SPECIAL EDUCATION TEACHERS' MOTIVATIONS FOR TECHNOLOGY USE IN THE CLASSROOM: A CLOSER LOOK AT INTERACTIVE TECHNOLOGIES THROUGH THE UNIVERSAL DESIGN FOR LEARNING AND ANTHROPOMORPHISM

BY

ERIN RUTH SILVA

A Thesis Submitted to the Graduate Faculty of

WAKE FOREST UNIVERSITY GRADUATE SCHOOL OF ARTS AND SCIENCES

in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF ARTS

Communication

May 2012

Winston-Salem, North Carolina

Approved By:

Ananda Mitra, Ph.D., Advisor

Marina Krcmar, Ph.D., Chair

Ann Cunningham, Ph.D.

ACKNOWLEDGEMENTS

First and foremost, I would not have been able to be where I am today if I didn't have the loving support of my family. Thank you Mom and Dad for always standing beside me through every decision I have made. Timothy, thank you for sharing your love of Wake Forest with me. I'm glad we were able to share in the traditions of this wonderful place. Last but certainly not least, thank you to my loving twin sister Kirsten. You have shared in my experiences on the roller coaster that is grad school, in those special moments including the ups, the downs. Thank you for sharing in my accomplishments and for being a guiding light and endless resource for my thesis study. You inspired me through the entire process. You are a truly wonderful teacher, sister, and friend.

Thank you, Ananda Mitra, my advisor, colleague, and confidant. You have been integral to my success here at Wake Forest. Through assisting me with this thesis, to classwork, and moving forward after Wake Forest, you have been nothing but kind, gracious, and helpful. It has been a ride and I am truly thankful for your help through this entire process. We did it!

Thank you, Marina Krcmar, for opening my eyes to empirical research. I would not have been able to complete this project without your help along the way. Thank you for having our class, empirical 2.0, go through the IRB process, complete a pilot study, and interpret statistics and writing up our own results. I would have never been able to complete this project without your guidance and the skills that you have taught me.

Thank you, Ann Cunningham, for providing me with endless resources. You played a vital role in my thesis project from providing input on my survey instrument to finding participants. Thank you for being there to help at all times.

Lastly, I'd like to thank my cohorts, my colleagues, and my friends. Thank you for your unwavering support. Through long nights, email chains of endless questions, study sessions, afternoon walks, shrimp boils and of course happy hour, these were two pretty awesome years. Rachel, Stephanie, and Drew, this calls for a toast! We did it!

TABLE OF CONTENTS

ILLUSTRATIONS

TABLES

FIGURES

LIST OF ABBREVIATIONS

CAI – Computer Assisted Instruction

CAST – Center for Applied Special Technology

ICT – Information and Communication Technologies

IDEA – Individuals with Disabilities Education Act

IEP – Individualized Education Program

NCES – National Center for Education Statistics

NCLB – No Child Left Behind Act

UDL – Universal Design For Learning

ABSTRACT

This study employed a survey design (N = 119) of special education teachers in order to conceptualize teacher motivations for technology use in the classroom. This study looked specifically at interactive technologies, namely interactive whiteboards and computer tablets. Survey measures included teacher attitudes towards technology, teacher preparation, and teacher level of innovativeness. Further, teacher level of anthropomorphism was also examined. Additionally, this study sought to break down teacher perceptions of interactive technologies to better understand the specific motivations for their use in the classroom. Results indicate that first, overall attitudes toward technology is significantly related to overall technology use. Second, teacher motivations ended up being a simple construct of benefits. Teachers do not think about interactive technologies in a complex way, rather there is a perceived benefit that pushes teachers to use them. Teacher motivations were broken into the following dimensions, perceived educational benefit, requirement, and personal benefit. Third, anthropomorphism is significantly related to overall attitudes toward technology. There was no relationship between anthropomorphism and overall technology use or teacher preparation and overall technology use.

CHAPTER 1:

INTRODUCTION

Education and technology use have become almost inseparable. From kindergarten to higher education, teachers and schools are always looking for ways to incorporate technology into the classroom. With the prominence of computers, databases, Power Points, and even whiteboards, it seems that traditional teaching methods solely of lecture and print books are fading away. Lessons are now supplemented with technology. However, there seems to be a disconnect on whether or not the use of technology is beneficial to students in the classroom (Freeland, Emerson, Curtis, & Fogarty, 2010). More specifically, it is unclear whether teachers are integrating technology effectively into the classroom and whether or not the use of technology in special education classrooms benefits the learning process for children with disabilities.

In order to fully understand the integration of technology and its effectiveness, it is important to understand the motivations behind particular technology use. This research study will look at technology attitudes, usage, and motivations for technology use by special education teachers. Specifically, this study will focus on interactive technologies, namely interactive whiteboards and computer tablet technology. A survey design study will be conducted to measure teacher's attitudes towards technology as well as the motivations for technology use in the special education classrooms.

This study is of particular importance because, for the 2008-2009 academic year, public schools in the United States enrolled 6,483,372 students aged 3-21 identified as having a disability under the Individuals with Disabilities Education Act (NCES 2010). Of the total students enrolled in public schools throughout the U.S., 13.2% of students

were classified as having a disability. Because students with disabilities account for a significant portion of the population, it is important for us to look at the integration of technology use and its effects in special education classrooms.

To better understand approaches for integrating technology into the classroom, it is important to keep in mind why it is being implemented in the first place. There is theoretical support for the effective application and integration of technology in the classroom; this will be discussed within the frame of the Universal Design for Learning. However, there are other sources pushing the use of these technologies. From federal and state legislation to school district administrators, there is a drive for the implementation of technology in the classroom.

There are national and state standards that require teachers to use technology to support teaching and learning (Kelly, 2002). These standards include the National Educational Technology Standards (NETS, 2008) as well as the 21st Century skills (*The Partnership for 21st Century Skills*, 2009) frameworks which strongly encourage teachers to use technology in the classroom. State and local school districts spend an extraordinarily large amount of money on educational technologies, so the question becomes, *should we or should we not integrate these technologies into the classroom?* In order to successfully do this, it is important to better understand the effects and outcomes of these technologies.

The President's Committee of Advisers on Science and Technology encouraged and stressed the importance of researching educational technologies and their impact on the learning process (Shaw, 1998). The committee suggested that "any research that can shed light on how technology might be employed in a *more* efficacious or cost-effective

manner would be of great value in maximizing the ratio of benefit to cost." Specifically, it was stated that there is a need for empirical studies to be conducted that are designed to determine which approaches to the use of technology are in fact the most effective. The more comfortable teachers are with technology by way of training and practice, the more likely they will integrate the technologies in their classrooms (Jeffs & Banister, 2006). Also keeping in line with the No Child Left Behind Act, teachers are constantly trying to reach assessment scores and the legislation suggests that the use of technology can help students and teachers reach their goals (No Child Left Behind [NCLB], 2002). Further, it is also mandated that teachers need to create Individualized Education Programs (IEP) for students with disabilities that consider a student's need for assistive technologies in the classroom (Fisher, 1999, Council for Exceptional Children, 2011).

Marshall McLuhan is noted for saying "we shape our tools, and they in turn shape us" (Griffin, p. 334). This is phrase certainly applies to the educational sphere. The development of educational and interactive technologies has changed the way teachers communicate with their students and how information is acquired, processed, and learned. Educators look to adopt these technological tools so they can function as a solution for problems, in this case as a method for communicating with students with disabilities.

In today's society, it has become conventional for users to engage with, use, and implement the newest technologies in the everyday structure of their lives. People are always looking for better, faster, and more efficient technologies to present themselves in the marketplace. Once one technology comes out, there is sure to be another quick to follow. Advances in technology tend to drive pedagogy in classrooms due to teachers

adjusting curricula to incorporate the newest technologies (Garrett, 2009). However, educators need to look at understanding the effects of these technologies in order to merit the integration of these technologies in the classroom. Therefore, it is vital to look at individual motivations and their implications on technology use in the classroom.

Taking all of these factors into account, this study will look at the evolution of educational technologies and how they have been applied and researched in general education and special education classrooms. This study will define what constitutes a special education classroom and how the class environment lends itself to technology usage. The theoretical backbone of this study will be based on Universal Design for Learning (Rose, Meyer, Strangman, & Rappolt, 2002) and the implications of technology usage in special education classrooms. Additionally, the concept of anthropomorphism will be applied to teachers' motivations for technology use as a factor that effects overall technology usage in the classroom. To do this, special education classrooms and students must first be defined and differentiated from their general education counterparts.

CHAPTER 2:

LITERATURE REVIEW

Special Education

Special Education, as a concept most similar to our current understanding, has been around since the late 1800s. At this time, schools specifically for the deaf and blind were created. Soon to follow were classrooms that encompassed students of varying abilities from students with emotional disabilities to gifted and talented students. In the 1930's there was a growth in preschool special education and the 1960's brought legislation that provided funding and research in the area of special education (Winzer, 2009). The nation now recognizes special education standards and practices under the No Child Left Behind Act (2002) and the Individuals with Disabilities Education Act (Revised 2004) and the Universal Design for Learning (CAST 2011).

The Individuals with Disabilities Education Act of 2004 states the purpose and importance of special education programs as the need "to ensure that all children with disabilities have available to them a free appropriate public education that emphasizes special education and related services designed to meet their unique needs and prepare them for further education, employment, and independent living" (Individuals with Disabilities Education Act, 2004). Every student has the right to an education that pays attention to and meets their individual needs.

To better understand the focus of current research, it is important to understand the types of research that have developed within the area of special education to best serve students with disabilities. Special Education studies have focused on children with two types of disabilities: learning disabilities, and behavioral and emotional disabilities.

For students with learning disabilities, it has been reported that teaching students in small groups as well as pairs have higher effect sizes than students receiving full class instruction (Elbaum, Vaughn, Hughes, & Moody, 1999). Additionally, it has also been shown that appealing to various senses can be effective when teaching students with learning disabilities (Vaughn & Linan-Thompson, 2003), as well as introducing concepts taught through a multisensory approach by appealing to sight, hearing, touch, and movement (Vaughn & Linan-Thompson, 2003).

Effective teaching practices for students with behavioral and emotional disabilities have also been widely studied. Behavioral reinforcement procedures both positive and negative (Kauffman, Mostert, Trent, & Hallahan, 2002) as well as praise in the classroom (Alberto & Troutman, 2003) have been effective for students with behavioral and emotional disabilities. Social skills interventions have also been additive to the learning process for students with behavioral and emotional disabilities (Landrum, Tankersley, & Kauffman, 2003).

In order to best serve students with disabilities, it is important for special education teachers to understand how students engage and interact in the classroom. Teachers who adapt to the various learning styles of their students can create a positive level of achievement in special education classrooms (Dunn, Griggs, Olson, Beasley, & Gorman, 1995). Additionally, it has been shown that teachers who appeal to multiple intelligences, as theorized by Howard Gardner, can increase success in struggling learners (Voltz, Sims, Nelson). Of the nine types of intelligences, bodily-kinesthetic and visual-spatial are two styles that can be combined and targeted for students with disabilities. Combining the hands-on experience and the visualization of content,

teachers can include students of different learning styles and allow students to engage in the classroom. Therefore, by understanding different learning styles and intelligences, teachers can create an inclusive classroom that meets the needs of all students from the start. The theoretical frame that illuminates the benefits of creating an inclusive classroom is the Universal Design for Learning.

Universal Design For Learning

The Universal Design for Learning, henceforth referenced as UDL, was formed through the collaboration of the National Center on Accessing the General Curriculum, the Center for Applied Special Technology, and the U.S. Department of Education, Office of Special Education Programs (CAST, 2011). The theoretical framework of UDL supports the idea of removing barriers from teaching methods and curricula in order to help all students and encourages the implementation of new media to help set goals, individualize instruction, and assess student progress (Rose et al, 2002).

The UDL framework was created based on the notion that education is not just about the mastery of content or the mastery of new technologies, but rather a mastery of the learning process. Regardless of individual abilities, learning styles, and disabilities, the education system should welcome all learners by providing a stable and barrier free learning environment. UDL caters to this goal by creating curricula that meet the needs of all students from the start (CAST, 2011). Studies have been conducted showing that the UDL framework has been successful for all students as well as students with disabilities in general education classrooms (Cawley, Foley, & Miller, 2003; McGuire, Scott, & Shaw, 2006). Additionally, the UDL framework can be used in conjunction

with assistive technologies to enhance educational opportunities for students with learning disabilities (Messinger-Willman & Marino, 2010).

Since UDL encourages teachers to use methods that allow for flexibility in the classroom to provide more access to help students learn, it seems only fitting that the use of interactive technologies can be applied to class environments to provide equal opportunity for all students (Meyer & O'Neill, 2000). Further, Meyer and O'Neill (2000) state "UDL is predicated on the flexibility of digital media and tools, including digital content, adjustable technology tools for accessing and operating content, and networked resources." If UDL and technology are used together, educators can "enhance the academic, social, and behavior outcomes of students with disabilities" (Messinger-Willman & Marino, 2010). Therefore using the theoretical pillars of UDL teachers can create a flexible learning environment for students with disabilities by integrating interactive technologies (interactive whiteboards and computer tablets) into their curriculum. The three pillars of UDL will be explained in reference to interactive technologies, which will then be discussed in more detail regarding their application and use in special education classrooms in a later section.

The three pillars that create the framework for UDL are providing multiple means of representation, providing multiple means of action and expression, and providing multiple means of engagement. The structure of UDL guides teachers to create a class environment where they can cater to all types of learners. Lesson plans are created with these three different pillars to encompass students with all kinds of learning styles. By creating various modes of representation, teachers have the opportunity to present content in a way that appeals to the visual learner, the tactile learner, and the auditory learner all

within the same class environment. The touch screen user interface provided by interactive technologies can cater to the different modes of representation by appealing to touch through user interaction and audio and visual content through specialized applications and accessibility to the world wide web.

By providing multiple means of action and expression, students can show their understanding of the material through various types of assignments. For example, students can complete a written assignment, create a video project, or a computer generated slideshow presentation. Interactive technologies can assist students by providing multiple means of action and expression. For example the interactive whiteboard has many functions like capturing notes while navigating websites, saving documents for presentations, the ability to create interactive presentations, and the ability to show a final video product that can help students interact with content in different ways and access captured content later through online resources.

Lastly, designing instruction that provides multiple means of engagement requires understanding that "learners differ markedly in the ways in which they can be engaged or motivated to learn" (CAST, 2011). There are many differences in the ways students can be engaged in a class, whether they prefer a consistent routine, spontaneity in classroom assignments, group projects, or individual projects. It would be difficult to cater to all the various means of engagement at any given time, but it is essential to provide multiple modes throughout the school term to give students an opportunity to work in a comfortable learning environment that appeals to them. The flexibility of applying interactive technologies in the classroom allows for its use in group collaboration

assignments or individual assignments and can be adjusted to fit the needs of each student.

UDL helps teachers create a classroom environment that engages all students. By combining the theoretical framework of UDL with the use of interactive technologies, teachers can create lesson plans for the benefits of all students, especially students with disabilities. To further understand why teachers have made the move incorporate technologies in the classroom other than a legal requirement or theoretical benefit, this study will review past research on the use educational technologies in the classroom.

Integrating Educational Technologies in the Special Education Classroom

One of the ways teachers can cater to the individual learning styles and intelligences of students is to implement a successful intervention through the use of technology. Over the past century, technology has become prominent and pervasive in the everyday classroom. Some of the more ubiquitous technological developments that have changed the classroom as well as teaching practices are the chalkboard created in 1890, film projector (1925), overhead projector (1930), educational television (1958), photocopier (1959), Scantron machine (1972), personal computer (1980), and the graphing calculator (1985) (Edudemic, 2011). As a result, it is no surprise that technology has become a common sight in the classroom. Especially now there are even more options than ever with virtual manipulatives, computer assisted instruction, and interactive technologies, such as the interactive white board and computer tablet.

Research reports have shown the use of technology with students who have disabilities can result in positive educational outcomes (Michaels & McDermott, 2003). However, not all teachers are integrating technology into the classroom (Lambert, Gong,

Cuper, 2008). The effective use of technology in special education classrooms cannot be measured if teachers are not using the technologies available to them.

In the current education K-12 education environment, it is often the case that educational decisions are made by administrators, parents, and school board members rather than teachers and what they perceive to be beneficial for their students (Boardman, Arguelles, Vaughn, Hughes, & Klingner, 2005). Research reports have provided methods and approaches for effective teaching techniques and should be more highly valued (e.g. Cushing, Carter, Clark, Wallis, & Kennedy, 2009; Kennedy & Horn, 2004; Ryndak & Alper, 2003), however, teaching approaches should be validated and proven with positive outcomes before decisions are made from administrators.

Specifically the integration of technology and its use in the classroom is an area that needs to be further developed by research. Since it is generally accepted that technology can create an inclusive learning environment, it is important to keep some baseline questions in mind: *Is technology available in the classroom? Are technologies being utilized? What are the motivations that drive teachers to incorporate technology into the classroom?*

Teachers will rely on years of experience and successful implementation more often than not, when determining what is the best method for accommodating the needs of their students. Though personal tendencies of teachers and even external decisions from the administration play a role in curricula development, determining the needs of each student and tending to those needs is the most significant responsibility for teachers in special education classrooms (Boardman et al., 2005). Therefore, this study will focus

on how teachers can incorporate technology in the classroom for the benefit of all students.

Many educational technologies have had an impact on the academic achievement of students in general education classrooms as well as special education classrooms and should not be overlooked. There have been positive education outcomes associated with the integration of computer based assistive technology and students with disabilities (Connor, Snell, Gansneder, & Dexter, 2010) as well as the utilization of information and communication technologies, or ICT (Fitchen, Asuncion, Barile, Ferraro, & Wolforth, 2009; Williams, 2005; Williams, Jamali, & Nicholas, 2006).

Assistive technologies, or access technologies, have played a major role in the current special education classroom. Assistive technologies as defined by the Individuals with Disabilities Education act as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (IDEA, 1997). Teachers should be aware of these assistive technologies so they can plan lessons accordingly and implement these technologies to meet the needs of students in their classroom. Particularly, the use of these assistive technologies has been researched in students with visual impairments. Some of the more focused studies examine the influence of teacher preparation programs nationally and internationally as well as the effect of assistive technologies on standardized test scores (Safhi, Zhou, Smith, & Kelley, 2009; Zhou, Parker, Smith, & Griffin-Shirley, 2011; Freeland, Emerson, Curtis, & Fogarty, 2010).

ICT are useful additions to the classrooms that enhance the learning process as well as liberate students from physical constraints (Williams, 2005). ICTs are digital technologies that can help with the interpretation of digital material, an example being Microsoft Word or any word processing program. Word processing tools allow users to manipulate and edit digital text, and like many ICTs can help engage students with material. There is growing support for integrating ICT into classroom environments to promote the inclusion of all students, particularly students with disabilities into mainstream classroom environments (Williams, Jamali, & Nicholas, 2006). Further, the perceived benefits of using ICT for students with special needs has been outlined by Williams et al (2006). The benefits for using ICT are described as helping facilitate tutor programs, improving exploratory learning, using technology as a tool, aiding in communication, use in assessment of skills, and for use as a management tool. Studies have examined the use of ICT for students with specific needs such as visual impairments (Carey, 2000), writing difficulties (Larcher, 2000), and cognitive disabilities (Harrysson, Svensk, & Johansson, 2004).

Another technological development that has changed the classroom is virtual manipulatives. Being an expansion of a more traditional approach in the classroom, virtual manipulatives are computer-based simulations of physical manipulatives that are accessed on the internet or through computer software (Bouck & Flanagan, 2010). This teaching approach is used often in mathematics for concepts such as fractions and learning Base 10 calculations. Due to the visual aspect of the manipulatives as well at their interactive nature, positive academic results have been reported (e.g. Reimer & Moyer, 2005; Suh, Moyer, & Heo, 2005). Virtual manipulatives are used most often in

the elementary school level and with younger children and are appealing to teachers because of the endless resources available online. Virtual manipulatives also provide students with instant feedback on their progress as well an endless time frame to learn the targeted concept. An advantage to the use of virtual manipulatives is that they can be accessed outside of the classroom and students can reinforce their learning at home.

Additionally, the use of virtual manipulatives has been found to be beneficial in the special education classroom, particularly in mathematics (Maccini & Gagnon, 2000; Miller, Butler, & Lee, 1998). Virtual manipulatives allow students to work independently and at their own pace. Students can work on their own if they need more time to learn the concept while the teacher addresses the rest of the class. The application of virtual manipulatives is appealing to students with disabilities because of their engaging and interactive nature as well as the ability to receive instant feedback from software programs (Bouck & Flanagan, 2010).

Virtual technology has also been an area of focus mainly in the special education classroom. Students with cognitive as well as physical disabilities can benefit from virtual reality, simulation, and virtual field trip technology (Powers & Darrow, 1994). Virtual reality programs provide immersive learning environments for students (Smedley & Higgins, 2005). For example, programs have been shown to be effective in teaching students with disabilities concepts about the home (Neale, Brown, Cobb, & Wilson, 1999) and also about chemistry and physics (Nadis, 1999). Virtual learning environments have also been shown to benefit students with autism by providing social skills training (Williams et al., 2006). With virtual reality technology, students are provided with an opportunity to explore places and content they would otherwise not

have access to in person in a risk-free environment, expanding their scope and knowledge base of society and the world around them.

Additionally, a growing area of educational technology is computer assisted instruction or CAI. CAI covers more broadly, technology use as supplemental material instead of using a particular program. CAI has been integrated and studied largely in the fields of learning a second language (Garrett, 2009), mathematics (Larwin & Larwin, 2011), and literacy and reading studies (Chambers, Slavin, Madden, Abrami, Logan, & Gifford, 2011). The effects of CAI have also been studied at the elementary, secondary, and post-secondary levels of education. CAI is used to facilitate the teaching process for both students and teachers by engaging students in ways previously unavailable. Based on the meta-analysis by Larwin and Larwin (2011), CAI can be beneficial to student achievement in small class settings as well as a supplementary approach to a previously designed lesson. CAI allows students to access websites and software designed to supplement lesson plans from the teacher. For example, in language classes, CAI is used for students to practice oral skills while interacting with the software in a different language. The computer allows the teacher to record and listen in on students oral competency lessons. It has been shown that students who use computer-based learning systems outperform those students who did not use computer-based instruction (Shaw, 1998). Studies have also shown that students who use CAI learn significantly faster, enjoy their classes more, and develop positive attitudes towards computers and technology (Kulik, 1994). CAI also allows for the active engagement of students with the learning process. A study conducted by Haugland (1999) showed that engagement is directly linked to motivation. This is a point that will be further explored later in regards

to interactive technologies. Further, motivation of young and primary-aged children increases when instruction is supplemented with the use of computers.

CAI has been used to teach students with disabilities since the 1970s (Okolo, Bahr, & Rieth, 1993), and has been shown to increase motivation and attention to tasks by presenting information in a new and exciting way. Using multi-sensory approaches to the technology design and its applications, students can become more engaged with the content via the computer than they would have otherwise without the technology. However, the traditional sense of CAI allows only one student to engage with the technology at once.

The more recent technological developments of the interactive white board and the computer tablet can allow for a whole class, small group, or individual instruction, and will be explored in the next section. The success of technologies like ICT and virtual learning environments provide a basis for the continuing integration of technology in the classroom. As computer technologies have been shown to be effective by providing the opportunity to learn with different modes of presentation, engagement, and assessment, it is assumed theoretically that these newer technologies can also be effective in the classroom. Both interactive whiteboards and computer tablets are relatively new tools that are being applied in special education classrooms and will be the focus of this research study. More information is needed regarding how interactive technologies can assist and add to the learning process for students with disabilities.

Interactive Technologies

Two of the more recent developments in educational technology which are becoming prominent are the interactive whiteboard, in particular the SMART Board, and

the tablet computer. The first interactive whiteboard was developed and produced by SMART Technologies Inc. in 1991. The SMART Board provides teachers with many options for its use including, manipulating texts and images, taking and saving notes, connecting to the internet and projecting webpages on the screen, and even allowing students to write on the screen with the ability of printing out their work (SMART Technologies, 2004). Interactive whiteboards create an engaging learning environment for students. It is reported that SMART Boards "increase student engagement during the learning process" (Beeland, 2002), and the act of being physically involved by touching and moving objects on the screen leads to student engagement and knowledge acquisition for young children (Harlen & Rivkin, 2000). Interactive whiteboards, if used effectively can increase student attentiveness and interest in daily lessons.

Interactive whiteboards seem to be an ideal special education classroom tool. A review of literature on interactive whiteboards by Koenraad (2008) illuminates the pros and cons of using this technology in an educational setting. The benefit of the implementation of interactive white boards in special education classes comes from the ability to cater to various learning styles (Koenraad, 2008). When used effectively interactive whiteboards combine the physical and the spatial learning styles. The technical features of the board can contribute to processing of information, engagement, and concentration, particularly in special needs students (Ofsted, 2005; Zirkle, 2006). Since interactive whiteboards are used by touching the screen, students do not have to work with a keyboard and mouse which allows more freedom for students with motor skills disabilities who struggle with traditional computer use.

SMART Technologies also researched the benefits of the interactive whiteboard and its ability to reach out to students with special needs. For example they found that there are benefits to the visual learner by witnessing the manipulation of objects on the screen as well as the kinesthetic learner who can touch and alter the space on the board (SMART Technologies, 2004). The impact of SMART Board technology use has been studied regarding observational learning in both young adults with disabilities (Mechling, Gast, & Krupa, 2007) and kindergarten-age children with disabilities (Campbell & Mechling, 2009). These studies focused on how observational learning provides support for small group instruction with SMART Board technology as well as the ability for students to acquire knowledge through observation and feedback between the teacher and their peers.

Another recent technological development that has been adopted in classrooms is the tablet computer. Tablet computer technology provides a unique and individual learning experience for students. With direct, hands-on manipulation, students are engaged with content on an individual level. Studies have found that the use of computer tablets in the classroom improves student engagement due to their highly interactive nature (Schroder, 2004). Teachers create lessons and applications for the tablet and allow students to complete the assignments at their own pace. With the use of tablet computers, each student has his or her own screen to focus on and can work independently from the traditional class/group dynamic.

Tablet computers are a new and emerging technology and have shown promise for being applied in the special education setting. There is little to no research on the effect of these technologies in students with disabilities, and empirical research should be

conducted on the efficacy of computer tablets in special education classrooms. Personal testimonies of the growing potential of tablet technology use are discussed in an article by Shah (2011). Shah states that tablet computers are useful for students with disabilities because of the variety of applications that are created specifically to address the individual needs of students. Applications such as "Math Ninja" and "A Piece of Cake" are useful for students with disabilities. Combining academic goals with games allows students to more easily engage with content and be less intimidated by educational constructs than if they were working with pen and paper.

The development of these applications for tablet computers is not an accident. By appealing to different modalities, the makers of tablets, particularly Apple, have created an entire line of educational "apps". The advances in software technology have led to the creation of multiple apps that create opportunity for multiple modes of engagement. There is a push for educational applications that are helpful in special education classrooms and this stimulates the development of even more applications. There is an incredible potential for the use of tablets in the special education classroom. Therefore, moving beyond the cost of the technology and the theory of successful outcomes of tablet use, these tools should be applied in the special education classroom to determine their efficacy through research practices.

When referring to the use of computer tablets, Rochette (2007) states that the more we can teach students using their media, the more effectively we can reach the space in which they learn. Students are becoming more and more familiar with technology, especially with computers, and if teachers can better understand the possible integration and application of computers and other educational technologies in the

classroom, it is possible to tap in to the unique learning styles of students who use these technologies in their everyday lives. Also, Clements and Sarama note that educational technology can encourage children's thinking and provide an opportunity for children to be in control and engaged in problem solving (2003). This engagement that students experience can open a window into childhood development for teachers to better understand how to present content to children in a meaningful way. The more teachers integrate technology, the more they can understand the overwhelmingly digital lives current students are living.

As teachers continue to look for ways to integrate familiar technologies into the curriculum, we should continue to analyze and revisit the unique educational properties that these technologies offer. Both interactive whiteboards and computer tablet technology appeal to the visual and kinesthetic intelligences of students. These technologies have the capability of appealing to all of the senses, particularly touch, sight, and sound. Further, by targeting these senses, both the interactive whiteboard and the tablet have the potential to enhance the academic experience for students with disabilities. These technologies can be effective theoretically, but it is necessary to look further into the application of these tools. More research needs to be conducted to see if these technologies are additive to the learning process or if they are just occupying time and energy without any positive effects. This study will look to isolate the individual motivations for teachers to use interactive technologies in special education classrooms.

Teacher-Student Communication via Technology

Technologies have been incorporated into classrooms to increase efficiency as well as demand on teachers who work with disabled students, when presenting complex

content (Carnine, 1989). It has also been observed that the use of technology can provide a learning experience that would have been impossible otherwise for students with disabilities (Woodward, Carnine, & Gersten, 1988). Teachers can utilize technology to create more dynamic lessons by catering to multi-sensory approaches, from a traditional pen and paper assignment, to textbook reading, to a visualization of the content on the computer. The teacher can pull content from different resources and students can ask questions and become more involved with the variety of content they are exposed to with technology enhanced lessons. Additionally, students exposed to multi-sensory learning environments have enhanced memory and knowledge of the presented content (Birsh, 1999). Thus, it is important to look at teacher motivations for technology use as individual motivations should be related to overall usage of technology in the classroom.

Studies have shown that students with disabilities benefit academically from active engagement (Hunt, Soto, Maier, & Doering, 2003) as well as inclusive settings (e.g. Browder & Cooper-Duffy, 2003; Turner, Baldwin, Kleinert, & Kearns, 2000). The implementation of technology in the classroom creates an interactive learning environment by promoting peer interaction and discussion and can lead to a change in teacher pedagogy (Smith, Hardman, Higgins, 2006). Additionally, the implementation of technology also allows teachers to coordinate interactive small group assignments that can generate discussion, increase observational learning, and allow for peer learning. The increasing use of technology has also aided in developing universal design program for students (McGuire, Scott, & Shaw, 2003), hence the theoretical framework of UDL came into being. The more variety of instruction in a classroom that can be

supplemented with technology, the more likely a teacher can appeal to the various learning styles of students.

To better understand what teachers believe is effective technology use, this study aims to look at teacher motivations that can lead to the successful implementation of technologies. Since interactive technologies provide one more way for teachers to engage students of all levels and competencies, this study will attempt to isolate variables that effect overall technology use. Specifically, this research study will explore teacher attitudes, level innovativeness, teacher training and preparation, as well as distinct motivations that can help conceptualize the various factors that relate to overall technology use in the classroom.

Determining Teacher Motivations for Technology Use

There have been many studies which look at the effects of technology in the classroom and the outcomes of technology use on student performance (i.e. Michaels & McDermott, 2003; Connor et al., 2010). However, there is not a significant amount of literature pertaining to teacher motivations for technology use in the classroom, specifically in the special education classroom. Studies have been conducted looking at teacher motivations for computer use (van Braak, 2001) and teacher motivations for using assistive technology in the special education classroom (Connor et al. 2010). However, understanding teacher attitudes toward technology may aid in understanding individual motivation for technology use in the classroom.

Teacher Attitudes Toward Technology

Teacher attitudes toward various technologies has been found to be a reliable predictor for teacher technology use. Attitudes towards computer use has been measured

in several studies and has led to the construction of various computer attitudes scales (i.e. Kay, 1989; Loyd & Gressard, 1984). A scale regarding general attitudes toward computers as well as an attitudes towards computers in education scale was created by van Braak (2001), and is adopted for this study. Teacher attitudes toward technology have been looked at through specific types of technologies, mainly computers, and for this study will be applied to interactive technologies. Though this scale has been reliable in the past, items were reduced and adjusted to accommodate interactive technologies. This scale will be used to better understand the relationship of teacher attitudes towards technology on overall technology usage and the theoretical effect that relationship could have on the educational outcomes of students with disabilities. However, another aspect of teacher attitudes that may also effect overall technology use is teacher level of innovativeness.

Innovativeness

In previous studies, innovativeness has been studied as a concept that can help us understand a teacher's willingness to adopt technology in the classroom and utilize new technologies as they become available. There have been studies showing that teachers level of innovativeness (van Braak, 2001; Marcinkiewicz, 1994), and attitudes toward technology are related to a teacher's use of technology in the classroom. Marcinkiewicz (1994) predicted the connection between innovativeness and computer use in teachers. This particular study was found to be reliable and if generalized, the same concept of innovativeness should apply to teachers general technology use, not just computers.

In this study, innovativeness will refer to the willingness to change and adapt interactive technologies in the classroom. Though innovativeness has been shown to be a

reliable predictor of computer use, this study will see if the same holds true for interactive technology use in the classroom. Innovativeness combined with teacher attitudes toward technology can help researchers conceptualize a more holistic variable of teacher attitudes to compare to overall technology use.

In measuring overall technology use, this study will control for teacher confidence with technology. Teacher confidence will be controlled because theoretically teachers who are more confident in their technology use and skills would naturally use technology more. This will be controlled for to create a baseline among subjects to see the isolated relationship between overall attitudes and overall technology use. Therefore, the first research question of this study is as follows:

> *RQ1: Controlling for teacher confidence with technology, what is the relationship between overall teacher attitudes toward technology use and overall usage of technology in the classroom?*

Teacher Preparation

When working with educational technologies, it is important to remember that the technology itself will not improve the educational environment. The technology needs to be applied and integrated effectively to enhance the curriculum and present content in ways that benefit the student. Therefore, the problem with many educational technologies including interactive technologies is that their success is determined by how they are used. Teachers need to apply educational technologies in a meaningful way to the classroom to reinforce the learned content; otherwise, why use technology in the first place?

Unfortunately, it seems that these technologies are significantly underutilized by students and teachers, and their knowledge of these technologies is minimal (Zhou et al., 2011). How can teachers create a conducive and open learning environment for students if they do not aid them as much as possible with the use of technology? Mull and Sitlington (2003) state, that educational technologies have the capability of improving the learning process for students as well as increasing knowledge attainment by providing a level playing field for students with physical, emotional, and/or behavioral disabilities. Mull and Sitlington (2003) also state that the integration of assistive and computer technology in special education classrooms can depend on the training of the teachers. Therefore, teacher training should be measured to see if there is a relationship between proving training opportunities and overall technology use. It is important to consider teacher training in order for teachers to have the necessary knowledge of these technologies and to be able to implement their use successfully in the classroom.

Level of teacher preparation (i.e. Anderson & Petch-Hogan, 2001; Dexter Anderson, & Ronnkvist, 2002) has been shown to be a factor related to the actual use of technology in the classroom. Teacher preparation has also been shown to be a positive predictor of teacher willingness to use technology in the classroom (Connor et al., 2010). Specifically, in the special education classroom, technology training and orientations allow teachers to feel more comfortable using the technology as well as the potential for technology in the classroom (Pope, Hare, & Howard, 2002; Maushak & Blodgett, 2001). Teacher preparation includes direct training on how to use technology, collaboration with other teachers, and orientation and support programs from the administration. For this research study, items portraying overall teacher preparation were adapted from a previous

study by Connor et. al (2010), and were changed to accommodate interactive technologies. Teacher preparation items were broken down into two categories, formal training and teacher collaboration. Teacher training will be measured to see if there is a relationship between the types of training and actual technology use, and will be the focus of the next research questions of this study:

> *RQ2: What is the relationship between overall teacher preparation and teacher technology use?*

Innovativeness, attitudes towards technology, as well as teacher preparation can all be related theoretically to motivations for technology use. However, there are other factors that can effect whether or not teachers are willing to adopt and integrate technologies into the classroom. To better isolate the individual factors that may help determine technology use, we will look at specific motivations for technology use in the classroom.

Teacher Motivations for Technology Use in the Classroom

Teachers' use of technology has been studied broadly from the integration of particular technologies, like assistive technologies (Connor et. al, 2010), to the individual characteristics that influence the use of computers in the classroom (van Braak, 2001). However, it seems that literature does not identify the critical factors that effect teacher use of technology on an individual level.

This area can be developed further by trying to isolate the main motivations for teachers to use technology. After a review of literature and many open discussions with current special education teachers, the most prominent factors that seem to motivate special education teachers to incorporate interactive technologies in the classroom are

student engagement (Giangreco, Broer, & Edelman, 2001; Seo, Brownell, Bishop, Dingle, 2008), the requirement for technology (Kelly, 2002), student incentives (Ely, 1999; Moore, 2007), meeting accommodation needs (Janney & Snell, 2004; Scruggs & Mastropieri, 1996), the perceived educational benefits (Shah, 2011), and allowing more time and efficiency in lesson planning (E. Silva, personal communications, September-October, 2011). Based on these six categories, the researcher of this study developed an instrument to measure teacher motivations.

To better understand how these motivations behind technology use, specifically for interactive technologies in special education classrooms, factor into overall technology use, this study posits the following research question:

> *RQ3: What factors motivate teachers to incorporate interactive technologies into the classroom?*

Technology and Anthropomorphism

Motivations for technology use can have a direct impact on overall technology use in the classroom. However, there are also some innate human characteristics that are offered by interactive technologies which can effect overall technology use.

As discussed previously, we have seen the effects of technology on the development of the classroom through the years. With the growing use of technology and implementation of technologies in the classroom, instruction and the class environment have changed. The question remains, however: what is it about these new interactive touch-based technologies that appeal to us so strongly? Based on previous literature, this study will postulate that teachers use interactive technologies because they appeal to our very nature as humans.

The physical interaction, active manipulation, and engagement that is encouraged by using interactive technologies provides a means for humans to identify with the technology itself. Generally, this concept in which technology can have human characteristics and that we form bonds and relationships with technology is referred to as anthropomorphism.

Anthropomorphism is defined as "the attribution of a human form, human characteristics, or human behavior to nonhuman things such as robots, computers, and animals" (Bartneck, Kulic, Croft, & Zoghbi, 2009). It is such that humans are defined by their activities and relationships. Therefore, it is believed that as technologies become more and more humanlike we will begin to associate unique human characteristics with the technologies. Studies have shown that the more a technology is anthropomorphized, the more competent and capable we believe it to be as well as more trustworthy with completing important tasks (Waytz, Cacioppo, Epley, 2010). This study will pose that the more humanlike a technology is, the more we are interested in them, and the more likely we are to use the technology.

To provide some background, human characteristics that are commonly studied through the lens of anthropomorphism as synthesized by Epley, Waytz, Akalis, & Cacioppo (2008) are physical appearance (Guthrie, 1993), emotional states (Leyens, Cortes, Demoulin, Dovidio, Fiske, & Gaunt 2003), and mental states and motivations (Gray, Gray, & Wegner, 2007). Additionally, anthropomorphism is commonly studied with animals and non-human, inanimate objects (Cheney & Seyfarth, 1990; Epley, Waytz, & Cacioppo, 2007), and computers and technologies (Tondu & Bardou, 2009). Specifically, there is an abundance of research on computers and programs that provide

visual and aural feedback (Gong, 2008; Gong & Nass, 2007; Nass & Brave, 2005). Further, research studies that have incorporated anthropomorphism have also focused on artificial intelligence (Turing, 1950) and virtual reality (Heim, 1993). Studies have looked at how attitudes are formed towards technology based on human characteristics as well as how behavior changes as a result of anthropomorphism. For example, Sundar (2004) found that students developed a sense of loyalty to computer terminals in computer labs on campus over time and repeated use. Additionally, motivational determinants of anthropomorphism, particularly sociality and effectance motivations have been studied to help us understand the contributing factors for why some people anthropomorphize more than others (Epley et al., 2008).

Additionally, Waytz, Cacioppo, & Epley (2010) pose that anthropomorphism requires "attributing human form or a human mind to a [non-human] agent," and the essence of anthropomorphism refers to attributing characteristics and capacities that "people tend to think of as distinctly human to non-human agents." This attribution of human characteristics has appeared to enhance human-computer interaction by increasing engagement (Nass, Moon, Fogg, Reeves, & Dryer, 1995) and by leading to more effective collaborative tasks (Burgoon, Bonito, Bengtsson, Cederberg, Lundeberg, & Allspach, 2000). Therefore, the unique characteristics of interactive technologies combined with their appeal to all users can also be explained by the theory of anthropomorphism.

For this study, it is postulated that if people form relationships with technology with just aural or visual stimuli, it should hold true that relationships are formed with physical stimuli. Interactive whiteboards and computer tablets serve as the prime

examples for anthropomorphism in this sense. The process of physically providing the input to these technologies and controlling the output encourages users to explore the uses of the technology and seek rewards. Based on the idea of anthropomorphism, we use these new interactive technologies to receive sensory feedback primarily through touch, but also sight and sound. This feedback provides humans with a physical and psychological reaction that allows us to understand and use the technology because it is instantly satisfying and rewarding. By physically being able to manipulate the technologies and in a sense "telling" the technology what to do, users are engaged and attentive when using interactive technologies. The unique features allowing the user to incorporate touch, movement, and active engagement can lead to motivation in the classroom as well as provide a means to appeal to various learning styles.

Therefore, if teachers tend to relate technology with human interaction, and thus have a higher level of anthropomorphism, there will be a higher use of these interactive technologies in the classroom overall. Also, with higher levels of anthropomorphism, teachers will have more positive attitudes toward technology. For this study, anthropomorphism will be measured through an *ease of use* scale that was created as a result of a focus group with special education teachers. Thus, this study presents the following research questions:

> *RQ4: What is the relationship between teacher level of anthropomorphism and overall technology use in the classroom?*
>
> *RQ5a: What is the relationship between a teacher's level of anthropomorphism and teacher attitudes toward technology?*
>
> *RQ5b: What is the relationship between a teacher's level of anthropomorphism and motivations for technology use?*

CHAPTER 3:

METHOD: SUBJECTS, INSTRUMENTATION, AND DATA COLLECTION

An online survey was distributed to special education teachers to measure teacher motivations for technology use, overall technology use in the classroom, technology availability, and student usage of technology in the classroom. The survey was administered to a sample of special education teachers to test the research questions of this study.

Subjects

Subjects were special education teachers who agreed to take part in this research study. Teachers were considered to be eligible to complete the survey if their primary responsibility was teaching students with special needs, and if they used interactive technologies in their classroom. Teachers were recruited through a snowball/network sampling process. To recruit subjects, initial contact was first made with school district special education coordinators who forwarded the survey link on to special education teachers in each coordinator's respective district. Teachers were also asked to forward the survey along to other special education teachers who may not have received the survey when applicable. In total (*N= 119)*, 91% of subjects were female and 9% male. Also, 60% were elementary level teachers, 21% were middle school level teachers, and 22% were high school level teachers.

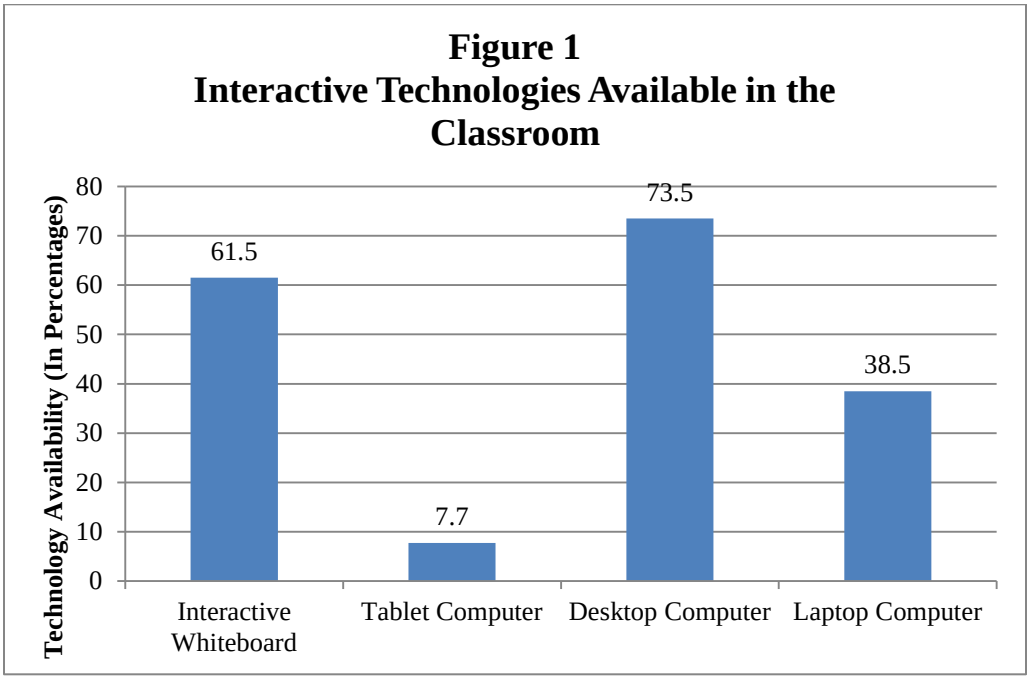
Instrumentation

Demographics

Included in the survey, were 11 items related to the demographics of the special education teacher and their school (i.e. How many years have you been teaching in your

current field of education? Which best describes your classroom setting?). Further, three items asked the teacher to think of one student in their classroom and report how long the student spent in their classroom (ranging from one day a week to five days a week), how much time of the school day did the student spend in the classroom, and which interactive technologies were available to the student when in the classroom. Also, teachers were asked which type of classroom setting they were in, an inclusion setting where the special education teacher is in the general education/mainstream class, a resource class where the student goes to a separate classroom for certain subjects, or a self-contained class where the student spends their time receiving individualized instruction. From the final sample, 40% reported being in a resource classroom setting, 41% in a self-contained classroom setting, and 16% reported being in an inclusion classroom setting. Additionally, of surveyed subjects, 38% worked in an urban school, 41% worked in a suburban school, and 21% worked in a rural school environment. Please see Figure 1 for the distribution of available technology in the classroom.

Figure 1
Interactive Technologies Available in the Classroom



Independent Variable Measures

Attitudes Toward Technology

To measure teacher's attitudes toward technology, an eight item scale was created. Items were adapted from an attitudes toward computers in education scale created by van Braak (2001) that was previously shown to be reliable (α = .89). Items were assessed for face validity and only some were kept from the original scale. Items were dropped because they were not related to the variables of interest in this study. Additionally, one item was added by the researcher, "Integrating interactive technologies into lesson plans does not take much time", to present an additional facet of teacher attitudes. Items on the scale were measured using a 5-point Likert type scale with anchors Strongly Disagree and Strongly Agree. Examples of some items included were "Interactive technologies provide an opportunity for improving academic performance," "Interactive technologies can increase student motivation," and "Interactive technologies allow teachers to help students with different learning styles." The eight item scale used in this study was found to be reliable (M = 4.28, SD = 0.48, N = 106, α = .83). See Table 1 for means and standard deviations of scale items.

Table 1. Means and Standard Deviations for General Attitudes Toward Technology

	Means	Standard Deviation	*N*
Interactive technologies provide an opportunity for improving academic performance	4.44	0.59	107
Interactive technologies can improve the efficiency of my instruction	4.36	0.75	106
Integrating interactive technologies into lesson plans does not take much time	3.11	1.08	107
Interactive technologies can increase the level of creativity in students	4.26	0.72	107
Interactive technologies can increase student motivation	4.56	0.59	107
The pre-service teacher should be provided with strong skills and practice with interactive technologies during his/her training	4.41	0.69	107
Student with learning disabilities can benefit strongly from the use of interactive technologies	4.55	0.54	107
Interactive technologies allow teachers to help students with different learning styles	4.63	0.54	107

Innovativeness

The innovativeness scale was composed of 12 items adapted from two scales created by van Braak (2001) which were previously found to be reliable (α >.79). Items were omitted from the adapted scale based on relevance and face validity. For this study, the scale included items such as "I find interactive technologies beneficial for my teaching practice," "New technology is not a high priority in the subject I teach," and "I'm aware I usually accept ideas later than people around me." Items were measured on a 5-point Likert type scale ranging from Strongly Disagree to Strongly Agree. In total the 12 item scale was found to be reliable at α = .86 (M = 4.22, SD = 0.54, N = 102). See Table 2 for a break-down of the innovativeness scale including means and standard deviations.

The overall variable measure for teacher attitudes toward technology combined both general attitudes toward technology and level of innovativeness. The overall

attitudes measure consisting of 20 items was found to be reliable at $\alpha = .89$ ($M = 4.25$, $SD = 0.45$, $N = 101$).

Table 2. Means and Standard Deviations for Innovativeness

	Means	Standard Deviation	*N*
I have realized that the introduction of interactive technologies represents an added value to my teaching practice	4.42	0.70	108
I personally realize that now is the time to use technology to teach my students	4.41	0.82	108
I find interactive technologies are beneficial for my teaching practice	4.37	0.79	108
I believe there is a need for the introduction of new technologies in my teaching practice	4.34	0.90	108
I believe interactive technologies benefit education as a whole	4.44	0.74	108
I think that introducing interactive technologies into the classroom can be beneficial to the profession of education in general	4.44	0.73	107
Using new technology is not a high priority in the subject I teach	3.84	1.20	108
I seldom trust new ideas until I see the majority of those around me accepting them	4.07	0.96	108
I'm aware I usually accept new idea later than people around me	4.06	0.88	106
I'm skeptical about the use of new educational methods until I notice they are successful for my colleagues	3.95	0.97	108
I do not seek change in my teaching practices	4.41	0.89	106
I am generally very careful about accepting new ideas	3.56	1.11	105

Teacher Preparation

A total of seven items were asked in regards to teacher preparedness. Items regarded teacher training, peer collaboration, and time allotment for learning the technology. Examples of questions included are "How many times in the past year did you receive in-service or workshop training in interactive technology?," "How often do you collaborate informally with teachers about interactive technology?," and "How much extra time (beyond planning time) do you use for programming and set up of interactive technology?" The items were drawn from a survey created by Connor et al. (2010). For

this study, teacher preparation was broken down into two facets, formal training and teacher collaboration to better illuminate the relationship between teacher preparation and teacher technology use. Formal training (M = 1.98, SD = 0.89, N = 106) consisted of two items. Since there were only two items to measure formal training, the researcher checked to see if the two items were strongly correlated in order to justify the creation and use of the formal training variable. It was such that the two items were significantly correlated (r =.31, p, .001) and therefore, was used as an individual measure. Teacher collaboration was measured with 5 total items and was found to be reliable (M = 3.02, SD = 0.82, N = 104, α = .63). See Table 3 for individual items as well as means and standard deviations.

Table 3. Means and Standard Deviations for Teacher Preparation Measures

	Means	Standard Deviation	*N*
Formal Training:			
How many times throughout the past year did you receive in-service or workshop training for interactive technologies?	2.23	1.16	106
How many times did you receive one-on-one training or assistance with interactive technology?	1.72	1.04	107
Collaboration Training:			
How often is extra time provided by your school specifically for collaboration with other teachers on interactive technology?	1.86	1.05	105
How often is extra time provided by your school specifically for collaboration with other teachers on accommodation needs of your EC student(s)?	2.41	1.49	106
How often do you collaborate informally with teachers about interactive technology?	3.00	1.40	107
How often do you collaborate informally with teachers about the accommodation needs of your EC student(s)?	4.13	1.07	107
How much extra time (beyond planning time) do you use for programming and set up of interactive technology?	3.68	1.41	107

Motivations for Technology Use

Motivations for technology use scale items were based on research as well as feedback from personal interviews with special education teachers. Motivations were developed as categories that explained why a teacher would be likely to use technology in the classroom. Motivation categories were student engagement (Giangreco, Broer, & Edelman, 2001; Seo, Brownell, Bishop, Dingle, 2008), the requirement for technology (Kelly, 2002), student incentives (Ely, 1999; Moore, 2007), accommodation (Janney & Snell, 2004; Scruggs & Mastropieri, 1996), perceived educational benefits (Shah, 2011), and time/efficiency (E. Silva, personal communications, September-October, 2011). In all, this scale yielded a total of 22 items that were measured on a 5-point Likert type scale from Strongly Disagree to Strongly Agree. Some of the items included in the scale were "I use interactive technologies because it is required by my school," "I use interactive technologies as a supplemental teaching tool," and "I use interactive technologies because it gets students involved with the material." For a list of items and means and standard deviations, see Table 4.

Table 4. Means and Standard Deviations for Teacher Motivations

	Means	Standard Deviation	*N*
I use interactive technologies only because it is required by my school	1.67	0.75	106
I use interactive technologies only for special occasions	1.76	0.86	106
I don't use interactive technologies because it gets in the way of the content I am trying to teach	1.63	0.84	106
I don't use interactive technologies because it distracts my students from learning	1.60	0.80	104
I don't use interactive technologies because my lesson plans are successful without them	1.74	0.87	106
I find interactive technologies are beneficial for my teaching practice	2.82	1.29	106
I use interactive technologies to take pressure off of my personal (traditional) lesson planning	2.59	1.01	103
I use interactive technologies to give myself more free time	1.85	0.86	103
I use interactive technologies to create lesson plans more efficiently	3.48	1.09	105
I use interactive technologies because they are hands on	4.22	0.88	106
I use interactive technologies because they are engaging	4.49	0.65	106
I use interactive technologies to customize lesson plans to fit each student's needs	4.05	0.92	106
I use interactive technologies because they get my students excited about learning	4.29	0.74	106
I use interactive technologies to try something new	4.15	0.72	105
I use interactive technologies as an alternative means of presenting information	4.20	0.79	106
I use interactive technologies as a supplemental teaching tool	4.19	0.75	106
I use interactive technologies because I believe they will increase student's understanding of the material	4.20	0.75	106
I use interactive technologies because of its perceived educational benefits	4.00	0.78	106
I use interactive technologies because I can adapt activities/lessons based on student interests	4.17	0.75	106
I use interactive technologies because they address different learning styles	4.33	0.69	105
I use interactive technologies because they get students involved with the material	4.35	0.71	104
I use interactive technologies because I believe it will help motivate students	4.33	0.73	106

Anthropomorphism

In order to gauge one's level of anthropomorphism as it relates to interactive technologies, the scale created by Bartneck, Kulic, Croft, and Zoghbi (2009) was adapted based on comments and feedback from special education teachers during a focus group study.

The original scale created by Bartneck et al. (2009), was anchored by the terms, natural, humanlike, conscious, lifelike, and moving smoothly. After testing the survey instrument in the focus group, these terms were found to be confusing and un-relatable by the target population. Further, after discussing the definition of anthropomorphism as the attribution of human characteristics to technology, it was agreed that the level of anthropomorphism was influenced by the usability of the technologies themselves. This feedback led to the adaptation of the Bartneck scale to an *ease of use* scale. The adapted scale terms were changed to the following adjectives: intuitive, portable, user-friendly, adaptable, and responsive. For item break-down please see Table 5.

In all five items were used to create the scale for overall level of anthropomorphism for each technology examined by this study (interactive whiteboards, computer tablets, and laptop computers). This led to a total of three questions with five dimensions each. Items asked subjects to rate their impressions about the nature of interactive technologies on a 5-point Likert type scale anchored with Strongly Disagree to Strongly Agree. Overall level of anthropomorphism was shown to be reliable at $\alpha = .86$ ($M = 3.87$, $SD = 0.50$, $N = 94$).

Table 5. Means and Standard Deviations for Anthropomorphism Measures

	Means	Standard Deviation	*N*
I believe Interactive Whiteboards are:			
Intuitive	3.69	1.05	106
Portable	2.51	1.15	106
User-Friendly	3.81	0.95	106
Adaptable	4.07	0.78	106
Responsive	4.10	0.79	106
I believe Tablet Computers are:			
Intuitive	3.59	0.92	101
Portable	4.14	0.83	101
User-Friendly	3.90	0.83	102
Adaptable	3.94	0.81	100
Responsive	3.96	0.77	101
I believe Laptop Computers are:			
Intuitive	3.72	0.99	105
Portable	4.24	0.78	106
User-Friendly	4.13	0.73	106
Adaptable	4.10	0.70	106
Responsive	4.03	0.77	103

Dependent Variable Measures

Overall Technology Use

Teacher and student technology use was assessed by a total of eight items. Four items related to the number of days a week student's used various forms of technology (interactive whiteboards, computer tablets, desktop computers, and laptop computers) and four items related to the number of minutes the student used the technology on the average day, ranging from less than 15 minutes to more than one hour. See Figures 2 and 3 for a detailed representation of student technology use.

Figure 2
How often did the student use Interactive Technologies?

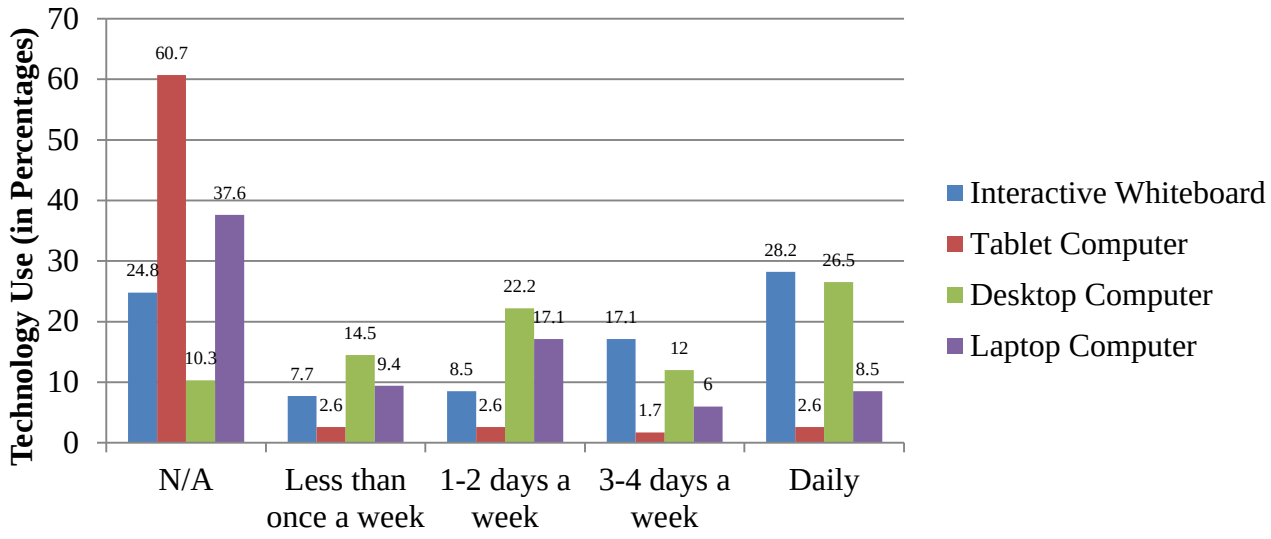
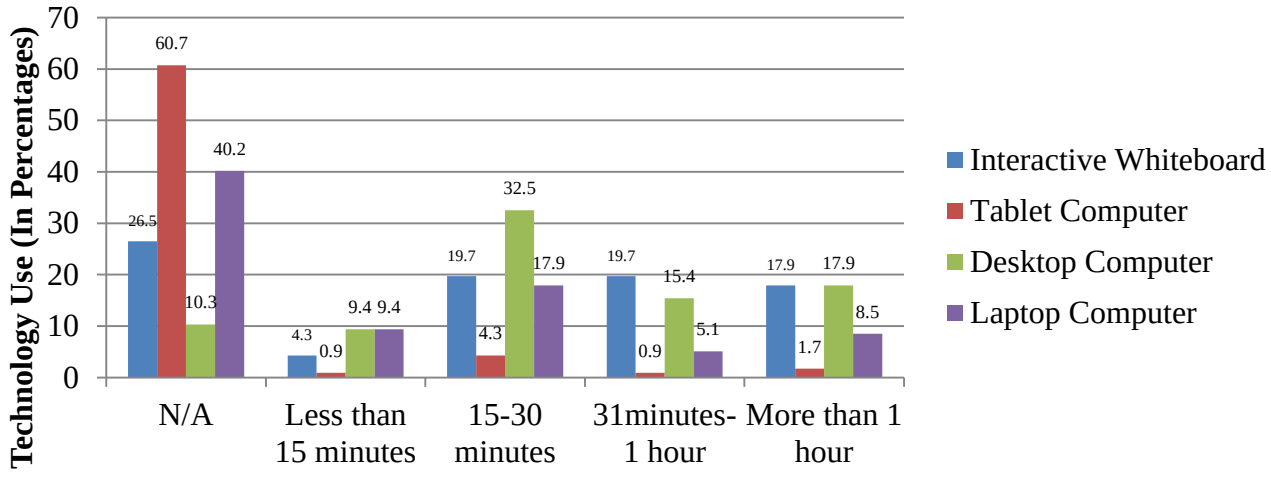


Figure 3
What was the average amount of time the technology was used by the student?



The overall technology use variable was created based on analysis of means and distributions of the original eight items. Since there were only two types of questions measuring technology use (one in days, and the other in minutes) researchers needed to pick one of the questions to represent the overall technology use variable. The two could not be combined because they were measuring different increments of time. Since a large portion of respondents (78.3%) said they were using at least one of the 4 technologies on a daily basis, it made sense to look at technology use in minutes for a more detailed break–down of technology use.

In order to create the technology use variable, responses were adjusted to only account for teachers who had access to the technologies listed (interactive whiteboards, computer tablets, desktop computers, and laptop computers). If a participant marked N/A (i.e. they do not have access to this technology) their response was omitted for the creation of the overall technology use variable. Using the technology for 30 minutes or less was coded as a 1, 30 minutes to an hour was coded as a 2, and more than one hour was coded as a 3. The overall technology use variable (M = 3.32, SD = 2.17, N = 104) along with individual items can be found in Table 6.

Table 6. Means and Standard Deviations for Overall Technology Use

	Mean	Standard Deviation	*N*
Overall Technology Use	3.32	2.17	104
Number of Minutes each Interactive Technology is used			
Interactive Whiteboard	1.13	1.16	117
Tablet Computer	0.11	0.47	117
Desktop Computer	1.17	1.09	117
Laptop Computer	0.54	0.93	117

Data Collection

For this study, a recruitment email embedded with the survey link was sent to special education district coordinators across a state in the southeastern United States. District coordinators forwarded the recruitment email to their staff. Further, the link was also sent to a professional organization of special education teachers to distribute via their list serve of members. Additionally, teachers were asked to forward the link to other special education teachers they thought did not receive the survey. The survey was accessed using an online survey hosting site.

After receiving a recruitment email from either a coordinator or a list serve, recipients clicked on a direct link to the survey which guided them to an informed consent form. After agreeing to answer the questions, the recipients were forwarded to the first page of the survey. Then they were prompted with a follow up screen that offered to compensate them for their time by entering into a drawing for a gift card to a school supply store. They could chose to enter an email address or leave the field blank. Upon completion, they were thanked for their time and willingness to participate in the research study.

CHAPTER 4:

RESULTS: ANSWERS TO RESEARCH QUESTIONS

The target populations for this research study were special education teachers who use interactive technologies in their classroom. Surveyed subjects were asked to answer questions while thinking about one particular student. Of survey responses, 79.4% of the students spent 5 days a week in the special education teacher's classroom, and 30.8% of those students spent the entire class day in the special education teacher's classroom. Therefore, for this study, we assume that the surveyed teachers were working with the student on a regular basis thus would have had time to integrate and use interactive technologies with the reported student.

To answer RQ1, which asked if there was a relationship between overall teacher attitudes and technology usage in the classroom, a partial correlation analysis was conducted. While controlling for teacher confidence with technology, technology attitudes was found to have a significant (r = .265, p <.01) and positive correlation with overall technology use. The more positive teacher attitudes are towards technology, the higher the overall use of technology in the classroom. See Table 9 for correlation statistics.

To answer RQ2, which asked if there was a relationship between teacher preparation and teacher technology use, two partial correlations were run. To test this research question, researchers looked at the relationship between both formal training and teacher collaboration and overall technology use. Formal training was found to have an insignificant relationship (r = -.017, p = n.s.) with overall technology use. Further, the relationship between teacher collaboration and overall technology use was also found to

be insignificant when controlling for teacher confidence with technology (r = .107, p = n.s.). The results show that there was no difference between those who had formal training or collaborative training and those who had no training at all on their overall technology use. See Table 7 for a break-down of correlation statistics

Table 7. Correlations between Teacher Preparation and Outcome Variables

	Overall Technology Use
Teacher Preparation	
Formal training	-.017
Collaboration	.107

* indicates significance at $p < .05$
** indicates significance at $p < .01$

To answer RQ3, to determine the factor structure of the teacher motivations scale, a principal components factor analysis with varimax rotation was conducted. The analysis showed the items fell on to four different factor dimensions with eigenvalues greater than one. However, after looking at the factor loadings, the factors were reduced to three. This is due to only one item falling on the fourth factor, and once reduced the item loaded on to another factor. In all, the three factors accounted for 64.20% of the variance. The three dimensions were perceived benefit, requirement, and personal benefit. Loadings that were >.55 we kept as part of a reliable measure. In all 21 items were retained for the measure (M = 2.84, SD = 0.37, N = 93). Please see Table 8 for complete factor loadings.

The first dimension, perceived benefit (eigenvalue = 9.59, M = 4.22, SD = 0.59, N = 102), contained a total of 13 items and was found to be reliable at α = .95. Some

items included in this dimension were “I use interactive technologies because I believe it will help motivate my students,” “I use interactive technologies because they get my students involved with the material,” and “I use interactive technologies because they get my students excited about learning.” This dimension incorporated all items that portrayed a unique benefit to the student through the learning process or through the adaptability of interactive technologies in the classroom environment.

The second dimension, requirement (eigenvalue = 2.72, M = 1.68, SD = 0.68, N = 104), contained five items and was found to be reliable at α = .88. Examples of items included in this dimension were “I use interactive technologies because it is required by my school” and “I don’t use interactive technologies because my lesson plans are successful without them.” Requirement is a factor dimension that takes into account the obligation to use specific tools and technologies in the classroom. This dimension also combined items that portrayed interactive technologies as a last resort for teachers and their lesson planning. This factor dimension is best explained by using technology because you have to and/or because it is there, not because there is a perceived benefit.

Lastly, the third dimension, the personal benefit dimension (eigenvalue = 1.81, M = 2.63, SD = 0.77, N = 99) contained a total of three items and was found to be reliable (α = .70). Examples of items included are “I use interactive technologies to take pressure off of my personal lesson planning,” “I use interactive technologies to give myself more free time,” and “I use interactive technologies to create lesson plans more efficiently.” This dimension takes into consideration the background work that is done by teachers to be prepared for the school day and the amount of time that is taken to create daily lesson plans.

Based on these results, the data indicates that teacher motivations are comprised of three dimensions: perceived benefit, requirement, and personal benefit.

To answer RQ4, which asked if there was a relationship between teacher level of anthropomorphism and overall technology use in the classroom, a partial correlation analysis was conducted. While controlling for teacher confidence with technology, the analysis showed there was not a significant relationship between anthropomorphism and overall teacher technology use (r = .115, p = n.s.). The level of anthropomorphism does not have an impact on the amount that teachers use technology in the classroom. See Table 10 for correlation statistics.

In order to best answer RQ5a, to analyze the relationship between teacher level of anthropomorphism and overall teacher attitudes toward technology, a Pearson product moment correlation was conducted. After running the correlation analysis, it was found that the variables were positively correlated (r = .292, p <.01). The relationship between level of anthropomorphism and teacher attitudes was significant. As the level of anthropomorphism increases, the overall attitudes toward technology increase and become more positive. See Table 9 for correlation statistics.

Table 8. Factor Loadings for Target Variables

	Perceived Benefit	Requirement	Personal Benefit
Requirement			
I use interactive technologies only because it is required by my school	-.226	**.626**	.178
I use interactive technologies only for special occasions	-.239	**.743**	.062
I don't use interactive technologies because it gets in the way of the content I am trying to teach	-.237	**.846**	.020
I don't use interactive technologies because it distracts my students from learning	-.275	**.829**	.037
I don't use interactive technologies because my lesson plans are successful without them	-.094	**.856**	-.123
Personal Benefit (for the Teacher)			
I use interactive technologies to take pressure off of my personal (traditional) lesson planning	.174	.022	**.823**
I use interactive technologies to give myself more free time	-.056	.156	**.817**
I use interactive technologies to create lesson plans more efficiently	.389	-.313	**.580**
Perceived Benefit (for the Student)			
I use interactive technologies because they are hands on	**.560**	-.190	-.051
I use interactive technologies because they are engaging	**.787**	-.258	-.056
I use interactive technologies to customize lesson plans to fit each student's needs	**.679**	-.302	.160
I use interactive technologies because they get my students excited about learning	**.888**	-.197	.049
I use interactive technologies to try something new	**.828**	-.139	.111
I use interactive technologies as an alternative means of presenting information	**.737**	.010	.135
I use interactive technologies as a supplemental teaching tool	**.748**	.112	.197
I use interactive technologies because I believe they will increase student's understanding of the material	**.787**	-.218	.139
I use interactive technologies because of its perceived educational benefits	**.632**	-.110	.175
I use interactive technologies because I can adapt activities/lessons based on student interests	**.820**	-.317	.059
I use interactive technologies because they address different learning styles	**.814**	-.199	-.052
I use interactive technologies because they get students involved with the material	**.877**	-.199	-.057
I use interactive technologies because I believe it will help motivate students	**.860**	-.182	-.067

*factor loadings were defined as .55 or greater and appear in bold.

Table 9. Correlations between Attitude Items and Outcome Variables

	Overall Technology Use	Anthropomorphism
Innovativeness	.286**	.171
Attitudes toward technology	.147	.440**
Overall Attitudes	.265**	.292**

* indicates significance at $p < .05$
** indicates significance at $p < .01$

To analyze the relationship between teacher's level of anthropomorphism and motivations for technology use in RQ5b, a Pearson product moment correlation was conducted. The correlation analysis tested the relationship between anthropomorphism and the three factors of teacher motivations for technology use in the classroom: perceived benefit, requirement, and personal benefit. The relationship between personal benefit ($r = .14$) and perceived benefit ($r = .09$) and anthropomorphism was found to be not significant (p = n.s.). However, the relationship between the requirement factor and anthropomorphism was found to be moderately significant ($r = -.297$, $p < .01$). The negative relationship shows that as the requirement factor increases, teacher level of anthropomorphism decreases. See Table 10 for correlation statistics between anthropomorphism and teacher motivations.

Table 10. Correlations between Level of Anthropomorphism and Outcome Variables

	Teacher Motivations			Overall Technology Use			
	Perceived Benefit	Requirement	Personal Benefit	Interactive Whiteboard	Computer Tablet	Desktop Computer	Laptop Computer
Level of Anthropomorphism	0.085	-.297**	0.141	0.066	0.072	0.115	0.04

*indicates significance at p <.05

** indicates significance at p <.0

CHAPTER 5:

DISCUSSION

This study sought to create an overall survey measure that encompassed teachers' motivations for technology use in the classroom. Innovativeness, attitudes, and preparation were measured, in addition to teacher motivations for technology use. By focusing on the use of interactive technologies, this study sought to illuminate the unique qualities of these technologies under the theoretical frame of anthropomorphism.

This study focused on the attitudes, perceptions, and use of interactive whiteboards and computer tablets. From the sample of subjects, most were using some type of computer in the classroom, either a desktop computer (73.5%) or a laptop computer (38.5%). Further, many subjects (61.5%) had access to an interactive whiteboard. However, only 7.7% of subjects had access to computer tablets. Of those that had the technology available to them, the tablet was being used regularly. 6.1% of those who had access to a computer tablet were using it at least 3-4 days a week and 5.2% were using it for up to 30 minutes at a time. This is interesting because though the tablets do not seem to be nearly as widespread, there is still a significant amount of use and implementation. The overall use of interactive technologies in special education classrooms is supported by the perceived benefit to their use, as reinforced by the teacher motivations scale in this study. We can expect that tablet technology will continue to be adopted as educational resources and that they will become increasingly present in special education classrooms.

Overall Attitudes Toward Technology

As the results of this study indicate, there was a significant relationship between overall attitudes toward technology and overall technology use. Is should follow that the

more positive attitudes toward technology are, the more likely technology is going to be used in the classroom (van Braak, 2001). The correlation between the variables show that there is a significant relationship. Though that does not indicate causation, it leads the researcher to assume that attitudes and technology use do interact with one another and can have a potential effect on technology adoption. This assumption is in line with similar studies that were previously conducted (Connor et al, 2010; van Braak, 2001).

Additionally, it was postulated that there would be a relationship between anthropomorphism and overall attitudes toward technology. The relationship was presented and found to be significant because the more human-like a user perceives a technology to be; the more comfortable a user should feel when using the technology. Therefore, the *easier* it is to use the technology, the more positive the user should feel about the technology. Thus, the higher level of anthropomorphism a person has toward a technology, the more positive the attitudes toward the technology should be. In this case, the fact that interactive technologies have a perceived *ease of use* allows teachers to feel more positively about these technologies, and this may result in technology use and adoption. These positive attitudes are translated into overall attitudes toward technology, allowing them to perceive interactive technologies as both positive additions to the learning process and additive to the educational process in general.

Teacher Motivations and Technology Use

Furthermore, this study sought to conceptualize individual motivations for teachers to use technology in the classroom. Since there seemed to be a unique draw towards interactive technologies, this study aimed to help articulate the aspects of interactive technologies that warrant their use in the classroom. Various motivations for

technology use were researched and originally broken down into six areas of interest: engagement (Giangreco et al, 2001; Seo et al, 2008), requirement (Kelly, 2002), student incentives (Moore, 2007), accommodation (Janney & Snell, 2004), perceived benefits (Shah, 2011), and time/efficiency (E. Silva, personal communications, September-October, 2011).

Ultimately, the factors that resulted from this study were perceived benefit, requirement, and personal benefit. This is interesting because despite qualitative interviews and research, special education teachers' responses indicated a pattern of simplified groupings when they were presented with individual items. The perceived benefits of interactive technologies (engagement, accommodation, and educational benefits) fell onto a single dimension. Though teachers recognize the differences in these items when discussing them orally, the items ended up being lumped together into a single idea when presented on paper; *interactive technologies can help my students learn.*

Also, it is interesting that the two other factors were personal benefit and requirement. These dimensions were not as strong as the perceived benefit factor, but they still played a role in overall motivations for technology use. The requirement factor is interesting because even if teachers do not see a perceived benefit for the use of interactive technologies, there still is a lingering requirement to use them. However, despite the requirement, it seems that teachers are still using these technologies, if nothing more than because they are available and seem to be a viable option in the classroom. This argument is supported by the theory of technological determinism, as discussed by Marshall McLuhan (Griffin, 1994), which states that new technologies are

continually introduced and implemented in society to be tested, and in this cased used in special education classrooms.

Lastly, there also seems to be a perceived personal benefit for using interactive technologies. Though there is a notion that learning these technologies does take time (for this study, 63.3% of subjects spent at least 15-30 minutes a week preparing for the use of interactive technologies in class) and they can be a personal burden on teachers, it seems the incorporation of interactive technologies can assist with creating individualized instruction and assessment more quickly and efficiently as presented by the results of this study and others (SMART Technologies, 2004; Hussain, 2006). In all, teacher motivations turned out to be a rather simple construct, counter to the multiple dimensions offered by past research.

Teacher Preparation and Technology Use

Another interesting result of this study was that there is no significant relationship between teacher preparation and overall technology use. Though this seems contradictory with prior research (Mull & Sitlington, 2003; Anderson & Petch-Hogan, 2001; Dexter et al, 2002), these results indicate that neither formal training nor teacher collaboration was related to teacher use of interactive technologies. In all, 61.3% of survey subjects reported they had one or fewer formal training sessions in the past year. Additionally, 60.7% of subjects had never received one-on-one training with interactive technologies. Formal training seemed to be sparse or not provided by the school administration. Because formal training does not seem to be offered by school administrators, it is understandable that formal training was not related to overall technology use.

However, unlike formal training, teacher collaboration was much more prominent. 60.7% of special education teachers collaborated informally at least once a month with teachers about interactive technologies, and 83.7% of special education teachers collaborated informally about the accommodation needs of their students at least once a month with over half (42.7%) collaborating two or more times a week. Though teacher collaboration was fairly high, discussion about students' needs was even more common than discussion about interactive technologies. These results appear to show that the main goal of special education teachers is to meet the needs of their students (Buell, Hallam Gamel-Mccormick, & Scheer, 1999; CAST, 2011), and this may or may not include the integration of interactive technologies. Thus teacher preparation both formal and collaborative, was not significantly related to overall technology use.

Anthropomorphism and Technology Use

The anthropomorphism measure created for this study yielded positive results as seen when correlated with overall attitudes toward technology. However, the measure did not yield significant results when correlated with the three dimensions of teacher motivations and with overall technology use. Looking at the teacher motivations individually, the relationship between anthropomorphism, perceived benefits, and personal benefits were not significant. Since the level of anthropomorphism was determined by perceived *ease of use*, it is understandable that it was not correlated with either the perceived or personal benefits. The usability of a technology may certainly affect whether or not it is used by teachers, but it is not the only factor taken into consideration when calculating the benefits the use of technology can provide for

students. Therefore, we would not expect a strong significant relationship between anthropomorphism and the perceived and personal benefit factors.

When looking at the third motivation, requirement, the relationship to anthropomorphism was significant. This particular relationship was also negative. Recall, that anthropomorphism is measured by the level of human-like characteristics that are attributed to interactive technologies. As technologies become required and in a sense "mandatory" there is a push from teachers that can affect their likeness of the technology. This "liking" can play a role in how usable they feel the technology can be. As requirement increases, "liking" decreases and thus usability and anthropomorphism will also decrease.

In addition, anthropomorphism was not significantly related to overall technology use. The results suggest there is no direct relationship between the level of anthropomorphism and the amount interactive technologies are used. However, it may be that the anthropomorphic qualities of technologies (Nass et al, 1995) help teachers form attitudes towards particular technologies, especially interactive technologies as represented in this study. It is the attitudes that are formed that can lead to the overall increased or decreased use of technology. Therefore, the relationship of anthropomorphism to other variables like attitudes toward technology can potentially influence or lead to a change in overall technology use.

Based on the research questions posed in this study, attitudes toward technology, innovativeness, preparation, motivations for technology use, and anthropomorphism all seem to play a role in overall technology use in special education classrooms. However, it seems that special education teachers are first deciding what will benefit and help their

students the most in the classroom, as outlined by CAST in the UDL guidelines, prior to considering their own attitudes and feelings toward technology use. There is something else going on in the teacher-student environment that is driving technology adoption and should be further investigated.

Theoretical and Practical Implications

It is important to understand the relationship between teacher attitudes toward technology, motivations for using technology in the classroom, and overall technology use, so education administrators can work in conjunction with teachers to create the best environment possible for students with disabilities. Once it is better understood what factors can predict and effect technology use in the classroom, we can begin to implement technologies successfully and aid not only students with disabilities, but students in all classrooms and grade levels.

The results of this study serve as a starting point for understanding teachers' motivations to use technology in the classroom. Additionally, this study has illuminated some potential problem areas with the support and training offered to teachers. If legislation, namely No Child Left Behind, 2002, and the Individuals with Disabilities Act, 2004, insists that teachers use technology in the classroom, there should be a means of support to ease the transition for both learning the technology and developing new lesson plans and curricula. If teachers are provided with the tools to understand the intricacies of interactive technologies, there will be only endless possibilities for how they can be applied in the classroom, as demonstrated in part by this study as well as other studies such as Pope et al, 2002, and Maushak & Blodgett, 2001.

Further, this study presents an opportunity to expand the concept of anthropomorphism to incorporate interactive technologies. By encompassing the human characteristics offered by touch, sight, and sound, these technologies certainly appeal to human nature. The concept of anthropomorphism may itself be an unconscious behavior like a habit or tendency (i.e. Sundar, 2004) that has an effect on our attitudes toward technology. However, this can be explored further through direct observation of user interaction with these technologies. Understanding how interactive whiteboards and computer tablets are used can help expand the *ease of use* scale created in this study and bolster the overall research related to the theory of anthropomorphism.

Limitations

In hindsight, the survey instrument used in this study presented some limitations. The survey instrument was not ideal for some measures. In particular the teacher preparation items and the overall technology use items could be further developed. Since teacher preparation was broken down into two dimensions, formal training and teacher collaboration, there should have been multiple items for each dimension. Specifically, the formal training measure consisted of only two items and therefore was not ideal. With more items, researchers can develop a more reliable measure for teacher preparation in future studies.

Further, the overall technology use items captured interesting results; however they could not be combined because they were measuring different increments of time. In the future, measures of technology usage should incorporate more detailed items that can clearly separate technology usage by individual technologies and also include what the technology is being used for. Perhaps a case study analysis would be useful for

understanding the applications of these technologies in the everyday classroom setting in future studies

Additionally, teachers' area of expertise was not captured in this study. There is no way to know if a participant was a speech pathologist, an instructor at a special needs school, or a general special education teacher. This information would be important to capture in order to see if there are differences in the way technologies are being applied based on teacher expertise and type of student disability.

Directions for Future Research

Understanding teacher motivations to use technology will continue to be of interest in the realm of education. With the continual development of technologies, there will always be a need for research that helps elucidate the effectiveness of technology in the classroom. This study can be extended to a more detailed level of technology use cases in the classroom to provide support for the successful integration of interactive technologies into class curricula. Three recommendations for future research will be outlined below.

First, future studies should seek to understand the student perspective. Since this study only surveyed teachers, a possible next step would be to investigate the benefits and educational outcomes of students' use of interactive technologies. Secondly, it would be interesting to see if these technologies have an actual benefit for students, and if they are consistent with the teacher perceptions of technology that were captured in this study.

Thirdly, there is a need to focus on computer tablets in the classroom more closely. The additive qualities to the learning process that are afforded by computer

tablets, like student engagement (Clements & Sarama, 2003), increased interactivity (Schroder, 2004), personalized lesson plans (Shah, 2011), and increased attentiveness (Harlen & Rivkin, 2000) should also be considered and further researched. Computer tablets are speculated to be able to change the classroom environment and assist students of all abilities to learn and apply content in a new and meaningful ways (Rochette, 2007). Computer tablets should continue to be a focus of study whether in a controlled experiment in order to isolate the unique qualities offered by the technology, or through use cases and focus groups to better understand how teachers and students alike interact with the technology.

This research study afforded an opportunity to glimpse into the daily routine of special education teacher and their use of technology in the classroom. Particularly the focus group discussions created an opportunity to better understand how interactive technologies are in fact a communicative tool. Teachers from the focus group described the use on interactive technologies in the following ways: “the use of technology in the classroom creates an even playing field for students with disabilities,” and “the use of technology can normalize the curriculum so students with disabilities, especially those with physical disabilities, can participate and be involved in the learning process.” The focus group itself was a communicative moment that allowed the researcher to better understand the passion of teachers who work to help each and every student succeed.

In conclusion, the body of research on the motivations for technology use as well as the successful implementation of technology in the classroom should continue in the future. As new technologies are developed and introduced into the classroom, teachers’ understanding of effective implementation approaches using technology will be

important to the educational success of students (i.e. Carnine, 1989; Connor et al, 2010, Ely, 1999; Janney & Snell, 2004). Once effective implementation strategies are better understood through research studies, teachers and administrators can work together to create an overall strategy for technology adoption in both special education and general education environments.

REFERENCES

Alberto, P. A., & Troutman, A. C. (2003). *Applied behavior analysis for teachers.* Upper Saddle River, NJ: Merrill/Prentice Hall.

Anderson, C. L., & Petch-Hogan, B. (2001). The impact of technology use in special education field experience on preservice teachers' perceived technology expertise. *Journal of Special Education Technology, 16,* 27-44.

Bartneck, C., Kulic, D., Croft, E., & Zoghbi, S. (2009). Measurement instruments for the anthropomorphism, animacy, likeability, perceived intelligence, and perceived safety of robots. *International Journal of Social Robotics*, *1,* 71-81.

Beeland, W. D. (2002). Student engagement, visual learning and technology: Can interactive whiteboards help? http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.135.3542&rep=rep1&type=pdf (Access May 7, 2011).

Birsh, J. (1999). *Multisensory teaching of basic skills.* Baltimore, MD: Paul H. Brookes.

Boardman, A., Arguelles, M., Vaughn, S., Hughes, M., & Klinger, J. (2005). Special education teacher's view of research-based practices. *The Journal of Special Education, 39*(3), 168-180.

Bouck, E., & Flanagan, S. (2010). Virtual manipulatives: What they are and how teachers can use them. *Intervention in School and Clinic, 45*(3), 186-191.

Browder, D. M., & Cooper-Duffy, K. (2003). Evidenced based practices for students with severe disabilities and the requirement for accessibility in "No Child Left Behind." *Journal of Special Education, 37,* 157-163.

Buell, M. J., Hallam, R., Gamel-Mccormick, M, & Scheer, S. (1999). A survey of

general and special education teachers' perceptions and inservice needs concerning inclusion. *International Journal of Disability, Development and Education, 46(2),* 143-156.

Burgoon, J. K., Bonito, J. A., Bengtsson, B., Cederberg, C., Lundeberg, M., & Allspach, L. (2000). Interactivity in human-computer interaction: A study of credibility, understanding, and influence. *Computers in Human Behavior, 16,* 553-574.

Campbell, M., & Mechling, L. (2009). Small group computer-assisted instruction with SMART Board technology. *Remedial and Special Education, 30*(1), 47-57.

Carey, K. (2000). *Enhancing Access to Library Based ICT services for Visually Impaired People,* Report No. 62, Library and Information Commission, London.

Carnine, D. (1989). Teaching complex content to learning disabled students: The role of technology. *Exceptional Children, 55*(6), 524-533.

CAST (2011). *Universal Design for learning Guidelines version 2.0.* Wakefield, MA: Author.

Cawley, J. F., Foley, T. E., & Miller, J. (2003). Science and students with mild disabilities. *Intervention in School and Clinic, 38,* 160-171.

Chambers, B., Slavin, R. E., Madden, N. A., Abrami, P., Logan, M. K., & Gifford, R. (2011.) Small-group, computer-assisted tutoring to improve reading outcomes for struggling first and second graders. *The Elementary School Journal, 111 (4),* 625-640.

Cheney, D., & Seyfarth, R. (1990). *How monkeys see the world.* Chicago, Il: University of Chicago Press.

Clements, D. H., & Sarama, J. (2003). Young children and technology: What does the

research say? Young Children, 58(6), 34–40.

Connor, C., Snell, M., Gansneder, B., & Dexter, S. (2010). Special education teacher's use of assistive technology with students who have disabilities. *Journal of Technology and Teacher Education, 18*(3), 369-386.

Council for Exceptional Children [The Voice and Vision of Special Education]. (2011). Retrieved from http://www.cec.sped.org/am/template.cfm?section=Home

Cushing, L., Carter, E., Clark, N., Wallis, T., & Kennedy, C. (2009). Evaluating inclusive educational practices for students with severe disabilities using the Program Quality Measurement Tool. The Journal of Special Education, 42(4), 195-208.

Dexter, S. L., Anderson, R.E., & Ronnkvist, A. M. (2002). Quality technology support: What it is? Who has it? And what difference does it make? *Journal of Educational Computing Research, 26,* 265-285.

Dunn, R., Griggs, S., Olson, J., Beasley, M., & Gorman, B. (1995). A meta-analytic validation of the Dunn and Dunn Model of Learning Style Preferences. *The Journal of Educational Research, 88*(6), 353-362.

Edudemic: Connecting Education & Technology. (n.d.). *The Evolution of Classroom Technology*. Retrieved April 27, 2011, from http://edudemic.com/2011/04/classroom-technology/

Elbaum, B.E., Vaughn, S., Hughes, M. T., & Moddy, S. W. (1999). Grouping practices and reading outcomes for students with disabilities. *Exceptional Children, 65,* 399-415.

Ely, D. P. (1999). Conditions that facilitate the implementation of educational technology innovations. *Educational Technology, 39 (6),* 23-37.

Epley, N., Waytz, A., Akalis, S., & Cacioppo, J. (2008). When we need a human: Motivational determinants of anthropomorphism. *Social Cognition, 26 (2),* 143-155.

Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three factor theory of anthropomorphism. *Psychological Review, 114,* 846-886.

Fisher, S. K. (1999). Assistive technology. In S. H. deFur & J. R. Patton (Eds.), *Transition and school-based services: Interdisciplinary perspectives for enhancing the transition process* (pp. 309-385). Austin, TX: PRO-ED.

Fitchen, C. S., Asuncion, J. V., Barile, M., Ferraro, V., & Wolforth, J. (2009). Accessibility of elearning and computer and information technologies for students with visual impairments in postsecondary education. *Journal of Visual Impairment & Blindness, 103*(9), 543-557.

Freeland, A., Emerson, R., Curtis, A., & Fogarty, K.. (2010). Exploring the relationship between access technology and standardized test scores for youths with visual impairments: Secondary analysis of the national longitudinal transition study 2. *Journal of Visual Impairment & Blindness, 104(3),* 170-182.

Garrett, N. (2009). Computer-assisted language learning trends and issues revisited: Integrating innovation. *The Modern Language Journal, 93,* 719-740.

Giangreco, M., Broer, S., & Edelman, S. (2001). Teacher engagement with students with disabilities: Differences between paraprofessional service delivery models. *Journal of the Association for Persons with Severe Handicaps, 26(2),* 75-86.

Gong, L. (2008). How social is social responses to computers? The function of the

degree of anthropomorphism in computer representations. *Computers in Human Behavior, 24,* 1494-1509.

Gong, L., & Nass, C. (2007). When a talking-face computer agent is half-human and half humanoid: Human Identity and consistency preference. *Human Communication Research, 33,* 163-193.

Gray, H. M., Gray, K. & Wegner, D. M. (2007). Dimensions of mind perception. *Science, 315*, 619.

Griffin, E. (1994). *A First Look at Communication Theory*. New York, NY: McGraw Hill, Inc.

Guthrie, S. E. (1993). *Faces in the clouds: A new theory of religion*. New York: Oxford University Press.

Harlen, J. D., & Rivkin, M. S. (2000). *Science experiences for the early childhood years: an integrated approach.* New Jersey: Prentice Hall, Inc.

Harryson, B., Svensk, A., & Johansson, G. I. (2004). How people with developmental difficulties navigate the internet. *British Journal of Special Education 31(3),* 137-142.

Haugland, S. W. (1999). What role should technology play in young children's learning? Young Children, *54(6),* 26–31.

Heim, M. (1993). *The Metaphysics of Virtual Reality*. New York: Oxford University Press.

Hunt, P., Soto, G., Maier, K., & Doering, K. (2003). Collaborative teaming to support students at risk and students with severe disabilities in general education classrooms. *Exceptional Children, 69,* 315-332.

Hussain, R. (2006). Deployment of ICT: A case for the interactive whiteboard. *Malaysian Online Journal of Instructional Technology 3(1),* 78-84.

Individuals with Disabilities Education act, 20 U.S.C. § 1401 *et seq* (1997).

Janney, R., & Snell, M. (2004). *Practices for inclusive schools: Modifying schoolwork* (2nd ed.). Baltimore: Paul H. Brookes.

Jeffs, T., & Banister, S. (2006). Enhancing collaboration and skill acquisition through the use of technology. *Journal of Technology and Teacher Education,* 14(2), 407-433.

Kauffman, J. M., Mostert, M. P., Trent, S C., & Hallahan, D. P. (2002). *Managing classroom behavior: A reflective case-based approach.* Boston, MA: Allyn & Bacon.

Kay, R. (1989). A practical and theoretical approach to assessing computer attitudes: The computer attitude measure (CAM). *Journal of research on Computing in Education, 3,* 456-463.

Kelly, M.G. (2002). *National educational technology standards for teachers: Preparing teachers to use technology.* Eugene, OR: International Society for Technology in Education.

Kennedy, C. H., & Horn, E. M. (2004). *Including students with severe disabilities*. Boston, MA: Pearson.

Koenraad, A.L.M. (2008). Interactive Whiteboards in educational practice: the research literature reviewed.

Kulik, J. A. (1994). *Meta-analytic studies of findings on computer-based instruction,*

in technology assessment in education and training. Lawrence Erlbaum, Hillsdale, New Jersey.

Lambert, J., Gong, Yi., & Cuper, P. (2008). Technology, transfer, and teaching: The impact of a single technology course on preservice teachers' computer attitudes and ability. *Journal of Technology and Teacher Education, 35*, 27-47.

Landrum, T. J., Tankersley, M., & Kauffman, J. M. (2003). What is special about special education for students with emotional or behavioral disorders? *The Journal of Special Education, 37*(3), 148-156.

Larcher, J. (2000). "Information technology for children with language difficulties", in Rinaldi, W. (Ed.), *Language Difficulties in and Educational Context,* Whurr Publishers Ltd, London, pp. 131-147

Larwin, K., & Larwin, D. (2011). A meta-analysis examining the impact of computer assisted instruction on postsecondary statistics education: 40 years of research. *Journal of Research on Technology in Education*, 43(3), 253-278.

Leyens, J. Ph., Cortes, B. P., Demoulin, S., Dovidio, J., Fiske, S. T., Gaunt, R. (2003). Emotional prejudice, essentialism, and nationalism. *European Journal of Social Psychology*, 33, 703–717.

Loyd, B., & Gressard, C. (1984). Reliability and factorial validity of computer attitude scales. *Educational and Psychological Measurement, 2*, 501-505.

Maccini, P., & Gagnon, J.C. (2000). Best practices for teaching mathematics to secondary students with special needs. *Focus on Exceptional Children, 32(5),* 1-22.

Marcinkiewicz, H. R. (1994). Computers and teachers: Factor influencing computer use

in the classroom. *Journal of Research on Computing in Education, 26(2),* 220-237.

Maushak, J. J., Kelly, P., & Blodgett, T. (2001). Preparing teachers for the inclusive classroom: A preliminary study of attitudes and knowledge of assistive technology. *Journal of Technology and Teacher Education, 9,* 419-431.

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2003). Universal design for instruction: The paradigm, its principles, and products for enhancing instructional access. *Journal of Postsecondary Education and Disability, 17,* 10-20

Mechling, L., Gast, D., & Krupa, K. (2007). Impact of SMART Board technology: An investigation of sight word reading and observational learning. *Journal of Autism and Developmental Disorders, 37,* 1869-1882.

Messigner-Willman, J., & Marino, M. T. (2010). Universal design for learning and assistive technology: Leadership considerations for promoting inclusive education in today's secondary schools. *NASSP Bulletin, 94 (1),* 5-16.

Meyer, A., & O'Neill, L. (2000). Beyond access: Universal design for learning. *The Exceptional Parent. 30 (3),* 59-61.

Michaels, C. A., & McDermott, J. (2003). Assistive technology integration in special education teacher preparation: Program coordinators' perceptions of current attainment and importance. *Journal of Special Education Technology, 18,* 29-41.

Miller, S. P., Butler, F. M., & Lee K. (1998). Validated practices for teaching mathematics to students with learning disabilities: A review of the literature. *Focus on Exceptional Children, 31(1),* 1-24.

Moore, S. L. (2007). Teaching every student in the digital age: Universal design for

learning. *Educational Technology, Research and Development. 55 (5),* 521-525.

Mull, C., & Sitlington, P. (2003). The role of technology in the transition to postsecondary education of students with learning disabilities: A review of literature. *The Journal of Special Education, 37*(1), 26-32.

Nadis, S. (1999). Immersed in science. *Computer Graphics World. 22(3),* 38-44.

Nass, C. & Brave, S. (2005). *Wired for speech: How voice activates and advances the human computer relationship.* Cambridge, MA: The MIT Press.

Nass, C., Moon, Y., Fogg, B. J., Reeves, B., & Dryer, D. C. (1995). Can computer personalities be human personalities? *International Journal of Human Computer Studies, 43,* 223-239.

National Educational Technology Standards for Teachers [NETS] (Second ed.). (2008). ISTE.

NCES (2010) *Number and percentage of children served under Individuals with Disabilities Education Act, Part B, by age group and state or jurisdiction: Selected years, 1990–91 through 2008–09.* (n.d.). Retrieved October 2, 2011, from National Center for Education Statistics website: http://nces.ed.gov/programs/digest/d10/tables/dt10_047.asp

Neale, H., Brown, D., Cobb, S., & Wilson, J. (1999). *Presence Teleoperators & Virtual Environments, 8(3).*

No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

Ofsted (2005), *Primary National Strategy: An evaluation of its impact in primary schools* 2004/05. London: Ofsted

Okolo, C. M., Bahr, C. M., & Reith, H. J. (1993). A retrospective view of computer based instruction. *Journal of Special Education Technology, 12,* 1-27.

Pope, M., Hare, D., & Howard, E. (2002). Technology integrations: Closing the gap between what preservice teachers are taught to do and what they can do. *Journal of Technology and Teacher Education, 10,* 191-203.

Powers, D., & Darrow, M. (1994) Special education and virtual reality: Challenges and possibilities. *Journal of Research and Computing in Education,* 27(1), 111-122.

Reimer, K., Moyer, P.S. (2005). Third-graders learn about fractions using virtual manipulatives: A classroom study. *Journal of Computers in Mathematics and Science Teaching, 24,* 5-25.

Rochette, L.. (2007). What classroom technology has taught me about curriculum, teaching, and infinite possibilities. *English Journal, 97(2),* 43-48.

Rose, D. H., Meyer, A., Strangman, N., & Rappolt, G. (2002). Teaching Every Student in the Digital Age: Universal Design for Learning. Alexandria, VA: Association for Supervision and Curriculum Development.

Ryndak, D. L., & Alper, S. (2003). *Curriculum and instruction for students with significant disabilities in inclusive settings.* Boston, MA: Allyn & Bacon.

Safhi, M., Zhou, L., Smith, D., & Kelley, P. (2009). Assistive technology in teacher training programs: A national and international perspective. *Journal of Visual Impairment & Blindness, 103(9),* 562-568.

Schroeder, D. (2004). Cabrillo high school: Tablet PCs and collaboration software improve classroom engagement at Cabrillo high school, *T.H.E. Journal, 32(1),* 3–4.

Scruggs, T., & Mastropieri, M. (1996). Teacher perceptions of mainstreaming/inclusion, 1958 to 1995: A Research Synthesis. *Exceptional Children, 63,* 59-74.

Seo, S., Brownell, M. T., Bishop, A. G., & Dingle, M. (2008). Beginning special education teachers' classroom reading instruction: Practices that engage elementary students with learning disabilities. *Exceptional Children, 75,* 97-122.

Shah, N. (2011). Special education pupils find learning tool in iPad applications. *Education Week,* 30(22), 1,.

Shaw, D. (1998). Report to the president on the use of technology to strengthen K-12 education in the United States: Findings related to research and evaluation. *Journal of Science Education and Technologies, 7*(2), 115-126.

SMART-Technologies. (2004). *Interactive Whiteboards and Learning: A review of Classroom Case Studies and Research Literature* (White Paper).

Smedley, T. M., & Higgins, K. (2005). Virtual technology: Bringing the world into the special education classroom. *Intervention in School and Clinic, 42*(2), 114-119.

Smith, F., Hardman, F., & Higgins, S. (2006). The impact of interactive whiteboards on teacher pupil interaction in the national literacy and numeracy strategies. *British Education Research Journal, 32*(3), 443-457.

Suh, J., Moyer, P.S., & Heo, H.J. (2005). Examining technology uses in the classroom: Developing fraction sense using virtual manipulatives concept tutorials. *Journal of Interactive Online Learning, 3(4),* 1-21.

Sundar, S. (2004). Loyalty to computer terminals: is it anthropomorphism or consistency? *Behavior & Information Technology 23(2),* 107-118.

The Partnership for 21st Century Skills [A Framework for 21st Century Learning].

(2009). Retrieved from http://www.p21.org/

Tondu, B, & Bardou, N. (2009). Anthropomorphism in robotics engineering for disabled people. *Proceedings of World Academy of Science, Engineering and Technology, 40,* 664-673.

Turing, A. (1950). Computing Machinery and intelligence. *Mind, 59(236),* 433-460.

Turner, M.D., Baldwin, L., Kleinert, H. L., & Kearns, J. F. (2000). The relation of a statewide alternate assessment for students with severe disabilities to other measures of instructional effectiveness. *Journal of Special Education, 34,* 69-76.

Van Braak, J. (2001). Individual characteristics influencing teachers' class use of computers. *Journal of Educational Computing Research, 25(2),* 141-157.

Vaughn, S., & Linan-Thompson, S. (2003, Fall). What is special about special education for students with learning disabilities? *The Journal of Special Education, 37*(3), 140-147.

Voltz, D. L., Sims, M. J., & Nelson, B. (2010). *Connecting Teachers Students and Standards: Strategies for Success in Diverse and Inclusive Classrooms*. Alexandria, VA: ASCD.

Waytz, A., Cacioppo, J., & Epley, N. (2010). Who sees human?: The stability and important of individual differences in anthropomorphism. *Perspectives on Psychological Science,5 (3),* 219-232.

Williams, P. (2005). Using information and communication technology with special educational needs students: The views of frontline professionals. *Aslib Proceedings, 57(6),* 539-553.

Williams, P., Jamali, H. R., & Nicholas, D. (2006). Using ICT with people with special

education needs: what the literature tells us. *Aslib Proceedings, 58(4)*, 330-345.

Winzer, M. A. (2009). *From Integration to Inclusion: A History of Special Education in the 20th Century*. Washington, DC: Gallaudet University Press.

Woodward, J., Carnine, D., & Gersten, R. (1988). Teaching problem solving through a computer simulation. *American Educational Research Journal, 25(1)*, 72-86.

Zhou, L., Parker, A., Smith, D., & Griffin-Shirley, N.. (2011). Assistive technology for students with visual impairments: Challenges and needs in teachers' preparation programs and practice. *Journal of Visual Impairment & Blindness, 105(4)*, 197-210.

Zirkle, Meredith L. (2006). *The Effects of SMART Board™ Interactive Whiteboard on High School Students with Special Needs in a Functional Mathematics Class*. Eastern Mennonite University.

APPENDIX A

Survey Instrument

INFORMED CONSENT
Technology Use in Special Education Classrooms

You are being asked to participate in a research study that looks at technology usage of special education teachers in the classroom. You will be asked to complete a brief online survey that asks some questions about your school demographics and teaching experience. You will also be asked some questions about your technology use in the classroom. You will then be asked questions about your attitudes towards technology in general. Lastly, you will be asked questions concerning your perceptions of technology use in the classroom.

Your participation in this study is completely voluntary. There are no direct benefits to you for participating in this study and the risks that you may encounter are no greater than those you might encounter in every-day life. You have the option to stop participating at any time without any penalty by simply closing your browser. If you wish to decline or withdraw from participation in this study you may do so. You may also choose to not answer any question(s) you wish to for any reason. In all, the survey will take no longer than 20 minutes to complete.

While there are no guaranteed direct benefits to you for participating, we hope this study will help the researchers learn something about reasons for technology use in special education classrooms that can be related to effective technology implementation in the classroom. The information from this study will be made available to you at the conclusion of the study. You may request information about the study results from the Co-Principal investigator.

At the end of the study, you will be given the option to enter an email address for a drawing for a $50 gift card to a school supply store. A random drawing for winners will be conducted at the end of the study. Please note, all emails will be kept confidential and will remain separate from survey data.

Additionally, your responses to this study will be completely confidential. No identifying personal information will be collected to minimize any risk of participating in the study. Only the Principal Investigator and Co-Principal Investigator will have access to the raw data.

If you have any questions, or if you wish to withdraw from the study, you can contact the Co-Principal Investigator at (302) 448-1938 or at silver0@wfu.edu. If you have questions about your rights as a participant, contact the Office of Research and Sponsored Programs, (336) 758-5888.

□ By clicking the Agree button below, you indicate that you are willing to participate in this research project.

( ) Yes, I agree () No, Thank You

Thank you for your willingness to participate in this research study. This survey should take no more than 20 minutes to complete.

At what level school do you teach?
A. [ ] Elementary School
B. [ ] Middle School
C. [ ] High School

Is your primary role helping students with special needs?
A. [ ] Yes
B. [ ] No

This section asks about your thoughts regarding interactive technology. For the purposes of this study, interactive technology refers to the use of interactive whiteboards (i.e. SMART Boards) and/or computer tablets.

Please rate the following items as they apply to you on the scale of Strongly Disagree to Strongly Agree.

I have realized that the introduction of interactive technologies represents an added value to my teaching practice.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I personally realize that now it the time to use technology to teach my students.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I find interactive technologies are beneficial for my teaching practice.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I believe there is a need for the introduction of new technologies in my teaching practice.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I believe interactive technologies benefit education as a whole.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I think that introducing interactive technologies into the classroom can be beneficial to the profession of education in general.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Using new technology is not a high priority in the subject I teach.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I seldom trust new ideas until I see the majority of those around me accepting them.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I'm aware I usually accept new ideas later than people around me.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I'm skeptical about the use of new educational methods until I notice they are successful for my colleagues.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I do not seek change in my teaching practices.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I am generally very careful about accepting new ideas.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

This section will ask questions regarding your general attitudes toward interactive technology on a scale from Strongly Disagree to Strongly Agree.

Interactive technology provides an opportunity for improving academic performance.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Interactive technologies can improve the efficiency of my instruction.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Integrating interactive technologies into lesson plans does not take much time.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Interactive technologies can increase the level of creativity of students.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Interactive technologies can increase student motivation.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

The pre-service teacher should be provided with strong skills and practice with interactive technologies during his/her training.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Students with learning disabilities can benefit strongly from the use of interactive technologies.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

Interactive technologies allow teachers to help students with different learning styles.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

For the following questions think of one student in your classroom who has access to one or more interactive technologies.

On average, how many days does the student spend in your classroom?

A. [ ] Less than one day a week
B. [ ] One to two days a week
C. [ ] Two to four days a week
D. [ ] Five days a week

How much time daily does the student spend in your classroom?

A. [ ] Less than 25% of the school day
B. [ ] 26% TO 49% of the school day
C. [ ] 50% T0 74% of the school day
D. [ ] 75% or more of the school day

Select all of the interactive technologies listed that are available for the student when in your classroom. You may indicate more than one.

A. [ ] Interactive Whiteboard
B. [ ] Tablet Computers
C. [ ] Desktop Computer
D. [ ] Laptop Computer

In the following items you will be asked about the amount of time your student spends using interactive technology. NA means the interactive technology is not available for the student when he or she is in your class.

In the month of October, on average, how often did the student, when in your classroom, use the interactive technology devices listed below?

A. Interactive Whiteboard

[ ] NA
[ ] Less than once a week
[ ] One to two days a week
[ ] Three to four days a week
[ ] Daily

B. Tablet Computers

[ ] NA
[ ] Less than once a week
[ ] One to two days a week
[ ] Three to four days a week
[ ] Daily

C. Desktop Computer
[ ] NA
[ ] Less than once a week
[ ] One to two days a week
[ ] Three to four days a week
[ ] Daily

D. Laptop Computer
[ ] NA
[ ] Less than once a week
[ ] One to two days a week
[ ] Three to four days a week
[ ] Daily

What was the average amount of time the technology was used?

A. Interactive Whiteboard
[ ] NA
[ ] Less than 15 minutes
[ ] 15 to 30 minutes
[ ] 31 minutes to an hour
[ ] More than an hour

B. Tablet Computer
[ ] NA
[ ] Less than 15 minutes
[ ] 15 to 30 minutes
[ ] 31minutes to an hour
[ ] More than an hour

C. Desktop Computer
[ ] NA
[ ] Less than 15 minutes
[ ] 15 to 30 minutes
[ ] 31minutes to an hour
[ ] More than an hour

D. Laptop Computer
[ ] NA
[ ] Less than 15 minutes
[ ] 15 to 30 minutes
[ ] 31 minutes to an hour
[ ] More than an hour

The next few questions refer to the school system where you now teach.

How many times throughout the past year did you receive in-service or workshop training in interactive technology?
[ ] 0
[ ] 1
[ ] 2
[ ] more than 2

How many times did you receive one-on-one training or assistance with interactive technology?
[ ] 0
[ ] 1
[ ] 2
[ ] more than 2

How often was extra time provided by your school specifically for collaboration with other teachers on interactive technology?
[ ] Two or more times a week
[ ] About once a week
[ ] About once a month
[ ] About once a semester
[ ] Less than once a semester

How often is extra time provided by your school specifically for collaboration with other teachers on accommodation needs of your EC student(s)?
[ ] Two or more times a week
[ ] About once a week
[ ] About once a month
[ ] About once a semester
[ ] Less than once a semester

How often do you collaborate informally with teachers about interactive technology?
[ ] Two or more times a week
[ ] About once a week
[ ] About once a month
[ ] About once a semester
[ ] Less than once a semester

How often do you collaborate informally with teachers about the accommodation needs of your EC student(s?
[ ] Two or more times a week
[ ] About once a week
[ ] About once a month
[ ] About once a semester
[ ] Less than once a semester

How much extra time (beyond planning time) do you use for programming and set up of interactive technology?

[ ] Daily at least 5-15 minutes
[ ] Weekly at least 15-30 minutes
[ ] Monthly at least 30 minutes
[ ] Once a semester at least 1 hour
[ ] Less than 1 hour a semester

This section will ask you to rate your feelings towards technology use on a five point scale from Strongly Disagree to Strongly Agree.

I use interactive technologies only because it is required by my school.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies only for special occasions.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies as a reward for students.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because they are hands-on.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because they are engaging.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies to customize lesson plans to fit each student's needs.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because they get my students excited about learning.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies to try something new.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies as an alternative means of presenting information.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies as a supplemental teaching tool.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because I believe they will increase students' understanding of the material.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because of its perceived educational benefits.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because I can adapt activities/lessons based on student interests.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because they address different learning styles.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because they get students involved with the material.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies to take pressure off of my personal (traditional) lesson planning.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies to give myself more free time.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies to create lesson plans more efficiently.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I use interactive technologies because I believe it will help motivate students.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I don't use interactive technologies because it gets in the way of the content I am trying to teach.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I don't use interactive technologies because it distracts my students from learning.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

I don't use interactive technologies because my lesson plans are successful without them.
O Strongly Disagree O Disagree O Neither Agree nor Disagree O Agree O Strongly Agree

This section will focus on your feelings about the following technologies. Be sure to think about the characteristics of the technologies, their functions, and how you use them. Given that, please rate your impression about the nature of the following technologies. Circle your rating for each item on a scale of Strongly Disagree to Strongly Agree.

I believe Interactive Whiteboards are…

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
…Intuitive	O	O	O	O	O
…Portable	O	O	O	O	O
…User-Friendly	O	O	O	O	O
…Adaptable	O	O	O	O	O
…Responsive	O	O	O	O	O

I believe Computer Tablets are…

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
…Intuitive	O	O	O	O	O
…Portable	O	O	O	O	O
…User-Friendly	O	O	O	O	O
…Adaptable	O	O	O	O	O
…Responsive	O	O	O	O	O

I believe Laptop Computers are…

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
…Intuitive	O	O	O	O	O
…Portable	O	O	O	O	O
…User-Friendly	O	O	O	O	O
…Adaptable	O	O	O	O	O
…Responsive	O	O	O	O	O

Lastly, this section will ask general questions about where you teach as well as your teaching experience.

What is your gender?

- o Male
- o Female

Which best describes your classroom setting?

- o Resource classroom
- o Self-contained classroom
- o Inclusion classroom
- o None of the above

Which best describes the setting of your school?

- o Urban
- o Suburban
- o Rural

In the past year, which grade level of students did you teach?

How many years have you been teaching in your current field of education?

- o Less than 1
- o 1 to 4
- o 5 to 9
- o 10 to 20
- o Over 20

How would you rate your confidence/usage with technology in general?

- o Very Low
- o Low
- o Average
- o High
- o Very High

Thank you for your participation in this study. TO compensate you for your time, you will be entered into a drawing to win a $50 gift cards to a school supply store. The winner will be contacted via email. Please enter your email address below so that we may contact you should you win. This email address will not be tied to your survey answers in any way.

CIRRICULUM VITAE

Erin Ruth Silva

EDUCATION

Wake Forest University, Winston-Salem, NC
May 2012
Master of Arts in Communication
GPA: 3.703

Elon University, Elon, NC
May 2010
Bachelor of Arts in Media Arts and Entertainment with a concentration in Broadcast and New Media
Minor in Business Administration
GPA: 3.436
Study Abroad: Paris, France
January 2008

INTERNATIONAL EXPERIENCE

Lived in Japan, traveled independently through England, France, and Ireland.
Intermediate French with proficiency

COMPUTER SKILLS

Proficient in: Microsoft Word, Excel, Outlook, Access, PowerPoint, Publisher; Adobe Dreamweaver, Photoshop, Illustrator, After Effects, Premiere; Soundtrack Pro; Final Cut Pro; Visual Basic, QBasic, HTML; ACT; Apple Motion, GarageBand, QuickTime; Sony Vegas; Constant Contact; IBM SPSS

ACADEMIC EXPERIENCE

Master's Thesis, Wake Forest University, Winston-Salem, NC
May 2012
Principal Investigator and Author
"Special Education Teachers' Motivations for Technology Use in the Classroom: A Closer Look at Interactive Technologies Through the Universal Design for Learning and Anthropomorphism"

North Carolina Graduate Education Day, Raleigh, NC
May 2012
Presenter
"Special Education Teachers' Motivations for Using Technology in the Classroom"
Invited to present to the NC legislature by the North Carolina Council of Graduate Schools

Graduate Student Research Day, Wake Forest University, Winston-Salem, NC
March 2012
Presenter
"Special Education Teachers' Motivations for Technology Use in the Classroom"
Runner up – Social Sciences Division

Graduate Research Assistant, Wake Forest University, Winston-Salem, NC
Author
Krcmar, M., Cingel, D. P., Silva, E. R., & Malsin, M. (in review). Comparing preschool-directed media to play and education, *Media Psychology*.
Student Undergraduate Research Forum, Elon University, Elon, NC
Spring 2008
Researcher/Presenter
"Young People's Perceptions of Hilary Clinton in the 2008 Presidential Education"

WORK EXPERIENCE

Wake Forest University Department of Information Systems, Winston-Salem, NC
December 2011-Present
Cisco Associate

- Serve as a liaison between Cisco Systems and Wake Forest Information Systems
- Work with faculty and staff to consult about integrating collaborative technologies in the classroom
- Work closely with Information Systems to analyze and compare technologies for campus wide adoption
- Create, manage, and promote technology events on campus for students, faculty, and staff from start to finish
- Assist in technology pilot studies for new technologies by analyzing data, creating survey instruments, and monitoring progress of participant feedback.

Wake Forest University Office of Leadership and Organizations, Winston-Salem, NC
August 2011 – December 2011
Graduate Assistant

- Work with the department of Campus Life to implement the My Journey Program
- Film and edit weekly videos for Campus Life webpage
- Attend and take pictures and video for Campus Life events
- Take part in weekly department meetings to create contact with other campus professionals and ensure the office needs are being met

The Light Factory, Charlotte NC
June 2011-July 2011
Marketing Intern

- Create Press Releases for community outreach programs
- Conduct Survey Research and data analysis to determine effective outreach programs
- Assist in Fundraising initiative development for future campaigns
- Attend community meetings and events to network and create a company presence

Film Editing Teaching Assistant

- Accompany Middle and High School aged students on shooting assignments
- Teach techniques of digital film editing using Final Cut Pro

Wake Forest University Media Relations, Winston-Salem, NC
September 2010 – December 2010
Production Intern

- Film and Edit footage for the WFU women's basketball team using Adobe Premiere
- Create accessible videos suitable for web viewing on wakeforestsports.com
- Brainstorm ideas to promote and market the women's basketball program

New Winston Museum, Winston-Salem, NC
August 2010 – November 2010
Office Assistant

- Assisted in office administration tasks
- Archived data and Oral Histories from locals of Winston-Salem

ADDITIONAL EXPERIENCE

American Red Cross Piedmont Carolina Chapter, Burlington, NC
January 2009-May 2010
Communications and Public Relations Assistant
Sports Endeavors Inc., Hillsborough, NC
April 2008-February 2010
Video Editor
Boy Scouts of America Old North State Council, Greensboro, NC
May 2009 – May 2010
Public Relations/Marketing Intern
Campus Technologies, Elon University, Elon, NC
September 2007 – September 2008
Office Assistant
Candy Kitchens Inc., Bethany Beach, DE
2005-2007; May-July 2010
Store Manager