whiteboard most beneficial for classroom management because,

Kids are now caring about what they're seeing. They're caring about what they're learning. And they're more connected to it.

When students feel a strong connection to what they are learning, Owen noticed they were more willing to learn the content. He felt this really helped him a lot with managing the class.

Melanie finds that using an interactive whiteboard to teach lessons also provides many benefits for planning. She feels it makes planning more manageable when technology is involved. She recommends a way to make planning more efficient,

Smart exchange. You go on that website, there are built in ones people have posted it. It's free to use. It's just that you need a username and password and it's free. And you can use whatever they have, you can adapt it in the way you want it. And it is there based on the curriculum too. But not the entire way you want it, but you will be able to use the
base of that and then modify it. It is helpful to know that there are other tools available for teachers to use in creating lessons to fit their classroom needs. Being able to use a base lesson and make modifications to it to accommodate needs in your classroom can make lesson planning more efficient and less time consuming.

Owen and Melanie both find that using interactive whiteboard technology allows them to use regular computer applications to execute a lesson. This means that teachers do not necessarily have to learn new computer software programs. Rather, teachers can continue to use programs they are comfortable with like, paint, Microsoft PowerPoint presentations, or PDF Documents. Teachers do not need to feel intimidated by new software like Smart Notebook, or they can learn the new software on their own while using programs like PowerPoint until they feel ready to use Smart Notebook regularly. Owen also points out that teachers can use other applications from their tablets using the Mimio if they have the right adapters for connecting a USB port to their tablet. I found this interesting because that expands the possible tools that teachers can integrate into their classroom use of interactive whiteboards.

**Personal Professional Development**

Both participants identified personal professional development as a key reason for learning how to integrate an interactive whiteboard. They both felt it could help them in the classroom and that it could benefit student learning while increasing job satisfaction. They also felt that it grew to become a personal interest of theirs after using it for a while.

Melanie learned about the Smart Board by SMART Technologies through workshops. She described that,

if we have a workshop, they will explain specific sections of the Smart Board, how to use it. Then we are asked to use it in our classroom and get used to that. Then we go back
with the feedback and prepare lessons based on it. And they also give us sample lessons or sources to get information from. So stage by stage they taught us how to use it. This would make it easier and less intimidating to learn how to use a piece of interactive whiteboard technology. Although Melanie goes on to describe that learning software for the Smart Board can be difficult at the beginning, she does point out that once you figure out the small components of the program you will find it very easy to use and that once you have learned the program, you can easily manipulate and maneuver things the way you want it to go for your lesson.

Owen decided to start using the Mimio in his lessons because it was available in every classroom at one of the schools he worked at. He mentioned, Using it on my own, I learned how to integrate it...it's very practical, very user friendly, so it doesn't take too long to kind of get accustomed. Anybody can really do it. It wasn't difficult at all. Owen mentioned in his interview that he used to find technology daunting and therefore felt intimidated by the thought of using an interactive whiteboard. However, after learning it on his own and with the help of colleagues, he realized how easy it was to get used to. He also found it a good opportunity to learn something new as it was available in every classroom at that school and he is now much more confident in teaching with interactive whiteboards and additionally is more open to learning new types of technology. As a young professional, Owen can now feel comfortable and confident in learning new skills to help him efficiently teach lessons to a diverse class of learners.

Similar to Owens' professional development, Melanie continues to develop her knowledge through extra tutorials and through learning by trial and error. While this study was not able to directly speak to students’ thoughts about their teacher’s integration of technology, it
is reasonable to think that seeing teachers modelling learning new skills, reinforces the general importance of learning.

**Student Learning**

Student learning is also benefiting from the integration of interactive whiteboard technology in the classroom. Melanie explains that,

> they get more practice, more hands-on learning. Like base ten blocks. My kids when they learned this one, they have used the Smart Board using virtual manipulatives. They have used that. Then there are interactive websites. They have gone on those.

As discussed previously, students are more engaged because they can manipulate items on the screen. It does not always have to be actual blocks they can use at their desks. Having shapes on the board that they can move can be interesting enough to catch their attentions. Owen explains this further by describing that,

> they can take any subject matter and they're now connected to it. And they're connected very literally through their hands, through their eyes, through their ears. As a result of that, they're much more excited about learning. They enjoy it more, and they are motivated to want to learn the content faster, so that they can now take part in the immediate activities that follow our lessons. They want to be a part of moving around numbers, they want to be a part of drawing, they want to be a part of whatever the Mimio lesson was for that day.

With increased student engagement during the lesson, students are picking up concepts faster and are more open to learning the content that might otherwise seem boring if taught without the assistance of an interactive whiteboard.

The next theme will discuss specific techniques my participants used in teaching lessons using interactive whiteboard technology.
Theme 2: Teaching Techniques Used with Interactive Whiteboards

There are two main areas that were mentioned under this theme. First the various activities and ideas for which they both used the interactive whiteboard. And secondly, Melanie also mentioned when it can be integrated and how often.

Time & Integration

Of the two participants, Melanie was the only one who received official training on how to use the Smart Board that is made available by SMART Technologies. She explained that, they asked us to integrate it right from the time the kids walk into the classroom. Little bit of short presentation for them, teaching them direct instruction, and the rest they are practising it on the Smart Board.

Sometimes, integration of a new piece of technology can be tricky. We do not want our students to be too distracted with the new object in the room. The way that Melanie had been encouraged to integrate it took into account the need for a gradual integration so that students could become accustomed to using an interactive whiteboard. If it is integrated from the time students enter the classroom, it may be less of a distraction for some students because it will become a tool used regularly in the classroom like a normal whiteboard. Melanie also found that an interactive whiteboard could be integrated into any curriculum area including media literacy, language, math, art, and music.

Activities & Ideas

An interactive whiteboard can be seen as a platform for teachers to present their lessons in ways that make certain subjects seem more interesting. For example, Owen explains that, math is always the one the everyone struggles with, even teachers. I know many teachers have adapted the direct instruction methods. It can be very difficult. We can try to plan as many three part lessons as we can, but sometimes it's hard to find a way to make kids actually touch the numbers and play with the numbers, and experience the numbers in different ways. I think that the Mimio, the whiteboards, offer that opportunity.
Integrating an interactive whiteboard to lessons that students might find difficult can potentially help students connect and make sense of the content being taught. Melanie has found similar outcomes from using the Smart Board in her math lessons. She finds that students enjoy being able to see the manipulatives on the board, but also are engaged by touching it to move it around. It's a different interaction compared to using actual base ten blocks at a table. This can be a way to provide another hands on representation of the number relationships in manipulatives, and using the same ideas in different contexts encourages students to learn and consolidate ideas more deeply.

Melanie also uses interactive whiteboards for science lessons. While she uses it for language as well, she sees more of a benefit for science. Specifically, she found it was great for labelling pictures and students did not need to worry about misspelling a scientific word because the Smart Notebook program will help them with that. She also said the board made the online dictionary more easily accessible. Students can find the meanings for things they do not understand and see it on the board immediately. This can be a helpful tool for students, especially students who are English Language Learners, to reinforce vocabulary meanings.

Both participants mentioned that interactive whiteboards were good to use for language teaching, including French. Melanie also links each lesson to a website that students can link to students and explore further on their own. I think the ability to insert external links from the interactive whiteboard provides teachers with increased opportunities to try different strategies and techniques when teaching a lesson to their class.
Theme 3: Perceived Student Impact

Overcome Challenges

Melanie found that integrating the Smart Board helped students overcome certain challenges. Many of her students have specific challenges and she explained that,

my kids they use it and write a lot. Which helps them to read it, they have challenges in reading. It's not that they cannot, but they don't know how to. So when the computer reads it to them, they can comprehend it. Decoding is a challenge for them.

Later on in the interview, she also described that her students learn to take turns and to wait for their turn which can be a challenge for a few of them. From what Melanie has observed, students can learn lesson content as well as practise self-regulation when she integrates an interactive whiteboard into her teaching. For example, Melanie shared that waiting in line can be difficult for her students, but when her students know that they need to wait for their turn in line to use the Smart Board, her students learn to control and develop their patience. This can be helpful for many different classes and this point would also connect with how an interactive whiteboard have helped Owen with classroom management.

Motivation & Engagement

Integrating an interactive whiteboard appears to increase student engagement during lesson instruction for the teachers in my study. As Owen put it,

I saw a different student engagement. So from the two months before, I saw students saying, "aw yeah, you know, learning is nice," but now with the Mimio, "this is fun, this is now. Yeah, let's do this. Rah!"

Owen found students were more engaged with learning compared to how they felt about it before. It seems to make a lesson more interesting and it could possible help students absorb the content being taught.
Melanie found that using the Smart Board helped to motivate her students to learn and overcome certain challenges they may have, for example, with reading and writing. The way that Melanie has noticed it in helping with motivation is that,

because my kids, the challenge is reading and writing. So once they know that they can fix the spelling, and their handwriting can be converted (into font), they are interested in that.

For students who might feel uncomfortable with their writing, they can feel more confident now that their written words are recognized and converted into a computer font. Students can also have the computer read back what they write and this could also motivate them because they can hear the words they recorded. It gives them a different level of encouragement and also a different, auditory, feedback on their writing. Also, when students do these activities on the board, it is motivating them and giving them an opportunity to play around on the Smart Board.

**Enjoyment**

Both of my research participants described the interactive whiteboards as "fun" for their students. Owen described it as,

it will enhance their academic learning, because it is engaging, exciting, and fun. It will help to gain commitment in students toward learning. Students will want to learn, because this is such a cool thing to use. So it kind of hides learning behind cool entertainment. So to you it is just seemingly fun, but to the teacher in the classroom, it is, you learning.

Melanie also agrees that her students find it fun to use. They are playing around on the board without realizing that they are actually learning at the same time. This changes the environment of the classroom. It is now a safe and comfortable place where students come to learn with enjoyment. Technology is something students may find an interest in nowadays, so integrating an interactive whiteboard can increase their enjoyment during lesson instruction. It makes it more interesting and it makes interaction with the lesson content more exciting.
Theme 4: Limitations of Interactive Whiteboards

Not Applicable to All Curriculum areas

Melanie found that the interactive whiteboard was less useful in teaching basic language lessons. Owen pointed out that he did not find it beneficial for visual arts lesson because,

it's not conducive to art. I didn't find it may solve something I was able to use as much in art, because you may not have so many students up at a time, so you really at any given time, you may have two students in a class of 19, you're bound to get students who are going to disengage, the last child to be chosen.

It was interesting that Owen mentioned the issue of turn-taking because Melanie found it useful to actually teach her students to wait for their turn. However, this difference likely reflects the different kinds of classes they each taught. Melanie had a small group of students, only about 10 students in her class, therefore it would have been more manageable for her to have students at the board taking turns. However, in Owens' case, his class had 19 students, which makes it potentially less engaging for some students who have to wait until the end to be up at the interactive whiteboard. It could be a long wait time depending on the activity students are doing at the board. This could be a huge limitation for integrating an interactive whiteboard into regular lesson instruction.

Technical Issues

Melanie pointed out that the only issue she has had with the Smart Board is when it gets moved around from classroom to classroom. She explained that,

it's just that only when you move it from one place to another, you have to calibrate the Smart Board every time you move it. And if there are technical problems, if you are trying to draw on it, and you are not seeing the drawing at the same spot where you want it, you know that it is off calibration. So then you can calibrate it, it's just a button and you have to click on the four points to calibrate it.

This could make interactive whiteboards, or specifically Smart Boards, less desirable for those teachers who are already intimidated by new technology, although the severity of these problems
is very dependent on the age of the particular machine—newer ones are much quicker to calibrate, for example. To now have to also learn how to calibrate and fix potential technical problems could reduce teacher motivation to learn how to integrate this piece of technology. Even thought Melanie felt she was okay with it after learning the first time it needed calibration, the thought of it could be daunting for some teachers who feel less confident in using technology in their lesson instruction.

A problem that Owen shared about the Mimio was that it would sometimes lose wireless connection between the Mimio bar on the whiteboard and the USB key plugged into the computer or laptop device. Once that connection is lost, the Mimio no longer picks up whatever is on your computer screen and you cannot move object around from the whiteboard. However, he does explain that moving closer to the board in proximity could help the connection, though not perfect it. Owen also felt that Smart Boards were challenging to fit in smaller spaces and a big piece of technology to move around a school. For that reason, he enjoyed using the Mimio more although it, too, had some technical issues to work through.

Costs

Both of my research participants thought that interactive whiteboards could be costly for schools. Owen and Melanie both agreed that Smart Boards can be expensive initially and even more costly with training. They thought that resources were insufficient for Smart Boards to be purchased for all schools. Melanie said that she uses a Smart Board in her classroom each day, but she is aware of the cost issue, saying,

it is an expensive thing, right? It's not easy to implement it that quickly. But we are slowly doing it. First we had only one. Then this came in, now we have three in our school. We have been fundraising.
She points out that her school has been fundraising to raise money to slowly equip their school with more resources, such as Smart Boards. However, this does raise the important question about the potential inequities in purchasing school technology. Fundraising efforts while helping some schools can create a bigger gap between schools that can afford to do such fundraising and those that cannot. Also, although Owen uses a Mimio that costs less, he points out it could still add up and whether a school can afford it would depend on the funding the school has.
Chapter 5: DISCUSSION

From the data collected through the two interviews that were conducted, we can see both benefits and limitations to the use of interactive whiteboards in regular lesson instruction. One consideration is that of teacher differences. For example, while Owen loves using the Mimio he would not suggest that every teacher pick up this piece of equipment and start implementing it in their classrooms. Overall, teachers need to use technology tools that they are comfortable with in order to integrate them meaningfully into their teaching. Owen feels strongly about allowing teachers to find their own level in the use of classroom technology. Therefore, while he finds particular benefits for certain things, such as teaching to multiple intelligences, he recognizes that other teachers may employ the same tool for different strategies, such as three part lesson plans instead. Melanie mentioned a similar point. She would encourage teachers to try it, but she also recognizes that it might not work for every person.

Implications for Teachers

Funding

Results from my findings suggest that funding can be a big problem for teachers. Although teachers may be willing to learn how to integrate interactive whiteboards, it may not be financially realistic for some schools. This may be a particular problem for inner city schools. Melanie's school relied on fundraising to purchase new equipment, but would fundraising be an effective or equitable strategy that inner city schools could use to create funding for new equipment? If not, then it would be difficult for these schools to integrate interactive whiteboards into regular lesson instruction.
Pedagogy

With the assistance of an interactive whiteboard during lesson instruction, teachers have the opportunity to teach to more of the multiple intelligences at one time. Teachers are also given a broad range of possibilities as to how they want to present content to their students. They can use interactive whiteboards to display images with sounds for students to hear the images speak to them. Teachers can also use it to create music or to show art examples in a more effective way. It can also be used as a way to motivate and engage students through play. Using interactive activities or games on the interactive whiteboard will make lessons more enjoyable for students and they will learn the lesson content and practise through playing games or exploring websites that offer further information on that specific lesson topic.

Implications for the Educational Community

Professional Learning Communities

Professional learning communities can be an opportunity for teachers to share ideas and plans with each other. Teachers can encourage each other to use interactive whiteboards in class, they can share experiences and their effective practices, share challenges, and work together to improve the creative uses of interactive whiteboards.

It would also be helpful for teachers to share templates that can be used on interactive whiteboards as well as game ideas. Some members of the teaching community might find it interesting to create games to use on interactive whiteboards to help improve student learning for specific topics. These games can be created using a base template that can be modified for any class or subject area. Base templates can be found online, or teachers can create one and keep it as a template that can be easily modified for different lessons.

Professional Development
Teachers have the opportunity to learn new skills all the time. The interactive whiteboard can be something they choose to add to their bank of skills in the classroom. They may not have access to an interactive whiteboard at all times, but learning how to integrate one could be of great benefit for them to then use a shared one at their school.

School boards need to consider how best to encourage teachers to consider developing technology skills in their own professional development especially since technology-related outcomes are now part of many curriculum strands across k-12. It would be a great opportunity for teachers to add to their skills and although this might be intimidating at first, if teachers are supported in trying out new technologies in their teaching, this could create more interest among the current teaching community.

Limitations

As previously discussed in chapter 3, there are a few limitations to this study. This was a descriptive study of only two teachers, and thus any conclusions are at best suggestive, as to whether or not interactive whiteboards will really benefit student academic learning compared to direct instruction. Also, data for this study was collected through interviews with two teachers in the same board of education. Given the small sample and the single Board, this study does not represent the general teaching community. My participants are also fairly young teachers, therefore, they are not a representative sample of all the teachers in the Toronto District School Board. This is just a small case study of two teachers and their experience of integrating interactive whiteboard technology into their lesson instruction. Finally, there are no student voices represented in this study. While both teachers discussed perceived student impacts, these impacts have not been investigated by either interviews with students themselves, nor by any
independent assessment of their work. Therefore, we cannot be sure that students are actually finding lessons using interactive whiteboards to be more motivating or engaging.

**Further Study**

This study provides a small amount of feedback on the integration of interactive whiteboard technology in teaching. However, it does not go deep enough into the topic in order to understand whether or not this technology can really influence student academic learning in a positive way.

There are still some questions that still need to be answered with regards to this topic and to find out if teachers are increasingly integrating it into lesson instruction. Here are some questions for further study:

- How can teachers working in inner city schools integrate interactive whiteboards into regular lesson instruction?
- Can the impacts from learning off an interactive whiteboard pose benefits in student academic learning over a long period of time?
- Do teachers actually enjoy or agree with teaching with more technology? Why or why not?
- With the huge financial costs for interactive whiteboard technology, are schools better off without such equipment and instead focus on spending the money in other areas to help student academic learning improve?
- What kind of training is made available to teachers to learn how to integrate it? Who pays for the costs of training?
- Why aren't school boards picking up cheaper options for interactive whiteboards, like the Mimio?
Conclusion

Overall, the interactive whiteboard can be an interesting piece of technology for both the teacher and the student. This however, is only one perspective. Some teachers and students might also have no interest in using such an expensive piece of technology. Some students also benefit more from actual objects that are tangible, that they can feel and squeeze and manipulate. Some students might also feel uncomfortable with working at the whiteboard because the rest of the class is sitting in their spots watching. Therefore, the integrating this technology into regular lesson instruction may seem like an advantage for both teacher and student, but it might not work out as well as we expect it to. We will not be able to really know until further research is done, where students also share in the discussion of how well they are learning and connecting to content from the lesson through the use of interactive whiteboards.
References


Appendix A: Letter of Consent for Interview

Dear ________________,

I am a graduate student at OISE, University of Toronto, and am currently enrolled as a Master of Teaching candidate. I am studying the integration of interactive whiteboard technology into regular lesson instruction for the purposes of investigating an educational topic as a major assignment for our program. I think that your knowledge and experience will provide insights into this topic.

I am writing a report on this study as a requirement of the Master of Teaching Program. My course instructor who is providing support for the process this year is Dr. __________________. My research supervisor is _____________________. The purpose of this requirement is to allow us to become familiar with a variety of ways to do research. My data collection consists of a 40 minute interview that will be tape-recorded. I would be grateful if you would allow me to interview you at a place and time convenient to you. I can conduct the interview at your office or workplace, in a public place, or anywhere else that you might prefer.

The contents of this interview will be used for my assignment, which will include a final paper, as well as informal presentations to my classmates and/or potentially at a conference or publication. I will not use your name or anything else that might identify you in my written work, oral presentations, or publications. This information remains confidential. The only people who will have access to my assignment work will be my research supervisor and my course instructor. You are free to change your mind at any time, and to withdraw even after you have consented to participate. You may decline to answer any specific questions. I will destroy the tape recording after the paper has been presented and/or published which may take up to five years after the data has been collected. There are no known risks or benefits to you for assisting in the project, and I will share with you a copy of my notes to ensure accuracy.

Please sign the attached form, if you agree to be interviewed. The second copy is for your records. Thank you very much for your help.

Yours sincerely,
Researcher name: _________________________________

Phone number, email: _________________________________

Instructor’s Name: _________________________________
Phone number: __________________________ Email: ________________

Research Supervisor’s Name: _______________________
Phone #: ____________________ Email: _______________________

Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw at any time without penalty.

I have read the letter provided to me by Leona Li and agree to participate in an interview for the purposes described.

Signature: ________________________________________

Name (printed): ___________________________________

Date: ____________________
Appendix B: Interview Questions

Background Information:

1. How many years of experience do you have in teaching?
2. Is technology a large part of your life/lifestyle? If yes, how?
3. How did you come to be interested in integrating technology into your teaching?

Understanding of Topic:

1. In your opinion, what is the importance of technology? What role does it play in today’s society?
2. How were you introduced to the interactive whiteboard? Did you receive official training? How did you learn how to use it/integrate it?
3. What made you decide to integrate interactive whiteboard technology into your daily lesson routines?

Benefits:

1. What are some benefits have you found in integrating interactive whiteboard technology into your regular lesson instruction?

Strategies:

1. Can you provide some examples of lessons you have done with the assistance of an interactive whiteboard?
2. Which curriculum area do you feel the interactive whiteboard is most beneficial for? Why?
3. How can this piece of technology be integrated across all curriculum subjects?

Perceived Student Impacts:

1. From what you have observed, how have your students reacted to learning through an interactive whiteboard?
2. In your opinion, how can an interactive whiteboard benefit student academic learning?

Challenges:

1. Are there any limitations when using this technology for lesson instruction? If so, what are they?
2. Have you experienced any trouble with interactive whiteboard technology? If so, how did you overcome this challenge?
3. If I asked you to name the most challenging thing regarding the integration of an interactive whiteboard into your lesson instruction, what would it be?
Conclusion:

1. Would you suggest that all teachers start to integrate this technology into their regular lesson instruction? If yes, why? If not, why not?
2. In your opinion, is there enough support for the use of this technology in your school/board?
3. Do you have any final comments or opinions in relation to integrating interactive whiteboard technology into regular lesson instruction?