Special Education Teachers’ Perceptions and Practices of Technology Integration for Supporting Students with Multiple Exceptionalities

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Abstract

This qualitative research study explores how two special education teachers practice and perceive technology integration in a public elementary school in downtown Toronto, Ontario. Participants came from classrooms identified as Special Education classes by the Ontario Ministry of Education, with students identified as having multiple exceptionalities requiring additional support and differentiation to support their success. From two in-depth interviews, this qualitative research study used cross-case analysis to examine participants’ perceptions and practices of technology integration to support students in the special education classroom. Results demonstrated that teachers value the potential of various educational technologies to support student communication and enhance learning experiences in the special education classroom. Participants also highlighted various practical considerations that special education teachers should consider. The implications for the educational community are discussed. Future research should explore which specific educational technologies are most beneficial for certain student needs.

Key words: Assistive Technology; Educational Technology; Elementary Education; Special Education; Special Education Teachers; Students with Multiple Exceptionalities; Teacher Perceptions; Technology Integration.
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Chapter 1: INTRODUCTION

Introduction to the Research Study

Twenty-first century classrooms are increasingly embracing new technologies for their potential to facilitate learning for students of all abilities. For instance, a recent news release from The Ontario Ministry of Education announced a $150-million technology and learning fund towards improving classroom technology. As Education Minister Liz Sandals emphasizes, “Students today are growing up in a world where technology and digital resources are an integral part of their everyday lives” (Wheeler, 2014). With this in mind, technology integration offers an approach to aligning classroom instruction with how students conduct their day-to-day lives. In fact, the literature is beginning to suggest that technology offers many benefits to enhancing education, including the potential to positively affect student achievement and motivation (Campigotto, McEwen, & Demmans Epp, 2013; Heafner, 2004). Numerous innovative features within many technology products allow teachers to customize, enhance, and scaffold a student’s learning. The tremendous flexibility of technology enables teachers to differentiate their instruction in ways that were not possible when restricted to traditional classroom media (Meyer & Rose, 2005). Thus, technology affords educators with the ability to support a diverse range of learners, while improving student achievement and motivation.

While technology has well documented use in general education classrooms, it also presents many advantages for students with exceptionalities. Assistive technology for instance, consists of various devices and services that are specifically designed to help students with exceptionalities. These may include communication aids, alternative
computer keyboards, and devices such as “adaptive switches.” Moreover, mobile digital technologies such as the iPad offer students with developmental delays in speech and language alternative avenues for accessing curriculum and learning (McEwen, 2014). Therefore in classrooms that consist of students with various exceptionalities, technology can maximize educational opportunities and improve outcomes (Jenson, Taylor, & Fisher, 2010).

The successful integration of technology into classrooms remains a goal for many teachers. With new technological tools being regularly introduced to the educational field, new demands and expectations are imposed on teachers (Johannesen & Eide, 2000). Several factors relate to the successful integration of technology into curriculum and learning. Some considerations include financing, the seemingly overwhelming decision of which tools to adopt given the plethora of technologies available today, and teacher training in the use and integration of technology.

The role of the teacher is an often over-looked determinant in discussions surrounding technology integration (Bitner & Bitner, 2002). This is problematic, as teachers hold the ultimate responsibility for how a classroom operates. Therefore, their perception towards technology will influence how regularly and effectively technology will be used to support student learning in the classroom. Several factors exist to deter technology integration, specifically, teacher scepticism and antipathy towards technology that is rooted in complacency. When these factors are present, the prospect of learning a new technological tool often leads to omitting technology from teaching and learning methods (Johannesen & Eide, 2000). While many studies tend to overlook the role of the teacher in technology integration in mainstream classrooms, this study endeavours to
examine two specific special education teachers who have adopted various technologies within their classrooms, and examine the practices they employ in the use thereof. More importantly, this study examines their motivations, their beliefs, their challenges, and their perception of the outcome of the use of technology in this setting.

**Purpose of Study**

This study focuses on how technology is being used to support students with exceptionalities, a population of children whose intellectual, emotional, physical, or social performance falls below the norm. Their differences may be related to physical, language, psychological, cognitive, emotional, or social factors, or a combination of these (Winzer, 2007). Using a qualitative research design, the primary objective of this study is to investigate special education teachers’ perceptions and practices of technology integration for students with multiple exceptionalities. Specifically, it hopes to illustrate how these technologies are being used, the impact teachers perceive it has on students, and also practical considerations concerning technology integration. There is great value in pursuing this investigation, as the way teachers perceive technology ultimately influences the success of these tools for students with exceptionalities. This study may affect the following four stakeholders within the educational community: students in the special education classroom, their teachers, parents, as well as school board administrators who might be interested in exploring teachers’ perceptions and practices of technology integration in this classroom setting. Given the impact educational technologies can have on students with exceptionalities, it is important to explore how teachers are integrating these tools in the special education classroom. My hope is that this study will encourage teachers that the process of technology integration is a
worthwhile endeavour given the numerous advantages it has for this population of students.

**Background of Researcher**

My interest in pursuing this area of research was triggered by several past experiences involving individuals with exceptionalities. One of my earlier experiences took place as a high school volunteer for an organization called “Best Buddies,” whose program goal was to integrate students with exceptionalities into the broader school community. In addition to developing an appreciation of diverse abilities, this experience led me to value inclusivity as a personal professional goal.

In the spring of 2013, I had an impactful experience as a volunteer in El Salvador at a home for abandoned children with intellectual and physical disabilities. This experience opened my eyes to the gifts that each child has to offer. This has since inspired me to take a “strengths perspective” that focuses on the potential of each student.

As an individual who grew up in the digital age, I understand the need and desire to use technology in everyday life. I have confidence that digital technologies have the potential to support meaningful learning. In previous practicum experiences, I have had the opportunity to teach in technology-rich classroom environments. Despite the resourcefulness of these classrooms, technology integration was not always well executed. This focused my attention towards the distinction between “technology use” and meaningful and intentional, “technology integration” to enhance teaching and learning. I was fortunate to have supportive Associate Teachers who welcomed my desire to experiment with various educational technologies.
As a teacher candidate, my experience with technology integration is still limited. However I am eager to explore the new methods of learning that technology offers. Now that technology is no longer an intimidating novelty, I believe that the 21st century is an exciting time for education to discover the possibilities that these tools can offer. Given the powerful innovations becoming increasingly accessible, teachers at large should challenge themselves, their students, administrators, and policymakers to help all teachers make the best use of the technology tools available to them.

**Research Questions**

With a single school as the focus of this study, I investigate technology integration in the special education setting as guided by the following central research questions: *How are a small sample of teachers integrating educational technology in the special education classroom; and what perceived impact do they observe educational technology has on students with multiple exceptionalities?* This central research question is underpinned by the following subsidiary question: *What practical considerations can they share with regards to integrating educational technology into their classroom?*

**Overview**

This study responds to the aforementioned research questions by adopting a qualitative approach that includes two interviews with teachers on their perceptions and practices of technology integration in the special education classroom. I adopt purposeful sampling and the semi-structured interview method to elicit this data from two special education teachers. In chapter 2, I present a review of the literature with a focus on the categories of exceptionalities, special education in Canada, technology integration, as well as teacher
beliefs and challenges concerning technology integration in classrooms. In the third chapter, I describe the research design, data collection methods, participants, and ethical review procedures. In Chapter 4, I report on the research findings gained from the interview process. In the final chapter I highlight my insights and their implications for the educational community, including recommendations for further study.
Chapter Two: LITERATURE REVIEW

Categories and Definitions of Exceptionalities

There are a myriad of subtle differences that make each child unique. Therefore “teachers do not expect every student to learn the same things at the same pace, with the same materials, in the same time, and with the same amount of instruction” (Winzer, 2007). Within this diverse range of learners, some students exhibit differences that substantially affect the way they learn, behave, and respond. Such children and youth are referred to as students with exceptionalities, whose behaviour and learning deviates significantly from the norm (Edmunds & Edmunds, 2014).

The term ‘exceptionality’ is used by The Ontario Ministry of Education to identify patterns of strengths and needs common across groups of students. According to the Education Act, an exceptional student is defined as “a pupil whose behavioural, communicational, intellectual, physical or multiple exceptionalities are such that he or she is considered to need placement in a special education program” (Ontario Ministry of Education, 2001). The Ontario Ministry of Education (2001) recognizes the following five categories of exceptionality: behaviour, communication, intellectual, physical, and multiple. They are developed to address the wide range of conditions that may affect a student’s ability to learn. Although there is some flexibility within these rather broad categories, it is important to note the general characteristics contained within each. This will help one understand the multifaceted and unique profile of an individual with multiple exceptionalities, the population of students central to this study.
**Behaviour Exceptionality**

This wide-ranging classification of exceptionality includes conduct disorders, anxiety and withdrawal, socialized aggression, Attention Deficit Hyperactivity Disorder, and childhood psychoses (Winzer, 2007). According to The Ontario Ministry of Education (2001), behaviour exceptionality is characterized by specific behaviour problems, as to adversely affect a student’s educational performance. The behaviour problem may be accompanied by one or more of the following indicators: difficulty building or maintaining interpersonal relationships; excessive fears or anxieties; compulsive reactions, an inability to learn that is not related to intellectual or sensory factors; or other health factors. In the classroom, the most common deviant behaviours exhibited by students with this exceptionality are aggressive acting-out and social withdrawal (Winzer, 2007).

**Communication Exceptionality**

Communication exceptionalities are broadly described as impairment in comprehension and/or use of verbal communication, which may be associated with neurological, psychological, physical, or sensory factors. The subcategories of this exceptionality include Autism Spectrum Disorders (ASD), Deaf and Hard-of-Hearing, Language Impairment, Speech Impairment, and Learning Disability (Ontario Ministry of Education, 2001). Given that speech and language disabilities interfere with the way in which a child interacts with the world, it can have adverse consequences for all aspects of a child’s development (Winzer, 2007).
**Intellectual Exceptionality**

Intellectual exceptionalities are atypical intellectual abilities, which includes the following three subcategories: Giftedness, Mild Intellectual Disability, and Developmental Disability. Giftedness is described by an unusually advanced degree of intelligence that requires differentiated learning experiences of a certain depth and breadth in order to fulfill a student’s educational potential (Ontario Teachers’ Federation, 2015). A mild intellectual disability is characterized by a learning disorder due to slow intellectual development, and requiring curriculum modification and supportive service in order to profit educationally. A student with a developmental disability has below average intellectual and adaptive abilities (OTF, 2015; Winzer, 2007). Adaptive functioning includes skills needed for self-care such as dressing, toileting, feeding, self-control, and peer interaction.

**Physical Exceptionality**

The Ontario Ministry of Education (2001) identifies two subcategories from the physical exceptionality category: Physical Disability and/or Blind and Low Vision. Physical Disability causes severe physical limitation or deficiency, as to require special assistance in order to provide the opportunity for educational achievement. This broad exceptionality category may include students with a wide range of conditions, which affects the nervous and/or muscular system such as Cerebral Palsy, Multiple Sclerosis, Spina Bifida, and Spinal cord injury (OTF, 2015). Of children with physical exceptionalities, almost half have Cerebral Palsy (Winzer, 2007). Blind and Low Vision is a condition of sight or vision impairment that adversely affects educational
performance. Students may exhibit different degrees of vision impairment. For instance, some students may be completely blind while others may have some vision but are considered legally blind. Adaptive technology is used for support, mobility, and positioning. Students with physical and health impairments are at significant risk if teachers are not adequately prepared to meet their specialized health care needs (Winzer, 2007).

**Multiple Exceptionalities**

This study targets the population of students with multiple exceptionalities. An extremely heterogeneous population, this group of students have independent and interdependent deficits in two or more of the previously presented exceptionality categories. For instance, the needs of these students may include physical accommodations, behavioural interventions, specialized equipment, alternative and/or modified curricula, as well as specific learning strategies (Edmunds & Edmunds, 2014). The Ontario Ministry of Education (2001) defines a student with multiple exceptionalities having “a combination of learning or other disorders, impairments, or physical disabilities that is of such a nature as to require, for an educational achievement, the services of one or more teachers holding qualifications in special education and the provision of support services appropriate for such disorders, impairments, or disabilities.”

**Terminology**

In society, the terms *disability, impairment,* and *special needs* are often used interchangeably. It is important to differentiate the meanings of these terms, as they are often misused. A *disability* is a consequence of an *impairment*, which limits an
individual’s functional performance (Winzer, 2007, Santrock et al., 2010). The term *special needs* is broadly used in education contexts to designate a student who requires special education (Winzer & Mazurek, 2000).

This study is driven by the belief that all children can achieve their full potential if they are provided with appropriate opportunities, differentiation, and a supportive environment. I therefore use the term ‘exceptional’ as a more inclusive approach for referring to children with learning and/or behaviour problems, children with physical disabilities, sensory impairments, and children who are intellectually gifted. Given the power of language to perpetuate negative connotations, People-First Language is used to emphasize the potential of the child while minimizing the impact of the disability or impairment (Pennsylvania Department of Education, 2015).

**Application of the Categories of Exceptionalities**

Regulation 181/98 governs the identification and placement of exceptional pupils in Ontario schools. This is one of several regulations made under the *Education Act* that concerns special education (Ontario Ministry of Education, 2001). All students with demonstrable learning based needs are entitled to appropriate accommodations in the form of special education programs and services, including classroom based accommodations (B. Finlay, personal communication, December 19, 2011). The determining factor for the provision of special education programs or services is the needs of individual students based on the individual assessment of strengths and needs.

The majority of students with exceptionalities receive specialized educational programming (Edmunds & Edmunds, 2014). In Ontario, this is referred to as an
Individual Education Plan (IEP). The IEP is a legal document that outlines a student’s individualized educational goals, as well as the services, methods, and strategies that will be used to support students with various education needs and strengths. The approach to developing an IEP is to focus on the functional or learning challenges faced by the individual student. IEPs are not intended to be static; rather, they are intended to evolve in order to account for the changing strengths and needs of each student for whom an IEP has been developed (Winzer, 2007; Ontario Ministry of Education, 2001).

Prevalence of Students with Exceptionalities

The United Nations estimates that more than 93 million children under the age of 14 are living with a moderate to severe disability (UNICEF, 2005). As a generalization, school-related figures tend to be higher, given that they emphasize the total of children and youth receiving special education services. In the United States for instance, more than 6.4 million school-aged children are receiving special education services (Winzer, 2007).

Canadian statistics for prevalence rates are based on the World Health Organization (WHO)’s definition of disability, which understands this concept not as an attribute of a person, but resulting from an interaction between health conditions and contextual factors. According to the WHO’s World Report on Disability, an estimated 7.7 per cent of all children from birth to 19 years of age have a limitation or disability (WHO, 2011). Moreover, prevalence rates are on the rise. From 1998 to 2004 for instance, the proportion of students with special needs in Ontario schools’ more than doubled (Winzer, 2007).
In Ontario, the most recent figures available at the time of this study’s completion are from the 2010-2011 school year. The Ontario Ministry of Education (2013) reported that more than 191,600 students were identified as exceptional pupils. Furthermore, 127,600 students who were not formally identified were provided with special education programs and services. Of the students who have been identified as having one or more exceptionalities, almost 80 per cent spend at least half the day within a regular classroom setting (Bennett, 2009).

**Special Education in Canada**

As far back as 1969, all Canadian provinces and territories have enacted legislation to ensure education to all children, including children with exceptionalities (Edmunds & Edmunds, 2014). Contemporary special education encompasses a schooling system that is designed to suit the specific needs and strengths of students with exceptionalities, to reach their full potential (Winzer & Mazurek, 2000). Formally defined as the educational services provided to children and youth with exceptionalities, special education includes specifically designed instruction, supplementary aids and services, and early interventions (CEC, 1997). The premise of special education is that when children and youth with exceptionalities are appropriately differentiated, they are more likely to reach their full potential (Edmunds & Edmunds, 2014). In a special education setting, teachers have the specialized knowledge and educational tools to teach and support these students more effectively. The Council for Exceptional Children (CEC), an international organization dedicated to improving educational outcomes for individuals with exceptionalities, views special education as an integral part of the total educational
system, rather than a separate order. Furthermore, special education typically functions within and as a part of the regular, public school system (CEC, 1997).

**The Special Education “Debates”**

An ongoing topic of debate concerns whether students with exceptionalities should be included in regular classroom settings or in specialized learning environments. Advocates of inclusive schooling argue that students with exceptionalities should be educated in the same setting as their normally developing peers. This mirrors societal perceptions about individual and educational rights (Winzer & Mazurek, 2000). A common conception of inclusive education envisions a unified system that incorporates all students as fully participating members of the school community. This involves combining general and special education strategies so that each student, regardless of his or her abilities, is supported (UNESCO, 2006). Given that students with exceptionalities present a range of different learning needs, one goal of inclusive education is to eliminate barriers that may prevent them from having successful learning experiences. This approach stands in opposition to the placement of special needs students in special education classrooms or schools. Advocates of this approach argue that segregation of students into specialized learning settings is essential for providing them with individualized instruction they need to succeed (Bennett, 2009).

The majority of children who receive special education however, spend most of the school day in the regular classroom and are periodically withdrawn to a special education classroom to receive additional instruction or support (Edmunds & Edmunds, 2014; Santrock et al., 2010). In Ontario, this accounts for approximately 17% of
elementary students. The most recent figures show that only 2% of all students spend the majority of their day in special education class (Ontario Ministry of Education, 2013).

Technology and Learning in the 21st Century

The twenty-first century has brought about a digital culture that places new demands on education (Bitner & Bitner, 2002). Jenson, Taylor, and Fisher (2010) conceptualize twenty-first century learning as learning enabled by and supported through Information and Communication Technologies (ICT). ICT includes any technology used to record information, broadcast information, and/or communicate through voice, sound, or images. Some examples include Internet applications, video technology, and computer software. Besides being a central part of contemporary life, ICTs and other educational technologies have become key tools in teaching and learning today. Given the diverse range of student needs in the 21st century classroom, effective technology integration can serve as a platform for differentiated instruction (Meyer & Rose, 2005). The wide range of technological tools available today offer teachers with limitless ways to address diverse student needs. Specifically, technology has made a considerable difference in the lives of students with special education needs and has been shown to have a direct impact on their achievement (Jensen, Taylor, & Fisher, 2010).

Operational Definition of Educational Technology

For the purpose of this study, educational technology is broadly defined as the use of any technological tool in education. This includes ICT, digital technology, mobile technology, and assistive technology, which can be all used to help deliver learning material and support learning processes. Thus this study uses the term educational
technology to refer to any type of technology that helps students with exceptionalities succeed in the special education classroom. I therefore consider assistive technology a subset of educational technology. Educational technology and instructional technology are used interchangeably in the literature (Dell, Newton, & Petroff, 2008). According to Roblyer (2003), no single acceptable definition of technology dominates the educational field. This study adopts Roblyer’s (2003) definition of educational technology, “a combination of the processes and tools involved in addressing educational needs and problems, with an emphasis on applying the most current tools: computers and their related technologies.”

Technology in Special Education

Students with multiple exceptionalities can greatly benefit from using technology in the special education classroom. The literature for technology in special education emphasizes Assistive Technology, as well as other modern educational technologies that are used for students with exceptionalities.

Assistive Technology

The Individuals with Disabilities Education Act defines assistive technology 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 the functional capabilities of a child with a disability” (Mittler, 2007). More generally, an assistive technology device must increase, maintain, or improve functional capabilities of a child with an exceptionality (Dell, Newton, & Petroff, 2008). A wide variety of assistive technologies are available to support student learning: including screen readers,
speech-to-text software, and augmentative communication systems. A key determinant for effective assistive technology use is finding an appropriate match between the assistive technology tool, the students’ exceptionality, and the task. Therefore, the process of finding the right tool may require a trial and error approach (OTF, 2014).

According to a report from the Toronto District School Board, the majority of principals report that assistive technologies have produced major benefits for their special education students (Ontario Ministry of Education, 2013). However, they identify a number of barriers to access, including cost, limits of equipment bandwidth, and training for teachers and Educational Assistants to support students’ use of the technology.

**Modern Educational Technology for Students with Exceptionalities**

While assistive technology has had a long-standing discourse for its effectiveness in special education, studies are beginning to show that commercially available digital technologies can have a positive impact on students with exceptionalities (Dell, Newton, & Petroff, 2008). Application developers, device manufacturers, and the media make bold claims that devices such as handheld touchscreen tablets can be effectively used in the instruction of students with exceptionalities (Campigotto, McEwen, & Demmans Epp, 2013). However, their use in both the regular and special education classrooms have been under-investigated. Therefore, studies of mainstream, commercially available digital technologies and applications such as the iPad and interactive whiteboard have only begun. In a recent study by McEwen (2014) for instance, students with ASD made significant gains in communication skills and social interactivity with the use of handheld iPod Touch devices.
Operational Definition and Framework for Technology Integration

This study conceptualizes technology integration as the process of determining which tools and methods to implement in order to assist students in achieving their educational goals (Dell, Newton, & Petroff, 2008). In addition, this study assumes that integrating technology is the next step after technology has become available and accessible. Therefore, technology integration is understood as a process by which teachers use technology purposefully to enhance teaching and learning.

With this conceptualization in mind, this study adopts a framework for technology integration called Technological Pedagogical Content Knowledge (TPACK). TPACK proposes that meaningful technology integration occurs when teachers consider the interplay of the following three forms of knowledge: content, pedagogy, and technology (Koehler, Mishra, & Cain, 2013). According to this framework, skilful integration of any technology demands an intentional approach to its instructional use. It also recognizes that technologies have their own propensities, potentials, constraints, and affordances.

Teacher Role in Technology Integration

Teachers are one of the key contributors to the success of technology integration for learning and instruction (Wang & Reeves, 2003). As advocated by the TPACK framework, the power of technology lies in a teacher’s skill to meaningfully integrate these tools into instruction. In particular, teachers of students with exceptionalities are expected and required to demonstrate competency with using and integrating assistive technology into their students’ educational programming when necessary (Dell, Newton, & Petroff, 2008). This is also reinforced by the standards of the Council for Exceptional
Children, which declares that entry-level special education teachers of students with exceptionalities must be competent in implementing specific technologies to support students with exceptionalities (CEC, 1997).

Since teachers hold the ultimate responsibility and leadership of a classroom, their skill and attitude determines the effectiveness of technology integration into the curriculum. However, the role of the teacher in this process is an often over-looked determinant (Bitner & Bitner, 2002). In order for technology to be used meaningfully to support and enhance student learning, their perspectives must be considered (Bitner & Bitner, 2002; Wang & Reeves, 2003). A study by Kim et al., 2013 investigated how teacher beliefs were related to technology integration practices. All participants were recruited from regular classrooms in public Elementary schools. The results of this study indicated that teacher beliefs, among other factors, influenced their technology integration practices. This calls for closer collaboration between educational researchers, technology designers, and teachers to ensure that teachers’ perspectives on technology integration are no longer overlooked. Moreover, perspectives of special education teachers in particular, are an area that has been quite under investigated.

Bitner and Bitner (2002) outlined eight areas that should be considered in order for successful technology integration. Among these, the climate, or school culture, should welcome teachers to experiment without the fear of failure. In addition, ongoing support must be provided and motivation to endure the frustration of change, encouraging teachers to focus on the possibilities that technology can offer students.
Conclusion

This literature review attempted to establish a theoretical framework for this research study. It also attempted to highlight areas of the literature in which this study will contribute to. As such, this study will add to the currently small body of research that investigates special education teachers’ perceptions and practices of technology integration.
Chapter 3: METHODOLOGY

Procedure

This study adopted a phenomenological qualitative research approach to investigate how a small sample of teachers are integrating technology in the special education classroom, and the perceived impact they observe it has on students with multiple exceptionalities. The phenomenological nature of this approach allows the researcher to explore technology integration in special education with a small group of individuals who have experienced this practice (Creswell, 2013). The phenomenological approach was best suited for this study given that the research explores the common experiences of technology integration of participants. It will inform the procedures of the study through an interview protocol that consists of many open-ended questions aimed to gather data that leads to an understanding of the common experiences of the participants.

The protocol of this research included a comprehensive literature review, which provides a theoretical background and context for the study. Data was collected from two in-depth interviews with participants who met the criteria outlined by the researcher. Through a face-to-face interview, participants were asked a series of semi-structured, open-ended questions. Interviews were transcribed and a cross-case analysis of common meanings from participants’ experiences was conducted (Creswell, 2013). A composite description of emerging themes is presented in Chapter four.

Instruments of Data Collection

The primary source of data collection was generated from two individual semi-structured interviews with teachers from a congregated Elementary school for students with
multiple exceptionalities in the Greater Toronto Area. Thus, the researcher was a key instrument in the data collection of this study. Consistent with the nature of qualitative inquiry, interviews were conducted in participants’ natural work settings. The informal, semi-structured nature of the interview allowed for flexibility and potential to elicit significant depth in addressing the research questions. Each interview took place over the course of approximately 35 minutes. Interviews were audio-recorded using an iPhone and subsequently manually transcribed. Some interview questions included: *What are your views on the use of technology in the special education classroom?* And; *what issues or challenges have you encountered in your practice of implementing technology for students with exceptionalities?* An identical list of 14 questions was presented to each participant. The full interview protocol can be found in Appendix B.

A secondary instrument of data collection included researcher observations recorded as descriptive field notes. The researcher acted as a “complete participant,” given that observations were made while fully engaging with the teachers being observed (Creswell, 2013). The opportunity to observe was granted as the researcher was simultaneously completing a practicum experience within the research setting. Observations were strictly based on the research purpose and questions. The physical setting, participants, classroom activities, and students’ interactions with technology were observed critically.

**Participants**

This study adopted purposeful sampling for the recruitment and selection of participants, who were sought from a congregated school for students with multiple exceptionalities. Potential participants from this school were consulted through recommendations from the
researcher’s colleagues. A foundational criterion that participants were required to meet was a genuine commitment to the success of students with multiple exceptionalities. In addition, they were required to have experience using educational technology to support students in the special education classroom.

Two special education teachers were selected for interview. Pseudonyms are used to maintain anonymity. The first participant, “‘Jill’”, has been teaching special education since the start of her professional years 16 years ago. “‘Jill’” has a class of students in the Kindergarten to Grade 2 range, with varying multiple exceptionalities. All students are nonverbal and exhibit developmental disability. The second participant “‘Kathy’”, has been a special education teacher for 10 years. The students in her classroom span the ages of Grade 4 to Grade 6, and many have Autism Spectrum Disorder (ASD) in combination with other exceptionalities. Both participants contributed valuable insight about their practices and perceptions of technology integration for students with multiple exceptionalities.

Data Collection and Analysis

Qualitative data was gathered via individual semi-structured interviews with two teachers. With permission from participants, each interview was audio-recorded using an iPhone and manually transcribed. Data was analyzed by coding for themes in line with the central and subsidiary research questions. During First Cycle Coding, descriptive and in vivo codes were assigned to relevant segments (Saldana, 2008). During consecutive cycles of coding, similarly coded data was consolidated into different or new categories. Categories represented broad units of information that consisted of several aggregated
codes (Creswell, 2013). This information was represented in the form of a data table, which included supporting quotes for each category.

**Ethical Review Procedures**

Prior to the implementation of this study, an Ethics Review Protocol was submitted to the University of Toronto Office of Research Ethics. This included the rationale for the proposed project, emphasizing its accordance with the requirements of the Master of Teaching Program. Ethics approval stipulated that the Master of Teaching Program had been “granted annual renewal of ethics approval to the above-referenced research protocol through the Research Ethics Board (REB) delegated process.”

Participants were contacted and informed of the general purpose of study. Given that participation in this study was entirely voluntary, participants were not obligated to sign the letter of consent. The two individuals who agreed to participate were requested to read and sign an informed letter of consent, which disclosed the purpose of study (See Appendix A for Consent Letter). They were also informed of the option to decline any interview questions and/or withdraw from the study at any time. The names of participants and schools are not revealed; and thus pseudonyms are used to preserve their anonymity. All confidential data has also been omitted. Audio-recordings from the interviews will be secured and retained for five years after the completion of the Master of Teaching Research Project. The participants were also informed that they might request a copy of the study upon its completion.

The level of risk for this research study is low. This is justified based on many grounds, namely that participation in the study is expected to be of no greater risk than that of everyday life (Creswell, 2013). In addition, participation is voluntary and the
researcher has selected all participants. The interview itself is low-risk given that participants will not be asked sensitive questions that would likely evoke an emotional response. Both a Master of Teaching course instructor and research supervisor supervised every component of the research study. For these reasons, the risk for this research study has been deemed low. On the other hand, an anticipated benefit derived from this research study is the advancement of knowledge. This study has the potential to reveal important insights about special education teachers’ perceptions and practices of technology integration for students with multiple exceptionalities.

Limitations

The current study exhibited three noteworthy limitations. The first limitation relates to the small sample size. Given the parameters of the Master of Teaching Research Project, the researcher was limited to selecting a maximum of only three participants. Although this provided the opportunity for significant depth of participants’ experiences, having a more sufficient sample size would have allowed for more robust conclusions to be drawn. The next limitation relates to the data collection method. Within the ethical review protocol granted for the Master of Teaching Research Project, the researcher was not permitted to collect data from other adults involved in the technology integration process, such as Educational Assistants, lunch hour supervisors, or school administrators. There may have been added value in interviewing these individuals, who would offer different perspectives on the research questions. A third limitation stems from the two-year timeline prescribed by the Master of Teaching program. Without this time constraint, longitudinal effects may have been studied. Despite these limitations, there is
much value rooted in the research approach and methods, which will be discussed in the section to follow.

**Strengths**

Several areas of strength are embedded in the small-scale, qualitative research approach selected for the current study. To begin with, the small sample size was advantageous for acquiring in-depth accounts of two special education teachers’ experiences with technology integration. The phenomenological nature of the study enabled the analysis of participants’ rich descriptions of their lived experiences with technology in the special education classroom. This allowed the researcher to develop a composite description of the essence of this experience for both participants. Finally, given the researcher’s position as a teacher candidate, the opportunity to conduct face-to-face interviews with educators was a valuable experience for collecting first-hand insights into professional practice.

**Timeline**

This research project was executed throughout the two academic school years of the Master of Teaching program, at the Ontario Institute for Studies in Education of the University of Toronto. The project commenced in September 2013; at this time the research problem was identified and the research questions were articulated. During the winter of 2014, the literature review was developed which provided a theoretical basis for this project. The data collection phase subsequently took place between September and December 2014. Phenomenological analysis of interview data began in January 2015, and shortly thereafter, themes and implications were reported. In line with program
requirements, the proposed completion date for this Master of Teaching Research Project is April 2015.
Chapter 4: FINDINGS

Introduction

In this chapter, I present the findings from two face-to-face interviews with special education teachers from a single public Elementary school for students with multiple exceptionalities. Following the cross-case analysis of data, five themes emerged. These themes seek to gain as much insight as possible into the central research questions of this study: How are a small sample of teachers integrating technology in the special education classroom; and what perceived impact do they observe technology has on students with multiple exceptionalities? To highlight the intricacies and multiple layers of meaning embedded in the data, the five themes were refined into sub themes. Within each theme and subtheme, excerpts from participant responses are provided where appropriate. The five central themes are the following:

I. Teachers consider that certain educational technologies can support the communication of students who are nonverbal

II. Teachers consider that educational technologies can enhance the learning experience of students in the special education classroom

III. Various characteristics of educational technology make it an effective teaching and learning tool for this group of students

IV. Successful technology integration requires a professional learning community setting for best results

V. Practical considerations related to technology integration in the special education classroom should be considered
Theme 1: Teachers consider that certain educational technologies can support the communication of students who are nonverbal

Both participants reported that certain educational technologies play a significant role in supporting students’ communication in the special education classroom. In particular, participants noted that the iPad serves as an effective communication device for students with Autism Spectrum Disorder who have communication difficulties. Alternatively, “Jill” described an assistive technology device that some students who are nonverbal rely on as their “voice.” “Kathy” on the other hand, has a class of mostly nonverbal students with a few verbal students who can articulate short phrases. She commented that “[my students] are always trying to say something.” Powerful effects stem from providing a way to communicate for students who are nonverbal. Thus with supported communication, two sub themes emerge: students exhibit an overall decrease in frustration, as well as an overall increase in independence.

Technology contributes to a decrease in frustration

“Jill” and “Kathy” shared similar observations that supported communication leads to a reduction in frustration experienced by students. Both participants attributed this to the affordance of technology to offer students an avenue to communicate. In a classroom of students with limited verbal communication, the effects are “revolutionary” as described by “Jill”.

“Kathy” shared that in her classroom, many students either use a personal or classroom iPad to communicate on a symbol-based communication app called “Proloquo2Go.” She stated simply, “they’re much less frustrated when there’s a way to
communicate.” Thus it was inferred that when students can express themselves directly, they experience less frustration. “Jill” related this effect to an inherent characteristic of human nature: “If people understand what you’re trying to tell them, you have no need to get as frustrated as you did, because they understand what you want.”

From my observations in “Jill’s” classroom consisting of six nonverbal students, I had the opportunity to watch a student with Rett’s syndrome learn how to use an eye gaze device to communicate. This form of assistive technology allows a user to generate speech by looking at an array of cells on a screen. Over the course of four weeks in this particular classroom, I witnessed a significant decrease in the student’s level of frustration. Thus, technological tools such as an eye gaze device have the potential to augment a student’s communication, empowering him or her to interact with the world.

Increase in Independence

Both participants spoke of the importance of offering choice-making opportunities for students in the special education classroom. Various educational technologies offer students a way to vocalize their preferences and choices. “Jill” illustrates how an interactive whiteboard is used to encourage student independence:

Almost every class in our school uses [the Promethean Board] for attendance. The kids come and they sign themselves in, some use it for snack choices if they’re doing a snack program in their room. So for engaging the children in the direction of their day, in their independence, in their self-autonomy - I’m all in favour of. It gives them the power, choice, and the independence. Can’t see anything wrong with using technology for that.

Fostering independence in children with exceptionalities is important for encouraging them to take a more active role in the world around them. By giving students choices, they are exercising control over their environment, while simultaneously
developing a sense of independence and autonomy. This theme illustrates how assistive and other educational technologies can support communication, especially for students who are nonverbal. In addition, participants noted that as an effect of supported communication, students experience less frustration and have the opportunity to exercise independence.

**Theme 2: Teachers consider that educational technologies can enhance the learning experience of students in the special education classroom**

A second theme that surfaced from the interview data was the belief that technology cannot replace the role of a teacher. Contrary to the common ideology that technology is a “quick fix,” both participants stressed that technology does not replace the teacher or any other classroom resources for that matter. Two subthemes stemmed from this finding. The first subtheme relates to the role of the teacher. The second subtheme suggests that technology holds the same value as other classroom resources.

*Technology Integration Requires the Teacher as Mediator*

Although both participants strongly argued that technology could not replace the role of a teacher, only “Jill” made reference to the idea that technology requires a teacher to mediate the learning experience. This point is strengthened by observation within the research setting, where it was observed that the majority of technology experiences were facilitated by either the classroom teacher or Educational Assistant. “Jill” explains,

I really believe that learning happens when it’s mediated with an instructor. You can sit a child in front of a television screen for 6 hours, and sure, they’ll pick up stuff, but they’re not going to learn as in-depth as if they sat with an instructor, a parent, a caregiver who was engaging them in conversation. And I feel exactly the
same with all forms of technology. If you want them to learn, you need to be teaching. If a teacher is not present to support the learning, then you don’t know what they’re doing.

Given the specialized learning needs of students with multiple exceptionalities, “Jill” emphasized the need to have an adult present to facilitate the learning experience. Without this support, the student may not profit as much educationally. In addition, “Jill” shared the importance of observing and assessing a student’s process while engaging in a specific learning task.

Most Educational Technologies Hold the Same Value as Other Classroom Materials

Besides being viewed as an impossible substitute for the role of the teacher, educational technology was also perceived to have equal value to other physical classroom resources. Both participants shared the sentiment that educational technology is but one classroom tool among many. As “Kathy” stated,

I wouldn’t replace [technology]. I wouldn’t replace old things that work. You can do a story on the [Promethean] board but there’s a lot of... like, we read books, like just turn this off and just have story time with a real book! And then we look at students when they have free choice time they look at books. So, it can’t be totally replaced. It’s great, but low-tech serves its purpose too. It’s good to have both.

“Jill” added that, “All a tablet is, is another classroom resource. It’s right there on par for me with counters, with calculators, with pencil grips, it’s another teaching tool to be used in the classroom.” Overall, the perceptions of both participants revealed that although technology has the potential to enhance learning experiences when mediated by an adult, it could not replace other “low-tech” classroom resources.
Theme 3: Various characteristics of educational technology make it an effective teaching and learning tool for students with multiple exceptionalities

Both participants of this study spoke very highly of various characteristics of classroom technology that renders it effective for students with multiple exceptionalities. In particular, three characteristics that were emphasized include the interactivity of the touchscreen interface, predictability, and versatility of technological tools. Altogether, these features make certain classroom technologies effective tools to support students with multiple exceptionalities.

**Interactivity of touch screen interface**

Touch screen devices that were used by both participants collectively included the iPad, Promethean Board, and ActivTable. All three devices are touch screen, which enables either a single user or multiple users to interact with the interface. As described by Campigotto, McEwen, and Demmans Epp (2013), the use of sight and sound reinforcement as well as haptic feedback provide a sensory aspect and dimension that pen and paper do not. As a result, students are naturally attracted and motivated to use the device. “Jill” echoed this in the following excerpt:

> The demands of touching the screen on the interactive white board seem to be easier to handle for some students than the demands of pulling Velcro and moving laminated things around. So I can do all the same things that I was doing with paper, but on the board.

However, McEwen (2014) outlines that the touch screen interface can be a source of many difficulties for students with severe fine motor constraints. Therefore, educators should consider this design constraint when using commercially available technologies.
such as these for students with motor planning difficulties. With this constraint aside however, the interactivity of the touch screen interface of many classroom devices such as the iPad, Promethean Board, and ActivTable can be effective for certain students.

**Predictability**

In addition to the interactivity afforded by touch screen devices, participants also favoured the predictability of most educational technologies. Although all students benefit from structure and predictability at school, students with exceptionalities may react more strongly than their peers when faced with an unexpected change (Volmer, 1995). “Jill” was particularly enthusiastic about the predictability technology offers for her students:

> No one can eat it, I can’t lose pieces. It’s always in the same place, the reward sounds are always the same, the predictability is there. And that’s one of the things that we think contributes to the success of technology in the classroom, is the predictability of the technology, of the responses, of the wait times, of all of it. And it’s the same with the iPad. It’s always gonna look exactly the same, its never going to be in a bad mood. It’s never gonna be rushed, it’s predicable.

Participants demonstrated the ability of educational technologies to offer predictability for students with multiple exceptionalities. As mentioned by “‘Jill’,” the predictability of technological features is a valuable characteristic for students of this population.

**Versatility**

Another favourable characteristic of educational technology in the special education classroom was the ability of teachers to use these devices for multiple instructional purposes. Participants shared how the versatility of educational technology offers
It gives you the balance to either have a passive class, where I am the teacher presenting a lesson using the board for visual reinforcement, or active participation, where the students are required to come up and interact either with each other on the board or just with the board, or with me and the board.

As shared by “Jill”, the interactive whiteboard provides teachers with several options for use. It provides the flexibility to facilitate versatile, interactive activities by giving anyone in the classroom the ability to control. Educational technology tools such as the interactive whiteboard can be used to facilitate whole-group or small-group instruction, assessment, collaborative learning, or personalized instruction.

**Theme 4: Successful technology integration requires a professional community learning setting for best results**

As previously mentioned, the research setting for this study exemplified successful integration of technology for students with multiple exceptionalities. Through the interview sessions, the participants of this particular public elementary school demonstrated that a professional learning community setting is beneficial in order for successful technology integration to take place. I draw three subthemes that articulate various elements of this professional community that were advantageous for technology integration.

*Community of Learners*

For the purpose of this subtheme, I define a community of learners as a group of people who actively engage in learning from one another. Thus, they create a learning-centered environment that is connected and supportive. One of the opening questions in the interview protocol asked participants what, if anything, drew them to teach in a specialized, congregated setting such as their school. Interestingly, both participants
highlighted that the school’s strong sense of community was what attracted them to work in this environment. “Kathy” for instance, described the school as “such a supportive school,” adding that, “if you know our principal, her big thing is, because this is a segregated, congregated setting, she really makes it a community feel and parents feel it.” My interpretation of her comment was that the staff forms a strong community who encourage and learn from each other on a regular basis. “Jill” shared similar sentiments: “I’ve taught in community-based classrooms and specialized settings, and it’s the community of learners, community of teachers and support staff.” From these two perspectives, it is evident that an effective community of learners may set the stage for successful technology integration.

Willingness to Experiment

Another commonly reported characteristic of this professional community was the willingness of teachers and administration to experiment and take risks with technology. For instance, “Kathy” noted:

Like with getting the Activ Table. If this is something that we want to try, and see how it works and how the kids respond, if they don’t like it then we’ll try something else. So the administrators, they’re pretty supportive.

This demonstrates that before effective integration can take place, teachers need to try out different methods and tools in a trial and error process. An administration team that supports and encourages this approach appears to be beneficial to successful technology integration. “Jill” illustrated that a large portion of the staff are either “totally interested, curious about new technology, [are] willing to give it a try either by jumping full-in or by observing.” She also described the effect this critical mass has on the rest of staff. Below she shares the school’s experience introducing Eye Gaze technology:
This particular [eye gaze technology] was new. It was shared at a lunch n’ share. It wasn’t appropriate for everybody, but a bunch of other teachers either a., I think every staff member came and tried it. And there were six other students where we felt like this might be something that could work for them. Almost every adult came in to see what it was like and try it. It starts with one person but you need to have enough people to get excited. Because if it’s just me, you can only build your own excitement for so long.

As demonstrated in this excerpt, a powerful effect happens when a small group of individuals share their learning with one another. At this school, regular “Lunch and Shares” are held, which ensured that the staff had ample opportunities to learn from one another.

Research Engagement

A third subtheme that emerged from the interviews was that the school engaged in ongoing research in order to stay up-to-date and knowledgeable about technology devices and integration strategies. “Kathy” was proud to share that the school participated in a large-scale research study a few years ago on the use of iPods as a device to enhance social interactions for students with ASD (McEwen, 2014). Besides this contribution to academia being a reflection of the school’s commitment to research, teachers in this school also initiate their own research projects to enhance technology practice in the classroom. This experience was described by “Jill:”

We do tons of research. We’re reading the latest stuff that comes out, we sign-up to different vendors and technology people who really have their finger on the pulse of what’s new and exciting. So we keep up with it, like traditional ways too. We subscribe to e-mails, so we hear about what’s happening. Twitter has been huge in keeping up with everything.

This information also demonstrated to the researcher that the school is committed to learning about emerging technologies that can be advantageous for students. Successful
technology integration seems to flourish when connected to a larger community of the school, researchers, vendors, and other educators.

**Theme 5: Practical considerations related to technology integration in the special education classroom need to be considered**

In response to one of the subsidiary research questions of this study, participants shared various practical considerations that educators should be mindful of when striving toward successful technology integration. Five subthemes emerged as five practical considerations that educators are encouraged to be aware of. These include (i) Substantial time and support required to learn new technology; (ii) Economics; (iii) Rigorous adoption process; (iv) Students’ inconsistent technology use between school and home; (v) Dependability on technology provider.

*Requires considerable time and support to learn new technological tools*

Commonly shared by both participants was the considerable time and support that is needed to effectively integrate technology for students with multiple exceptionalities. “Jill” outlined that “you have to spend a ton of time with the child, assessing them, reassessing them, trying a million things to find out what [technological] system is going to be the best one for them.” Although various technological tools are available for students in special education, increased time is required to experiment and decipher which tools are the most beneficial for a particular student. To elaborate on this, “Kathy” shared that:

Like there’s not enough time and support. They’re not one-on-one. Initially, we need to teach a student to use a device. It’s just not going to do itself. So
we’ve 8 students in this class and 3 adults. Working one on one is not really possible.

Adult support is another element that is necessary to implement devices effectively for students. From my observations of a student learning to use the eye gaze tracker to communicate, I saw a lot of prompting and set-up required from the Educational Assistants and Teacher. For students who rely on certain devices to communicate, time and support is crucial to teaching students how to use technology.

**Economics**

More familiar to the educational community at large are the substantial financial costs needed to acquire educational technology. Typically, money to purchase and sustain the newest and most up to technologies are limited. In the current study, economics was found to be a challenge associated with technology integration. “Jill” shared that,

> There’s not enough devices to give the kids each one. You know, if you want them to use it as their voice, it can’t be with them all the time, the resources to buy every single app. The resources…Because a lot of this stuff is trial and error. But we don’t have thousands of dollars to buy everything out there.

From the researcher’s observations as a Teacher Candidate in this school, a conscious effort to select the most beneficial tools for students was made by support staff. In addition, the school held regular fundraisers and school events to raise funds, although there were not always for technology-specific purchases.

**Rigorous Adoption Process**

In order for a school to adopt new technology, evidence must be collected that suggests that a given technology will be beneficial to students. “Jill” expressed this process as a
hurdle: “You know you need it but you can’t get it. And you can’t get it, because you have to show you need it, but you can’t show you need it unless you have it. That’s been frustrating.” Such requirements add a great burden to already busy teachers, particularly those in special education settings.

Inconsistent Technology Use Between School and Home

A subtheme that surfaced unexpectedly was the inconsistent use of technology between school and home. Although this issue is more relevant to students using technology as a crucial communication tool, it is nonetheless a practical consideration that educators should be aware of. Teachers and other support staff dedicate considerable time teaching students how to communicate with various devices such as the iPad or Eye Gaze Tracker. According to participants, oftentimes these technologies are not used in the same manner between school and home. “Kathy” illustrated this inconsistency in the excerpt below.

All the parents are on board but at the same time they don’t have the time either. And I know a lot of things I’ve heard from parents are that they know what they want at home? So, you know, to have them make the request that I want the washroom when you know they can just run in to use the washroom. Or I want juice… I want … because we want the students to communicate and make those choices? But at home they just help themselves!

As described in this quote, parents generally have different ways of knowing what their child wants and needs that has developed over years, and that doesn’t require a particular technological device that may be in use at school. However, for the future benefit of these students in situations without the constant presence of parents to decipher their wants and needs, a technological device may be crucial for communication outside of home and school. Overall, this inconsistency should be noted and understood by educators. Perhaps this can lead educators to consider strategies to help parents learn and become
comfortable with technology tools being used with their child in the school so as to maintain consistency at home and school.

**Reliance on External Providers**

A final practical consideration that surfaced from the data was the technical issues and glitches that often occur and the dependability of the school board provider to get these issues resolved. Participants expressed that the delay in getting technical issues solved can be rather frustrating. For instance, “Jill” described a past experience when “the company had turned off some of the features like plugging in HDMI to our boards or plugging in S-cables. That was annoying!” Other issues that were raised by both participants were losing WiFi connection and relying upon external companies/providers to fix it. Along the same frustration lines, “Kathy” shared:

[The frustration of] not having it when you need it. Or, seeing that it’s there but not being able to use it. Right now my computer isn’t working. It’s a school board issue. I’m waiting for the school board to come and fix it. And I’ll keep waiting. In the meantime, I can’t use my Promethean Board. That’s frustrating.

Perhaps the technical glitches that affect the ability to incorporate technology for students in any school environment will reduce over time as technology connections become more pervasive and reliable. However, in the public education system, unfortunately the reliance on outside sources to provide and repair technology is difficult to avoid. The technical issues that arise are nonetheless important for educators to be mindful of, so that they are prepared to exercise flexibility when these situations arise.
Chapter 5: DISCUSSION

Introduction

The main goals of this study were to investigate special education teachers’ technology integration practices as well as their perceived impact for students with multiple exceptionalities. It also attempted to identify some practical considerations that must be overcome when incorporating technology for this purpose. Within the five overarching themes that were presented in Chapter Four, there is extensive evidence to support the benefits of integrating technology for students with multiple exceptionalities. In this chapter I reflect on these findings by focusing on the professional implications these insights will have on my teaching practice and also on that of the educational community at large. I also review the limitations of this study and conclude by raising some questions for further study.

Implications and Recommendations

Implications for the Researcher

The findings of this study will certainly inform my teaching practice, regardless of the nature of educational setting I enter. At the very core of these findings is the increasing number of ways that technology integration can support students with exceptionalities. Although the participants were drawn from a single school site for students with exceptionalities, the findings from this study are also salient to general education classes in which students with exceptionalities are being increasingly integrated. In retrospect, I began this research study with the limited knowledge yet hopeful belief that technology
can be a valuable teaching and learning tool for all students. However I now conclude this research study with a more informed understanding of how technology can be specifically incorporated for students with exceptionalities in order to support their educational goals. This study has also advised me about some practical considerations that need to be taken into account, including possible barriers that I might encounter.

**Implications and Recommendations for the Educational Community**

This study also revealed important implications for the educational community. It is my hope that readers of this study will be impressed by its findings of the numerous benefits of educational technology for students with exceptionalities. In terms of the practical considerations that participants shared, I am hopeful that educators will not be discouraged but rather seek ways in which to overcome them.

I did not anticipate the degree to which the professional community within the school could impact successful technology integration in a classroom. There was no specific question on the interview protocol that asked for this information. Instead, participants unknowingly spoke about the school’s strong sense of professional collaboration and this was found to be an important determinant for successful technology integration. Given the inherent challenges in selecting, adopting, and integrating technology for students with individual learning needs, having a strong professional community that is equally committed to technology integration is important. This has implications for administration teams who are working towards the same goal. I hope that this study inspires administration teams to develop methods to bring staff members together and work towards a common goal of achieving successful technology
integration. To model after strategies observed in the research setting of this study, a method could include lunch-hour talks in which teachers share their successes and failures with various technologies.

Reflecting on the significant potential of technology to support all students, I recommend that pre-service teacher education programs strengthen their technology integration practices. Although most pre-service teacher education programs include courses on technology integration, technology should be more thoroughly and meaningfully integrated in all courses. More specifically, special education courses should emphasize the value of various educational technologies for students with exceptionalities. With more technology-based experiences incorporated more broadly across teacher education courses, teacher candidates will develop positive attitudes towards technology integration.

Limitations

The Master of Teaching Research Project provides a valuable opportunity to engage with educational theory and investigate its practical application to teaching. It does however present several potential points of improvement. I begin by noting some limitations rooted in the parameters of the Master of Teaching Research Project. The major limitation of this study is the restricted amount of participants interviewed. Due to the maximum of three participants prescribed by the guidelines, a fairly limited amount of data was available for analysis. Although only two participants were used in this study, both individuals provided rich accounts of their experiences, perceptions, and practices of technology integration in the special education classroom. Nonetheless, recruiting
additional participants would have strengthened this study and made findings more generalizable to the greater educational community.

Another limitation relates to the restricted variety of perspectives gathered from the interviews. For the purpose of this study, the teachers interviewed were from the same school, and thus limiting the breadth of data analyzed. Further, while valuable information was obtained from the teachers’ perspectives, many other individuals other than the educators themselves are involved in the use of technology for students with exceptionalities. Particularly in the special education classroom, educational assistants, lunch hour supervisors, administrators, and school psychologists were also observed to play a role in assisting with technology integration, and could also be useful informants in subsequent research.

In addition to the limited number of participants and the singular setting used in this study, a third limitation was the short time line prescribed by the Master of Teaching Research Project. With added time, the depth and breadth of the findings, analysis, and conclusions would have been more significant. Therefore with a larger participant pool, broader scope of viewpoints, and extended time frame, the study would have been improved in showcasing the status of technology integration in the special education classroom.

A final limitation to the current study concerns the researcher’s decision to draw participants from a single research setting. Given that the research setting was a school uniquely for students with multiple exceptionalities, it was assumed that the data collected would reflect exemplary integration of technology for this population.
students, and provide an in depth, case study perspective. Therefore, the researcher hopes that the findings gathered would serve as a model example of how technology can benefit students with exceptionalities. However, this school is one of very few congregate sites for students with multiple exceptionalities and therefore teachers in mainstream schools may encounter different resources and barriers.

**Further Study**

This study shed light on how special education teachers are integrating technology for students with multiple exceptionalities, and the impact they perceive it has on this population of students. However, many questions remain. For instance with the proliferation of digital technologies entering the 21st century classroom, it would be useful to investigate *which specific technologies* might be advantageous for *what types of students*. Given that the range of exceptionalities is enormously vast, a study that focused on how specific technologies can benefit students with certain learning needs would provide valuable guidance for special education teachers. In addition, further study could investigate what is preventing special education teachers from utilizing technology for students with multiple exceptionalities. Lastly, teacher perceptions and practices were examined only once. Longitudinal data on perceptions and practices on technology integration for this population of students would gain better richer understanding.

**Conclusion**

As part of confronting the diversity of the 21st century classroom, educational technology holds tremendous value for supporting various student needs. Technology integration is an intricate process, as the needs, challenges, and strengths of each child must be
carefully considered. This research study revealed that teachers’ perceive educational technology to have a positive impact on students with multiple exceptionalities, particularly in terms of supporting communication and enhancing learning experiences in the special education classroom. However, integration of technology in this setting is critically reliant on the role of the teacher and the degree to which his or her professional support structure embraces is. The findings of this study suggest that teachers require a professional learning community in which support, collaboration, and mentoring are available. Leaders who make decisions regarding the infusion of technology into the classroom must do so with an open mind and progressive attitude, and must consider the teachers’ perspectives. Closer collaboration between researchers and teachers can also help to ensure that teachers’ perspectives are no longer overlooked. This is echoed by Fullan (1982), “Educational change depends on what teachers do and think—it’s as simple and complex as that”.
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Appendix A: Letter of Consent for Interview

Date: ____________________

Dear ____________________

I am a graduate student at OISE, University of Toronto, and am currently enrolled as a Master of Teaching student. For the purposes of a graduate research paper, I am studying how teachers are using technology to help students with low-functioning ASD reach their learning goals, and what perceived impact they think it has on their ability to communicate. I think that your knowledge and experience will provide insights into this topic.

I am writing a report on this topic as a requirement of the Master of Teaching program. My course instructor who is providing support for this assignment is Clare Brett. The purpose of this requirement is to allow us to become familiar with a variety of ways to do research. My data collection consists of a 30-minute interview that will be audio-recorded.

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

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

Yours sincerely,

Researcher name: Alexandria Maida
Email: a.rosemaida@gmail.com
Research Supervisor: Clare Brett  
Email: clare.brett@utoronto.ca

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

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

Signature: ________________________________

Name (printed): ____________________________

Date: ____________________________
Appendix B: Interview Protocol

1. How long have you been teaching students with multiple exceptionalities in the special education classroom?

2. What (if anything) drew you to teach in a specialized setting such as the Smithson School?

3. How would you describe the communicative abilities of students with multiple exceptionalities in your classroom?

4. What are your views on the use of technology in the special education classroom?

5. Does your school make a concerted effort to stay current with available technology? If so, how?

6. Which types of technology do you use in your classroom?

7. Are there any specific technologies that are predominately used? What characteristics of the technology render them more effective?

8. For what purpose do you incorporate these technologies to support students with multiple exceptionalities in your classroom?

9. Please provide one or more example(s) of what you consider effective use of technology at your school.
10. What impact do you perceive this technology has on the communication of students with multiple exceptionalities?

11. What are the indicators of communication that you observe technology has on these students?

12. In what other ways has technology impacted your student(s) with multiple exceptionalities?

13. What issues or challenges have you encountered in your practice of implementing technology for students with multiple exceptionalities?

14. Is there anything else you would like to add with respect to the use of technology for students with multiple exceptionalities?