A Study of Special Education Teachers' Knowledge of Assistive Technology for Children with Reading Difficulties

Randal Todd Sydeski

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A STUDY OF SPECIAL EDUCATION TEACHERS’ KNOWLEDGE OF ASSISTIVE TECHNOLOGY FOR CHILDREN WITH READING DIFFICULTIES

A Dissertation
Submitted to the School of Education

Duquesne University

In partial fulfillment of the requirements for the degree of Doctor of Education

By
Randal T. Sydeski

August 2013
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Randal T. Sydeski

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DUQUESNE UNIVERSITY
SCHOOL OF EDUCATION
Department of Instruction and Leadership

Dissertation

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Education (Ed.D.)

Instructional Leadership: Excellence at Duquesne

Presented by:

Randal T. Sydeski

Bachelor of Science, University of Pittsburgh - Greensburg, 1989
Master of Science, California University of PA, 1999

June 19, 2013

A STUDY OF SPECIAL EDUCATION TEACHERS’ KNOWLEDGE OF ASSISTIVE TECHNOLOGY FOR CHILDREN WITH READING DIFFICULTIES

Approved by:

__________________________________________, Chair
David Carbonara, Ed.D.
Assistant Professor, Duquesne University
School of Education – Instructional Technology

__________________________________________, Member
Rose Mary Mautino, Ph.D.
Assistant Professor, Duquesne University
School of Education – Instruction and Leadership

__________________________________________, Member
Rachel Robertson, Ph.D., B.C.B.A.
Assistant Professor, Duquesne University
School of Education – Special Education
ABSTRACT

A STUDY OF SPECIAL EDUCATION TEACHERS’ KNOWLEDGE OF ASSISTIVE TECHNOLOGY FOR CHILDREN WITH READING DIFFICULTIES

By

Randal T. Sydeski

August 2013

Dissertation supervised by David Carbonara, Ed.D.

This study investigated high school special education teachers’ knowledge of assistive technology (AT) for students with reading difficulties in Southwestern Pennsylvania. A survey was disseminated via e-mail using the SurveyMonkey online survey tool to 201 special education teachers. The survey asked questions pertaining to the respondents’ demographics, knowledge of assistive technology (AT), knowledge of reading (programs) and school district professional development. Most questions utilized a Likert-type scale format, however; the last question was open-ended and allowed participants to write a response about anything not asked in the survey about AT, reading or professional development. A total of 94 special education teachers responded to the survey for a 46.77% response rate. Demographic data showed that respondents were
mostly female (68.5 %), with a Master’s degree (69.6 %) and averaged between 5-9 years of experience (27.2 %). Teachers had various special education teaching assignments.

Study results show that while almost all teachers (98.8 %) had at least some knowledge of the definition of AT, a number of them had no knowledge about the National Reading Panel’s 5 domains for reading success (31.5 %), commercial programs to support reading (16.9 %), handheld device applications (apps.) (15.7 %) to assist with reading, or text reading programs (12.4 %). The survey also showed that (86.4 %) of the teachers received 10 hours or less of instruction in reading assessment/instruction.

Results of the study suggest that professional development is needed for advancing teacher knowledge of AT and assisting students with reading difficulties to meet the requirements of federal and state laws.
DEDICATION

To my wife Lisa, my daughter Victoria and my son Nathan,
I dedicate this study to you.

With patience and understanding, you have allowed me to reach a personal and professional goal that many times seemed distant.

I cannot thank you enough for believing in me.

It is for you that I live my life…I love you!!

and

To my parents James and Elaine Sydeski,
Thank you for being my first teachers and for teaching me…..

…that there is a God
…that your family and your reputation define a person’s life
…that your character needs worked on every day
…that the truth is of utmost importance
…that laughing keeps you young

…and that with hard work, anything is possible!
ACKNOWLEDGEMENTS

There are a number of people that I would like to acknowledge; for without their support, the goal of attaining a doctoral degree would not have been possible:

First, I would like to thank my wife, Lisa. We always talk about our crazy lives and that one day we will be able to look back and say, “How did we do it?” One of those times is right now. Over the last several years, our crazy times have included attending classes, completing projects, loved ones passing, changing jobs and you giving birth to our two beautiful children. Lisa, you have allowed me to complete this marathon called a ‘dissertation’ and I needed your support throughout the entire race. How did we do it? WE DID IT!

I am grateful for the opportunity to attend the ILEAD program with so many good people and I always looked forward to spending time with my classmates in the ILEAD 4 cohort. The retreat at LOC to start the program, the professors we shared, the coursework, the discussions and the laughs are memories that I will always cherish. To my friends Ken Williams, Nancy Rose and Linda Echard, I am so glad that we spent time walking this similar path.

I would like to acknowledge my friend, mentor, and boss, Dr. Bart Rocco. You have believed in me and supported me personally and professionally for more than 10 years. You have taught me many things and I value our relationship.

Next, I would like to acknowledge my nephew, Emmett. You and your disabilities inspired and enlightened me with the topic of assistive technology (AT). I hope and pray that one day, you will be able to speak my name.
I was fortunate and blessed to have a dissertation committee with a variety of professional backgrounds. My dissertation Chair, Dr. David Carbonara, provided the deadlines, planning, organization, and structure that I desperately needed. His knowledge of technology and statistics challenged me to “dig deeper” so that I would expand my own knowledge. While I wondered what direction we were sometimes going, he always knew the ultimate destination. Dr. Rose Mary Mautino believed in me when completing my dissertation seemed like an improbability. She was my Reading area expert and the calming force when my days were hectic. Thank you for keeping me focused on the goal and “knowing” that I would complete the dissertation. By being a newer professor at Duquesne University, Dr. Rachel Robertson took a chance on me by being a member of this committee. I am grateful that she did. Her special education knowledge and constant feedback allowed me to better understand AT and improve my writing style.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iv</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>CHAPTER I: INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Background of the Study</td>
<td>1</td>
</tr>
<tr>
<td>Teacher Preparation and Reading</td>
<td>3</td>
</tr>
<tr>
<td>Technology as a Support</td>
<td>4</td>
</tr>
<tr>
<td>Professional Development</td>
<td>5</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>6</td>
</tr>
<tr>
<td>Purpose</td>
<td>6</td>
</tr>
<tr>
<td>Research Questions</td>
<td>7</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>7</td>
</tr>
<tr>
<td>CHAPTER II: REVIEW OF RELATED LITERATURE</td>
<td>9</td>
</tr>
<tr>
<td>History of special education</td>
<td>9</td>
</tr>
<tr>
<td>Technology’s impact on special education</td>
<td>11</td>
</tr>
<tr>
<td>Assistive technology</td>
<td>14</td>
</tr>
<tr>
<td>Reading’s importance for all students</td>
<td>20</td>
</tr>
<tr>
<td>Technology as a reading tool</td>
<td>22</td>
</tr>
<tr>
<td>Training and professional development needs</td>
<td>28</td>
</tr>
<tr>
<td>CHAPTER III: METHODOLOGY</td>
<td>34</td>
</tr>
<tr>
<td>Introduction</td>
<td>34</td>
</tr>
<tr>
<td>Research questions</td>
<td>34</td>
</tr>
<tr>
<td>Research design</td>
<td>35</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>36</td>
</tr>
<tr>
<td>Procedures</td>
<td>37</td>
</tr>
<tr>
<td>Limitations</td>
<td>39</td>
</tr>
<tr>
<td>Summary statement</td>
<td>39</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE 1</td>
<td>Demographic characteristics of survey respondents</td>
<td>45</td>
</tr>
<tr>
<td>TABLE 2</td>
<td>Comparison of survey questions to research questions</td>
<td>47</td>
</tr>
<tr>
<td>TABLE 3</td>
<td>Knowledge of AT to assist students</td>
<td>48</td>
</tr>
<tr>
<td>TABLE 4</td>
<td>Knowledge of Reading and AT</td>
<td>52</td>
</tr>
<tr>
<td>TABLE 5</td>
<td>Professional development hours received from your school district</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>in reading/assessment and AT</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

This proposal describes a research study that will examine the knowledge of special education teachers in Southwestern Pennsylvania as it relates to assistive technology and the teaching of reading. The study will examine the pre-service instruction and in-service professional development that special education teachers receive in reading instruction and assistive technology.

Background of the Study

Special education. These words can identify certain individuals, their differences, their uniqueness, an educational program and/or a range of services that can be provided. Within an educational setting, special education children have certain legally guaranteed rights to an educational program that addresses their unique needs. These needs may be specific to one disability, however, many children have several disabilities that impair their ability to learn and/or function in the general education curriculum. In the most recent United States Census Bureau report (2010), about 2.8 million of the 53.9 million school-age non-institutionalized children (age 5 to 17) were reported as having a disability. This 5% of the student population requires supports to allow them to achieve success similar to their regular education counterparts.

Every special education student has unique needs that require accommodations or modifications based on their identified disability (disabilities). In the Commonwealth of Pennsylvania, special education teachers are primarily responsible for the delivery of
instruction and making curriculum available for students with special needs. These educators must have a bachelor’s degree, hold a valid Pennsylvania Special Education teaching certificate, demonstrate subject matter competency, and pass rigorous state tests (PDE-2013).

In addition, at the middle/secondary level, special education teachers must demonstrate subject matter competency similar to middle/secondary subject area teachers. This identifies them as being ‘Highly Qualified’ in the subject matter that they teach (PDE-2012).

Along with these formal teaching requirements, special education teachers must be able to provide instruction that is particular a student’s strengths/weaknesses. The assessment and determination of how to meet a student’s educational goal is formalized in a document known as an Individualized Educational Program (IEP). This document guarantees the rights of students with disabilities under the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA, 2004).

In January 2001, several years prior to IDEIA being enacted, George W. Bush reauthorized the Elementary and Secondary Education Act. This legislation became known as the ‘No Child Left Behind Act’ (NCLB - 2001) because of the educational goals it established for schools relating to ALL students’ academic performance, attendance, and graduation rates. These two pieces of legislation established high expectations for both students and teachers.

To support the academic goals of NCLB, Pennsylvania’s Department of Education established academic standards to serve as the foundation of what students should know and be able to do at certain grade levels. Pennsylvania’s administrators and
teachers utilize these standards to guide them when writing challenging curriculum for students. Then, if the curriculum is taught using “best-practice” pedagogy, students should be able to achieve established performance levels established in the 'No Child Left Behind' legislation. (Pennsylvania Department of Education, 2012)

**Teacher Preparation and Reading**

In its *Synthesis of Research on Teacher Preparation for Reading Instruction* (2007), it is noted by the International Reading Association (IRA) that, “Teachers need to be taught the art of reading instruction” and recognizes that, “just because a teacher is a good reader, does not mean that he or she will be a good teacher of reading; instruction in how to teach reading is required” (p.7).

In a U.S. News and World Report study (2011) that rates teacher education programs, Kate Walsh, the President of the National Council on Teacher Quality (NCTQ) states, “We now know beyond any shadow of a doubt that teacher effectiveness is the single biggest school-based contributor to learning.” She goes on to say that, “Just like in every other profession, the quality of their training has a tremendous impact on how well teachers perform. The only way we will meet the challenge of ensuring that all our country's students get the excellent teachers they deserve is to transform teacher preparation."

Linda Darling-Hammond (2000) asserts that many of these teachers are underprepared and that teacher preparation programs need to implement rigorous professional standards to ensure that teachers will know the subjects they teach and how to teach them to children.
In March 2012, Pennsylvania’s Standards for emerging readers reflected that students should be able to read, understand, and respond to informational text – with an emphasis on comprehension, vocabulary acquisition, and making connections among ideas and between texts with a focus on textual evidence (Pennsylvania Department of Education, 2012). Teachers need to be able to teach these skills, however, for students with reading disabilities, accomplishing these skills may be quite difficult.

**Technology as a Support**

Technology, specifically assistive technology that is used to increase, maintain, or improve functional capabilities of individuals with disabilities has allowed reading disabled students the opportunity to overcome barriers in their learning. Assistive technology (AT) can help struggling readers acquire the content knowledge, skills and information that was previously out of reach. Technology has been shown to increase student attention, improve comprehension, and increase attitude and motivation for students with reading deficits (Reisberg, 2009).

In the last 10 years, assistive technology has improved greatly. Text to speech and Braille reading software are much more commonplace for individuals to access. Both the Microsoft and Apple corporations have developed hardware and software that allows accessibility for individuals based on the user’s needs and capabilities. Advancements in the development and use of assistive technology have allowed students with disabilities to perform tasks that were previously unable to be done (Dove, 2012).

The Technology-Related Assistance for Individuals with Disabilities Act of 1988, otherwise known as the Tech Act, defined assistive technology as technology “…used to
increase, maintain, or improve functional capabilities of individuals with disabilities.”

The consideration and use of this assistive technology (AT) is a requirement under federal law in an Individual’s Educational Program (IEP) (IDEA, 2004). In public school settings, most of the time a special education teacher handles a student’s ‘case’ and is responsible for arranging and implementing the annual IEP meeting.

**Professional Development**

If schools are to improve, teachers must improve their knowledge and instructional practice. Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009) defined effective or ‘high quality’ professional development as providing for improvements in teachers’ knowledge and instructional practice that would result in improved student learning. Also, the ‘No Child Left Behind’ Act (2001) required that states offer teachers the availability of ‘high quality’ professional development. While this standard of ‘high quality’ was not defined in NCLB, 91% of teachers said that they participated in some sort of professional development activity through a workshop, training session or conference (NCES Schools and Staffing Survey, 2007). Most (77.4%) of this training was done during the contract year and a majority (64%) said that their professional development focused on the use of computers for instruction and a similar number (60%) of teachers had some professional development related to reading instruction in the past year (ibid).

Special education teachers average 59 hours of professional development over the course of a year and while school districts give teachers staff development opportunities,
these trainings do not reliably incorporate ‘best practices’ such as time to plan now to implement a new skill (Billingsley, 2003).

**Statement of the Problem**

As AT evolved in recent years, it is not known if special education teachers have stayed abreast with their professional knowledge of new and current AT devices to make recommendations at IEP meetings as required by federal law. It is also unknown if special education teachers have the knowledge to make AT recommendations to advance students’ reading skills. The knowledge of AT and reading for special education teachers are possible determinants of whether a student learns to read; therefore it is critical that special education teachers stay current with their knowledge of AT and reading pedagogy.

**Purpose**

Both pre-service special education teachers at colleges/universities and in-service special education teachers in America’s schools should be staying abreast of current AT technology. These teachers should also have a knowledge of pedagogy that reflects “best practice” reading instruction since reading impacts a student’s ability to be successful in other subject areas. Unfortunately, there is not a nationally mandated assistive technology curriculum for special education teachers, nor is there a nationally mandated reading curriculum that identifies AT supports for students.
The purpose of this research study is to identify the level of AT knowledge among special education teachers in Southwestern Pennsylvania with respect to reading and to determine if they are receiving or have received professional development in this area.

**Research Questions**

The proposed research study will be guided by the following questions:

1. What do special education teachers know about assistive technology?
2. Can special education teachers identify the names of the assistive technology applications for reading support?
3. What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?

**Significance of this Study**

There are approximately 460,000 special education teachers in the United States (U.S. Dept. of Labor, 2012). Every teacher has a unique educational background, receives varied training and/or participates in different professional development activities. While colleges and universities initially prepare students to enter the teaching profession, on-going professional development is required to stay abreast of current laws, procedural guidelines, trends and advancements in technology.

Because reading is a fundamental life skill and assistive technology to assist reading disabled students is rapidly changing, special education teachers should possess the most current AT knowledge and pedagogy that allows students with disabilities to overcome their barriers to learning reading.
It appears that a comprehensive review of Southwestern Pennsylvania special education teachers’ AT knowledge with respect to reading has not been completed. The results obtained from this research study would add to the field of research and be beneficial to: school districts (for professional development), colleges/universities (for teacher preparation), AT companies (for development and training purposes), special education educators (for legal mandates of IDEA) and reading educators (for AT reading applications).
CHAPTER II
REVIEW OF RELATED LITERATURE

History of special education

Civil Rights. This phrase has great historical meaning for many different groups of people. Throughout much of the 20th century, students with physical, intellectual and/or learning disabilities were not offered the same access to a public education as other students. Most students with these disabilities were in special schools, homeschooled, institutionalized or did not receive any education at all (Trent, 1994). Even though all states passed compulsory education laws by 1918, they continued to discriminate against students with disabilities. The Wisconsin Supreme Court ruled in Beattie v. Board of Education (1919) that school officials could exclude a student from attending a public school. In this case, a student had a medical condition that caused him to drool, have facial contortions and speech related problems. The court’s decision supported school administrators’ right to expel a student who disrupted the learning environment and suggested that he attend a day school where students were deaf (Yell, Rogers & Lodge-Rogers, 1998).

A similar court decision in Ohio also excluded special education students. The Cuyahoga Court of Appeals (1934) ruled that despite compulsory attendance laws for children ages 6 through 18, students may still be excluded from receiving a public education. The educational opportunities for these students need not be extended to anyone whom the State Department of Education viewed as incapable of benefiting from these services (Winzer, 1993).
Contained within the Fourteenth Amendment of the United States Constitution, the Equal Protection Clause declares that, “no state shall…deny to any person within its jurisdiction the equal protection under the law” (U.S. Constitution, 1868). This clause was the basis for the landmark desegregation court case of *Brown v. Board of Education* (1954). In this case, the United States Supreme Court ruled that state-sanctioned segregation solely on the basis of a person’s unalterable characteristics (i.e. race) was unconstitutional. This piece of legislation was not only a major victory concerning the Civil Rights of minorities, but also laid the foundation for equal educational opportunities for students with disabilities.

Sadly, even after the *Brown v. Board of Education* decision, the legislation in many states still supported the practice of segregating students with disabilities. In a 1958 Illinois Supreme Court decision (*Department of Public Welfare v. Haas*), the court held that the State’s existing compulsory attendance legislation did not require Illinois to provide a free public education to the “feeble minded” or to children who were “mentally deficient” and who, because of their limited intelligence were unable to reap the benefits of a good education (Yell et al., 1998).

In 1965, under the leadership of President Lyndon Johnson, unprecedented federal dollars were allocated and policies implemented to address education, social equality, and a “War on Poverty”. The Elementary and Secondary Education Act (ESEA) included funding for special education and low-income (disadvantaged) students (Newman, 1990). As parents fought for their children with disabilities, seeking equal educational opportunities, litigation grew from the inequities that still existed in public schools
between regular and special education students. Two important court cases defined the constitutional rights of special education students.

In the seminal case of *Pennsylvania Association for Retarded Citizens (PARC) v. Commonwealth of Pennsylvania* (1971), the U.S. District Court ruled that it was the obligation of the Commonwealth of Pennsylvania to provide a free public education to mentally retarded children up to age 21. The phrase “least restrictive placement” originated from the PARC decision. Similarly, in *Mills v. Board of Education* (1972), the U.S. District Court ruled that schools are constitutionally prohibited from deciding that they have inadequate resources to serve children with disabilities (Martin, Martin & Terman, 1996).

Only a few years after the Mills decision, the Education for All Handicapped Children Act (1975) reaffirmed that public schools must provide equal access to students with physical and/or mental disabilities in a least restrictive environment. It mandated that public schools evaluate and create an educational plan with parental input to try and create an educational experience for a handicapped student that was as close as possible to the educational experiences of non-handicapped students (i.e. Individualized Educational Program). Also, it declared that if a student is identified as having a disability, appropriate services for their disability must be provided by the state.

**Technology’s impact on special education**

While the 1970’s was a decade pervaded with legislation to advance the educational rights of special education students, this was also a period in time when developments in technology had a lasting influence on how teachers instructed their
students. The microprocessor, floppy disc, e-mail, and the first electronic book were all technological innovations of the 1970’s (Gillis, 2010) that transcended (then) current views of pedagogy.

Clifford H. Block (1981), Associate Director of the U.S. Agency for International Development, in discussing technology and the great changes taking place in education during the 1970’s stated, “Educational institutions, and those within them who learn, and teach, and administer, need time and experience to incorporate these new ways of learning into their individual, social and economic patterns of behavior” (p.72). This new technology was creating new ways of thinking about the teaching and learning process. In a paper presented by Hofmeister (1983) at the National Conference on the Use of Microcomputers in Special Education, he proposed that the textbook would become obsolete; replaced by computers in the ‘Information Age’. He stated that, “One of the primary impacts of the information age on the education profession as a whole is tied to a dramatic change in the way we approach the storage, retrieval, and application of information” (p. 2).

Concerning technology application in the classroom, Howell (1990) writes about the complex interactions that occur between the student and the computer. In order to effectively integrate technologies into a special education classroom, the logistics of hardware and software allocation and the development of specific planning strategies must be important considerations.

As the technology changed, Hofmeister (1983) stated that special education teachers needed to address new teaching strategies, “We like the pupils, have to build on our own computer literacy skills. Some of these skills will be the same as our pupils”
From this statement, Hofmeister seems to be saying that professional development is needed so that educators can stay current with technology and their instructional practices.

The Council for Exceptional Children (CEC) is acknowledged as the largest professional organization of teachers, administrators, higher education faculty, researchers and others concerned with the education of children with disabilities. The CEC recognizes that technology is a driving force that will shape the future of the nation and that it can “facilitate learning, engage students and create opportunities for adaptation and creativity that benefit all learners” (CEC, 2012).

Sometimes, technology can engage students that were previously disconnected from their schooling. In his blog about students use of iPads, education consultant, Ben Johnson (2013), writes about a study in England at the ACS Cobham School that evaluated 1st and 2nd grade students for engagement, collaboration and perseverance. The results showed that in every instance that students using the iPad rated higher in each category compared to the control group. The students using the iPad also found it easier to type in the iPad than on the computer keyboard.

CEC also recommends that educators utilize technology as a teaching tool in their classrooms. For this to occur, the CEC advocates that teacher preparation programs as well as current special educators participate in on-going high-quality professional development integrating technology into instruction, curriculum and assessment (p. 3). Unfortunately, integrating technology into any classroom is not an easy process. Many times, the limited access to computer software, hardware, and support are barriers. Also, teachers need time to explore new applications or to learn the best use of new technology.
Even if teachers had the time, they still might need training or instructional leaders with training to adopt new uses of computer technology into their classroom. These challenges to implementing technology into the classroom have been an issue since computers have been introduced as an instructional tool (Ertmer & Park, 2008, Edyburn & Gardner, 1999).

**Assistive technology**

The technology was indeed changing and Congress responded with legislation to make technology available for all students. The Technology-Related Assistance for Individuals with Disabilities Act (1988) was enacted to include people with disabilities of all ages, all disabilities, in all environments (early intervention, K-12, post-secondary, vocational rehabilitation, community living, and aging services). This was the first time that the terms ‘assistive technology device’ and ‘assistive technology service’ were defined and used in legislation. The goal was to create an awareness of assistive technology (AT) so that persons with disabilities can more fully participate in education, employment, and other daily activities similar to their ‘non-disabled’ members of their community. The ‘Tech Act’ as it is commonly known made funding available to the states to support these efforts.

In 1990, the Individuals with Disabilities Education Act (IDEA) was passed to further address the rights of disabled persons. The goal of IDEA was to provide “free appropriate public education” to all children with disabilities in the “least restrictive environment.” IDEA was reauthorized in 1997 and 2004 and utilized the definition of assistive technology from the Tech Act. Assistive technology (AT) is:
“any 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.”
-- IDEA 1990

Both IDEA and Pennsylvania Chapters 14 and 711 require that when developing a student’s Individualized Education Program (IEP), AT needs must be a consideration (Pennsylvania Department of Education, 2012).

To determine whether a student with a disability needs AT support, the Pennsylvania Department of Education (PDE) recommends that IEP teams should consider the following questions when determining whether a child needs AT:

- To meaningfully participate in the general curriculum?
- To participate in academic or functional activities?
- To access print materials?
- To access auditory information?
- For written communication and/or computer access?
- For augmentative/alternative communication? (AAC)
- To participate in state and local assessments?

-- (PDE, 2012)

AT can be categorized from no- to low- to high- tech options.

No-tech AT includes simple non-electronic devices such as: adapted spoon handles, customized pencil grips, and picture communication displays.

Low-tech AT devices include: single message communicators, portable word processors and talking calculators.

High tech AT devices are usually more complex electronic devices such as computers and specialized software.
The Office of Special Education and Rehabilitative Services (OSERS) under the United States Department of Special Education Programs has worked with the Council of Chief State School Officers to compile a handbook titled the “Accommodations Manual: How to Select, Administer, and Evaluate Use of Accommodations for Instructions and Assessment of Students with Disabilities” (Thompson, Morse, Sharpe, & Hall, 2005). In this manual, when selecting accommodations for instruction and assessment for individual students, Thompson and her colleagues state that every IEP team member should be knowledgeable about the state and district content standards and assessments. They emphasize that, “Effective decision-making about the provisions of appropriate accommodations begins with making good instructional decisions. In turn, making appropriate instructional decisions is facilitated by gathering and reviewing good information about the student’s disability and present level of performance in relation to local and state academic standards” (p. 16). But the question remains, how do IEP team members get the knowledge to make appropriate accommodations with respect to AT?

While the federal mandates of IDEA (2004) required that appropriate accommodations related to assistive technology be considered when developing an IEP, States were not offered any guidance with respect to how to determine or document if AT was considered. A ‘yes’ or ‘no’ box was added to IEPs and checked by the majority of school districts for AT consideration in an unnamed mid-western state. Other States required that IEP teams write a narrative of their discussion about a student’s need for AT consideration (Dissinger, 2003).
The National Assistive Technology Research Institute (NATRI), an organization that was funded from 2001-06 by the U.S. Department of Education and the University of Kentucky stated that, “In order to implement the AT Mandates in IDEA, it is clearly imperative that school district personnel have the knowledge and skills necessary for implementing those mandates. Schools are addressing this issue through the provision of in-service training and related professional development efforts” (NATRI, 2006).

While teacher preparation programs provide coursework in special education and AT to prospective teacher candidates, the following research studies indicate a need to train current (in-service) special education teachers with the same AT knowledge and skills as their inexperienced counterparts.

In a survey of 1,100 public school special education teachers to assess the benefits, barriers and classroom use of AT, Derer, Polsgrove and Rieth (1996) found that a lack of AT knowledge, skills, and professional development were identified as barriers towards AT implementation even though 80% of the respondents had some sort of training. Additionally, over 41% of the surveyed special education teachers indicated that the professional development they had received was inadequate to assist and support students with AT.

Bryant and her colleagues (1998) wrote that a broad knowledge base is needed for educators of students with LD. This knowledge is a necessity for special education teachers as more and more youngsters with disabilities are placed in general education settings (inclusion) for greater parts of the day. Special education teachers’ knowledge and skills should guide them with implementing specific AT devices to meet the
particular needs of the child; this might involve identifying proper hardware, software
and application of the AT.

In a study done by Puckett (2002), 31 special education teacher (volunteers) from
K-8 participate in four weeks of asynchronous on-line training and discussion on AT and
general curriculum standards. The teachers were from rural, urban and suburban settings
across two states. They also attended a 25-hour workshop on 6 different AT applications.
As part of the teachers professional development, they received an AT toolkit and
developed lesson plans utilizing technology to address language arts and mathematics.
The qualitative results from Puckett’s study suggest that “participants increased their
knowledge and potential use of AT and reported greater confidence in using AT to
address state curriculum standards for special education students.” (p.10)

Lee and Vega (2005) conducted a study across 48 school districts in California to
assess the perceived knowledge, attitudes, and challenges of AT use by 154 special
education personnel (teachers, specialists and coordinators). While it was encouraging
that 22% of the respondents received more than 40 hours of training, 18.2% did not
receive any training. The overall results showed that almost half (48.7%) of the
participants received almost no or very little AT training (i.e. between 1 and 5 hours).
These results indicate that AT training for special education personnel is minimal.

In another study done as part of NATRI’s efforts, 210 teacher interviews were
conducted across 10 states to analyze successful practices and barriers for AT
implementation. While the teachers in the study indicated that adequate AT access and
support were critical components for AT implementation, the teachers responsible for
implementing AT in the classrooms reported the lack of awareness and device-based training as major barriers to AT implementation (Temple, 2006).

When making IEP decisions related to AT, a broad knowledge base is needed by educators with the necessary skills to implement AT. Unfortunately, Edyburn (2003) writes that both pre-service and in-service teachers lack adequate training in AT to make appropriate IEP decisions. He offers a paradox related to AT: “How am I supposed to consider AT when I don’t know what the options are?” (p. 18)

There are a number of barriers that exist to provide the proper delivery of AT services. First is the sheer number of AT devices. ABLEDATA (2012), an organization sponsored by the National Institute on Disability and Rehabilitation Research, has identified more than 40,000 assistive technology products. This immense number of constantly changing devices makes it difficult for one to have the knowledge to make the right decision.

Marino, Marino & Shaw (2006) concur that even experienced special educators who try to stay current in the AT field have difficulty ascertaining current appropriate information from the many different resources that are available.

Another barrier is the training needed in the use and integration of an adopted AT device (Bausch & Hasselbring, 2004). To state that training is needed implies that there is a lack of knowledge among teachers and service providers to make AT decisions. While university programs ‘prepare’ pre-service special education teachers on the types, use and integration of AT, they are not meeting this need and school “Districts are forced to provide professional development training or individuals are left on their own to pursue training from regional or national training programs” (p.103).
Reading’s importance for all students

When the highly acclaimed *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983) was written, the report recognized that the United States was in danger of losing its status of educational and economic supremacy. Other nations were challenging the United States in educational achievement thus causing great competition in economic development. According to its authors, the need to be literate was essential for maintaining identity as an American. They wrote:

“…individuals who do not possess the levels of skill, literacy, and training essential to this new era, will be effectively disenfranchised, not simply from the material rewards that accompany competent performance, but also from the chance to participate fully in our national life” (page 7).

A person’s inability to read may also be reflected in some personality issues including poor self-esteem, low motivation, behavioral difficulties, and academic underachievement. There is also a relation between reduced occupational/economic status and low literacy skills (Sloat, Beswick, Willms, 2007). Truly, the ability to read is a critical life skill.

According to *Reading at Risk: A Survey of Literary Reading in America* (2004), Americans are spending less time reading, reading comprehension skills are eroding, and those declines have serious civic, social, cultural, and economic implications. When looking at raw numbers, the National Adult Literacy Survey (2002) estimates that 42 million adult Americans can’t read at all and 50 million Americans can only recognize
enough words to read at a 4<sup>th</sup> or 5<sup>th</sup> grade level. This statistic represents almost one-third of the U.S. population that is classified as ‘functionally illiterate’ which limits their ability to read maps, training manuals, decipher directions, and perform basic job functions.

President Bush reauthorized the Elementary and Secondary Education Act in 2001 and it became known as the ‘<i>No Child Left Behind Act’</i>. This piece of legislation (NCLB) strengthened special education students’ rights for equal access to a public education while still holding them accountable for achieving academic goals in Reading and Math. One of the goals of NCLB was that 100% of students will be able to read by Grade 3 (NCLB, 2001). There are a number of reasons why a person does not become literate: poverty, learning disabilities, lack of literacy within the family, the child not being ready to learn when beginning the reading process, and ineffective teachers (Gunning, 2006).

While schools cannot control societal and genetic influences that affect reading, they can control the knowledge and skills of their classroom teachers. This increased accountability for students to accomplish reading goals and for the classroom teacher to demonstrate sound pedagogy (while raising student achievement) requires a commitment to “best instructional practice”. The opportunity for students to utilize AT devices as a learning tool will allow them to reach this and other performance goals.

The currently accepted systematic model for assisting students who are having learning difficulties is known as ‘Response to Intervention’ (RTI). The origins of RTI came from the President’s Commission on Excellence in Special Education (U.S. Department of Education, Office of Special Education and Rehabilitative Services [OSERS], 2002). As Gersten and Dimino (2006) write, “The purpose of RTI is not only
to provide early intervention for student who are at risk for school failure, but also to
develop more valid procedures for identifying students with reading disabilities” (p. 99).

**Technology as a reading tool**

For students with learning disabilities, reading fundamentals of phonetics, decoding text
and comprehension are difficult if not impossible tasks. Hasselbring and Bausch (2005)
write that assistive technology can break down literacy barriers in two ways:

1.) **Reading support** – Computer-based applications help students with learning
disabilities successfully access grade level text as they read

2.) **Reading intervention** – Technology helps students strengthen and improve
their overall reading skills.

They write that, “In an ideal situation, students can use assistive technology intervention
to continually improve their reading skills while at the same time taking advantage of a
reading support to provide the scaffolding necessary to read text at their grade level”
(p.73).

One of the leading reasons for referral to special education involves reading
difficulties. Estimates suggest that 80% of students with learning disabilities receive
services for a reading disability (Edyburn, 2004).

Edyburn writes that technology to assist struggling readers has evolved from
marketplace developments. The devices that involve text-to-speech (e.g. Kurzweil 3000,
ReadingBar and TextHelp) have shown great promise however, the research is
inconclusive that these devices enhance reading performance and subsequent
achievement.
Technology can be a powerful teaching tool. In an early study done by Kulik and Kulik (1991), they found that computer assisted instruction was a valuable teaching tool for teaching and learning. In their meta-analysis, they found that education technology was capable of producing small effects on student achievement (ES=+0.30) and suggest that this technology could help learners become better readers, writers and problem solvers.

In their research study titled “Reviewing systemic reviews: Meta-Analysis of What Works Clearinghouse Computer-assisted Reading Interventions”, Streke and Chan (2012) support and reference the work of Kulik and Kulik (1991). They found that data from the What Works Clearinghouse intervention reports demonstrate that using computer-assisted reading programs in elementary schools can result in modest learning gains. The impacts of computer-assisted programs appear most promising in the ‘Beginning Reading’ area.

The Apple™ company has made a commitment to accessibility for people with disabilities. Assistive technology is built into every Apple™ product; these include: screen magnification, VoiceOver (advanced screen reading), text-to-speech, closed-caption support, spelling, thesaurus and grammar tools (Apple, 2012).

The CBS newsmagazine “60 Minutes” aired a report titled “Apps for Autism”. In this story, reporter Lesley Stahl interviewed families who claim that their autistic children are able to demonstrate vocabulary through pictures, have much higher attention and engagement, improve social skills, and facilitate communication by using Apple’s iPad computer device. Prior to using the iPad, these same children were previously identified by their teachers as incapable of communication (Stahl & Sughrue, 2011).
Educators must be able to match the students’ instructional needs or levels of learning. While some technology will demonstrate new concepts to students, other technology will offer practice with content that is already learned. Likewise, some technology will offer visuals to acquire mastery while other technology might challenge students at complex levels or with abstract ideas (King-Sears & Evmenova, 2007).

In a paper that was compiled from several separate reports for the Partnership for Accessible Reading Assessment (PARA), Thurlow and her colleagues (2009) write that even experts in the field find it difficult to identify reading disabled subjects when conducting research studies. Both parent groups and the media purport that reading disabled children are students with an average intelligence. However, as Stanovich (1986) writes, school-labeled reading disabled children have consistently shown IQ’s of closer to 90 [NOTE: 100 is an average IQ] on nonverbal and performance intelligence tests when they have been identified as the ‘sample group’. This creates a problem as this ‘sample group’ with mild IQ deficits has been compared with a (normal IQ) control group in school-labeled samples. Obviously, performance differences have appeared demonstrating that the less skilled readers also have lower IQ’s.

This skill, the ability to assess and identify student strengths and weaknesses, is one of the most important responsibilities of teachers. Yet Mertler (2005) writes that most teachers do not feel well prepared to assess their students and that their pre-service teacher training with educational measurement was inadequate. This lack of “assessment literacy” inhibits teachers to choose appropriate assessment methods, administer, score and interpret the results. Limited coursework (if any) at the pre-service level and
coursework that does not match the actual classroom experience are issues that directly affect students.

In 1987, noted educational psychologist Lee Shulman stated that teachers’ subject matter knowledge and their pedagogy should not be mutually exclusive in teacher preparation programs, rather, these two knowledge bases should be combined so that teachers are more effectively prepared. The concepts of content knowledge and pedagogy have an interdependency that embodies a teacher’s knowledge of teaching. Shulman previously wrote (1986):

“We expect a math major to understand mathematics or a history specialist to comprehend history. But the key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy in the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students” (p. 15).

Shulman’s model that defines the intersection of pedagogical knowledge with content knowledge became known as pedagogical content knowledge (PCK).

With respect to reading comprehension, the highly acclaimed RAND report (2002) supports Shulman’s assertion of the importance of a teacher’s pedagogy by stating, “Regardless of the quantity and quality of research-based knowledge about comprehension, students’ reading achievement will not improve unless teachers use that knowledge to improve their instruction” (p. xviii).
As technology is introduced into a teacher’s instructional practice, it takes an average of four or five years for the teacher to feel a comfort level where traditional instruction blends seamlessly with technology-based instructional practices. (Sheingold & Hadley, 1990) For this to occur, school districts must have a commitment to on-going professional development for their teachers. According to Byrom (1998), staff development that is tailored to teachers’ needs and provides a learning environment where teachers are motivated to increase their technology skills and knowledge is the most effective.

Students and their teachers are constantly exposed to an ever-changing world of technology. E-mail, instant messaging, applications (apps), wikis, Internet resources, podcasts, electronic tablets, web pages, search engines, SmartBoards, iPads, video conferencing and blogs are educational tools being utilized every day in 21st century schools. To learn the artful skill of reading, both teachers and students MUST embrace the most modern technology that is available. For one of its position statements, the International Reading Association recognizes that, “To become fully literate in today’s world, students must become proficient in the new literacies of the 21st century technologies.” The IRA goes on to state, “As a result, literacy educators have a responsibility to effectively integrate these new technologies into the curriculum, preparing students for the literacy future they deserve” (IRA-2009). Teachers have a professional obligation to not only stay current with their content and pedagogy, but to also stay current with the communication technology that has the potential to enhance learning and literacy.
In a study done by Weller, Carpenter and Holmes (1998), they compared two schools, one using traditional instruction and the other using computer assisted instruction. Using reading scores on the Iowa Test of Basic Skills, their findings indicate that the mean reading test score for the school using traditional instruction was 30.2 compared to a mean score of 39 for the school using computer assisted instruction. The Analysis of covariance indicated the computer assisted group means were significantly higher in reading ($F_{2.61} = 12.40, p < .001$) with the higher scores attributed to computer-assisted instruction. This finding suggests that computer technology is a beneficial tool towards achieving higher reading test scores.

Similarly, in a study conducted by Erickson and her colleagues (2005), they studied the implementation and use of a new literacy and communication instructional program called MEville to WEville. The program addressed a number of different areas: language development, reading/listening comprehension, writing development, reading development, and literacy experience. Three classroom teachers and 23 students with significant developmental disabilities were studied from three self-contained special education classrooms. Information from pre- and post-tests, observations, teacher inventories and classroom inventories were gathered and interpreted. The results suggest that using the assistive technology program (MEville to WEville) yielded modest literacy gains; however, these gains were notable because several of these students didn’t have any gains over a nine-year period.

Technology has allowed students with disabilities to reach a higher level of reading achievement than would be possible without it. In a study done by Higgins and Raskind (2005), they examined the effectiveness of the Quicktionary Reading Pen II to
examine its effectiveness for decoding single words and assisting students during independent silent reading (comprehension) in both the classroom and other settings. Thirty students identified with learning disabilities and deficits of 2 or more years below expected reading levels (as measured by the Woodcock Johnson Reading Mastery) took part in this research. The results of the study revealed that students using the pen demonstrated significant increases when asked reading comprehension questions. Students not only read easier selections more accurately but also demonstrated good reading comprehension with more difficult passages.

While the aforementioned studies suggest that positive results can be obtained from using assistive technology to aid the reading process, in their meta-analysis using 25 years of research, Stetter and Hughes (2010) state that there is still a need to study computer-assisted instruction (CAI) and its effects on reading. They reference the fact that the National Reading Panel (2000) found fewer than two dozen studies of CAI in reading (with their criteria) and only a handful on comprehension instruction. A summary of the various studies support the recognition that using technology has become a life skill for literate people. With respect to teaching reading comprehension to struggling readers, teachers view the use of technology as a valuable tool and believe there are benefits to using technology to assist these students. While the infusion of technology in schools has improved students’ classroom experiences, there is still a need for professional development of teachers as to how to best use available technology to improve reading instruction.
Training and Professional Development needs

Torff and Sessions (2008) conducted a study relating ‘Teacher Attitudes about Professional Development’ with teachers of different genders, age levels, years of experience and levels of educational attainment. Their research suggests that teachers in their first two years of teaching welcome and embrace professional development. Teachers in years 3 through 9 start a gradual but steady drop in attitude towards professional development and teachers with 10 or more years of experience have unchanging attitudes. Age did not have as much as an impact as years in the profession. Secondary school teachers had a less positive attitude about professional development during their first 9 years in the profession compared to their elementary school counterparts. Finally, neither gender, nor educational attainment had a significant impact on teachers’ willingness to embrace professional development. These findings suggest that newer teachers in the profession have a more favorable attitude about professional development.

With respect to AT professional development, in its ‘Guiding Document for AT Implementation’ the Quality Indicators for Assistive Technology (QIAT) Consortium (2011) recognizes that “training and technical assistance are an ongoing process” (p.6). QIAT identifies that the team of people responsible for AT implementation and the success of the student includes the special education teacher. While training should be done throughout one’s career, AT professional development must begin at the pre-service level.

Similarly, the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center for Early Learning and Children’s Media (FRC)
wrote a joint position statement stating that all early childhood teachers should understand and be able to use any assistive technologies that are available to children with special needs in their classrooms. They also advocate that early childhood educators need available, affordable and accessible professional development that includes in-depth, hands-on technology training, ongoing support and access to the latest technology tools and interactive media (NAEYC & FRC, 2012).

A study conducted by Anderson and Petch-Hogan (2001) was done to measure pre-service teachers’ awareness of technology for students with disabilities. A pre-test survey was administered before each candidate’s field experience and a post-test survey was completed following the field experience. As part of their field experience, students developed and taught lessons to learning disabled or behaviorally challenged classrooms and were strongly encouraged to use assistive technology (AT) for a minimum of two hours during the field experience. There was statistical significance reported in students perceived abilities [p=.019] following the use of assistive technology during the semester. The teachers also became more aware of the software and hardware available for students with disabilities and how they could be utilized as instructional tools. This study indicated that exposure to AT was beneficial as a training practice during teacher preparation.

However, not all teacher preparation programs are providing students with essential AT skills to be successful. Michaels and McDermott (2003) conducted a study on the importance of pre-service preparation with respect to AT implementation, integration and continued support of students. They surveyed 143 graduate special education programs and asked questions related to knowledge, skills, dispositions, the
understanding of AT, use of AT, making AT decisions, and program integration for the institutions with respect to their teacher education programs. The results suggest that current graduates are leaving these graduate special education teacher preparation programs without the critical AT competencies to be successful in the prospective teaching positions.

Similarly, when literacy experts were interviewed about meeting the needs of their students through the Response to Intervention (RTI) model, they stated that there are essential skills and competencies that school personnel should know and be able to do. One of these competencies is an in-depth knowledge of literacy development and instruction. Unfortunately, many of those that were interviewed “indicated that they gained this knowledge of literacy instruction through the professional development that they received at their schools rather than from any teacher preparation or graduate program” (Bean & Lillenstein, 2012).

During her research of 234 special educators in Southwestern Virginia, Gustafson’s (2006) study about their assistive technology skills, knowledge and professional development needs indicated that the professionals have an ‘average’ level of knowledge and skills on selected AT skill competencies. However, these educators also indicate that they have a critical need for professional development in determining if an AT assessment was needed and conducting the AT assessment (p. 61).

Lei (2009) conducted a study with 70 teachers or pre-service teachers who were digital natives. The study utilized a survey that assessed the technological knowledge, skills and attitudes of the teachers by identifying different technology skill levels from basic skills (i.e. e-mail) to advanced skills such as editing audio files and designing web
The survey gathered information related to general technology use, ownership of technology, attitudes and beliefs toward technology, experiences and opinions on using technology in education. While the students were positive about their personal use of technology, they were reserved about their use of technology for instruction. “Most participants did not have experiences with subject-specific technologies, and they knew even less about technologies that could help students with special needs” (p.92). One of Lei’s recommendations was that assistive technology should be an important component of teacher technology preparation programs.

In his study to describe the level of AT knowledge and skills among the European branch of the participating school system special education professionals and related service providers, Marsters (2011) wanted to identify AT training needs related to the 42 professionals’ knowledge of AT. His findings suggest that professional AT knowledge and skills fall short of the recommended best practices outlined by the Quality Indicators of Assistive Technology (QIAT). The participants also indicated AT device training needs in using AT in the general education setting and when conducting AT assessments.

The ever-changing (assistive) technologies of the 21st century have created a need for constant professional development by the educators that recommend their use. The knowledge of reading and the AT devices that support reading processes for special needs children is a critical skill for every special education teacher. Unfortunately, many special education teachers lack this knowledge, and although consideration for AT is
mandated by federal law, until special education teachers obtain or advance their knowledge in AT, children will be unable to reach their full reading potential.
CHAPTER III

METHODOLOGY

Introduction

This study is being designed to examine the AT knowledge of special education teachers in Southwestern Pennsylvania with respect to reading and their professional development needs. These in-service special education teachers will be asked to rate their knowledge of assistive technology with respect to reading, based on their educational background and professional development training. The utilization of an Internet survey instrument will be used to collect data. This chapter describes the research questions, participants, procedures and limitations of the study.

Research Questions

The following questions will be answered in this research study:

1. What do special education teachers know about assistive technology?
2. Can special education teachers identify the names of the assistive technology applications for reading support?
3. What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?
Research Design

The proposed research study is a quantitative study based on the previous work of Michaels and McDermott (2003) [Appendix A] and Marsters (2011) [Appendix B] that identifies teachers’ knowledge of assistive technology in the classroom so that appropriate professional development could take place to strengthen teachers’ knowledge and pedagogy. This study also aims to identify special education teachers’ knowledge with respect to reading and assistive technology. The previously mentioned studies did not identify the teaching of reading through assistive technology as an additional knowledge/skill set.

A quantitative approach will be utilized as the mode of inquiry. Quantitative techniques are used to summarize a large number of observations with experimental, descriptive and correlational designs. Using a questionnaire (survey) is a very common quantitative technique for collecting data in educational research. While the majority of the survey instrument will make use of quantitative data, there will be one open-ended question used at the very end of the survey to identify any gaps in the data (McMillan & Schumacher, 2001).

The proposed research study will use a cross-sectional survey design to gather information about teachers’ knowledge about AT and teaching reading. This research design was used because the researcher wants to collect data quickly to make inferences about a specific population at one point in time. Because data is being collected one time, the survey will only serve as a snapshot of the target population from which data is being gathered (Gay, Mills and Airasian, 2009).
Gay et al. described the questionnaire, or survey, as “an instrument to collect data that describes one or more characteristics of a specific population” (p. 175). Research using a survey is ideal for education because the researcher can gather sample information about population groups to “learn about their characteristics, opinions, attitudes or previous experiences” (Leedy & Omrod, 2005, p. 183).

Descriptive research will be used to transform the survey results into indices that will describe the data. McMillan and Schumacher (2001) state that descriptive statistics are the “most fundamental way to summarize data, and it is indispensable in interpreting the results of quantitative research” (p. 206-207).

**Participants**

The target population in this study will be high school special education teachers in Southwestern Pennsylvania. A convenience sample of Principals in Southwestern Pennsylvania will be identified from the researcher’s professional experiences. All participants will be currently employed, college-educated and have a Pennsylvania Special Education teaching certificate. Both males and females of varying ages with a range of teaching experiences will be surveyed. Also, the expected tenure of the teachers will range from new teachers to teachers with more than 30 years of experience.

**Instrumentation**

The author obtained written permission to use and modify two existing surveys developed by Michaels & McDermott (2003) [Appendix A] and Marsters (2011) [Appendix B]. These surveys were used as a framework for the development of the
researcher’s survey instrument [Appendix C] and while these surveys address special education teachers’ knowledge of AT, neither survey specifically addressed the teaching of reading using AT. The survey instrument will be submitted to the Institutional Review Board (IRB) at Duquesne University for formal approval.

The survey that will be administered will be divided categorically by demographic information (4 items), knowledge of AT (6 items), knowledge of assessing/supporting student reading through AT (5 items), professional development with respect to AT and reading (4 items) and one open-ended question that will allow the participant(s) to explain any particular aspect of AT, reading or professional development that might have been omitted from the survey.

Demographic information will be gathered by participants choosing the most relevant answer for each question. Knowledge of AT and supporting reading will be gathered by a 5 point Likert-type scale ranging from 0= No Knowledge to 4= Extensive Knowledge. Chang (1994) referenced that an odd-number of responses used in a Likert scale maximizes reliability in a survey. The open-ended question will be a text box area where the participant can type his/her response.

**Procedures**

A letter [Appendix D] will be sent to approximately 25 principals outlining the research study. An e-mail [Appendix E] will be sent to the principals along with a script that will be forwarded to the special education teachers’ participating in this research study along with a SurveyMonkey link. The surveys will be reformatted electronically using SurveyMonkey and survey participants will be able to access this survey through a
specific web link. SurveyMonkey utilizes “Secure Sockets Layer (SSL) technology that protects user information using both server authentication and data encryption ensuring that user data is safe, secure, and available only to authorized persons” (SurveyMonkey, 2012).

Confidentiality and anonymity of the participants, his/her school and the data obtained will be maintained throughout the entire research process. The information will be housed only on SurveyMonkey’s computer server and the researcher will be the only person with access to the information via a secure username and password. Coding of data will be utilized in SurveyMonkey to verify submission of data and to report possible tendencies in the data. Also, participant names will not be collected and assigned participant numbers will be used only to document survey submission and possibly report an open-ended answer.

The program SPSS is incorporated into the SurveyMonkey software and will be used to run an analysis of the data obtained. This will eliminate possible errors when transporting data from one format (source) to another.

Following an initial 3-week time frame, a follow-up e-mail letter [Appendix F] will be sent to the principal along with the link that should be forwarded to all special education teachers in that particular building serving as a reminder requesting that they complete the survey if they haven’t already done so.
Limitations of the study

This study will be conducted in Southwestern Pennsylvania. Geographically this is only a small (limited) geographic area in the United States. Also, the survey size is relatively small. By contacting the special education teachers of approximately 25 principals, the number of special education teachers from which data will be collected is only a small representation of all special education teachers in the United States.

The survey will be administered to high school special education teachers. The results will be limited in that high school special education teachers make up only a fraction of all special education teachers. Elementary and middle school special education teachers might receive more (or less) training and professional development with AT and reading but are not participants in this study.

Lastly, the survey limits the professional development aspect of AT to the last 2 years. Teachers may have received extensive AT training more than 2 years ago that would not be reflected in this research.

Summary Statement

Special education teachers in Southwestern Pennsylvania regularly perform a multitude of skills for their daily job responsibilities. Among them, staying abreast of special education law, handling procedural guidelines when writing IEP’s and being competent in their pedagogy are just several of the many proficiencies that they must demonstrate each and every day.

While many of these teachers are new additions to the profession, most have been practicing their craft for more than 10 years. The assistive technology innovations that
have been discovered over the past 10 years beg the question as to whether these teachers have the knowledge to successfully consider these AT devices when making recommendations concerning reading during an IEP meeting.

Using a quantitative approach, completion of the author’s electronic survey instrument using SurveyMonkey will provide data to answer each of the research questions. The 25 principals’ schools using the special education teachers at these schools will be the surveyed population answering several multiple choice questions, a number of Likert-scale type questions and one open-ended question.

This research study can assist with the ongoing professional development of in-service special education teachers. It can also provide insight into the training of special education teachers and their knowledge of AT and reading. An analysis of this data will be presented in Chapter IV.
CHAPTER IV

RESULTS

Introduction

This chapter presents the results of this study examining special education teachers’ knowledge of assistive technology for children with reading difficulties. This chapter will review the administration of the survey, response rates, demographic data of survey respondents, research questions and a statistical analysis of how the research questions compare to the survey questions. Descriptive statistics will be utilized to present the variables studied as well as the subgroups.

The principals of twenty-eight high schools in Western Pennsylvania were contacted via a letter (Appendix A). This letter served as an initial contact/professional courtesy to inform the Principal about the researcher’s intent to survey special education teachers in his/her building. The letter also functioned to inform the Principal that the researcher will be calling him/her to verify the names/emails of these same special education teachers in his/her building.

Before survey administration could occur through the online website SurveyMonkey, individual special education teachers’ email addresses needed to be obtained. Special education teachers were identified in two ways. First, the researcher was able to obtain many teacher names, teaching assignments and email addresses by accessing school district websites. The majority of the 28 school districts had this information present on their websites, however 4 did not have identifiable teacher information. One week after the initial mailing to the building principals, the researcher called each building principal to verify permission to administer the survey, and to
confirm and/or modify the names/e-mails of special education teachers in his/her building.

After speaking with the building principals, two (2) school district required their Superintendent’s permission to proceed with the survey and two (2) school districts had their Assistant Superintendent review my survey information before I could proceed. Only one (1) school district’s principal did not respond to phone calls to participate in the survey. Originally, one (1) school district’s e-mail server returned all of the initial e-mails that the researcher sent to teachers as ‘non-deliverable’; however, after a second attempt, the e-mails were able to be delivered.

E-mails and survey contacts were sent out using an AOL account created by the researcher specifically for his research: sydeskiduq@aol.com. E-mails and surveys were sent out to teachers in their identified school district group on May 21, 2013. These e-mails were sent as blind carbon copies (bcc) to the teachers as another way to secure confidentiality within the school district and protect teachers’ anonymity. A follow-up e-mail was sent on May 28, 2013 to all participating school districts to thank those teachers that completed the survey and as a request for those teachers that did not yet complete the survey to do so.

Response Rate

After the initial e-mail to 201 special education teachers (Appendix B), by the end of the day on Friday, May 24, 2013, 51 responses were returned. This was a 25.37 percent response rate. One week later after the reminder e-mail was sent, 43 additional
teachers replied by Friday, May 31, 2013 for a total of 94 responses. This resulted in an overall response rate of 46.77 percent.

Research conducted at the University of Texas–Austin (2007) indicates that an acceptable response rate for online surveys is 30 percent. This is fairly consistent with the meta-data analysis research conducted by Ipathia, Incorporated (2009) of 199 research studies where they indicated that the average survey response rate was 32.52 percent. By having a response rate of 46.77 percent, the researcher’s survey exceeded the acceptable standard response rate by approximately 15 percent.

Demographic data

Ninety-four teachers initially opened the SurveyMonkey link to begin taking the survey; however, after reviewing the informed consent page, 2 teachers declined further participation and clicked on the ‘Disagree’ button. This in turn ended the survey. This left 92 qualified participants who began survey participation after agreeing to the informed consent page.

Four questions were asked to the special education teachers concerning their demographics. A total of 92 teachers responded to all four questions and a breakdown of their responses are found in Table 1. The demographic data indicates that most teacher respondents were females (63 of 92) that had a Master’s degree (64 of 92). Three survey participants had their Doctoral degree. Feng and Sass (2012) report that students in special education courses have higher achievement gains if their teacher holds a post-baccalaureate degree; “the effects are particularly strong in the case of reading achievement” (p.23). The fact that the most respondents have an advanced degree might
suggest that they have received coursework in assistive technology and/or reading instruction that respondents having a Bachelors’ degree might not.

While the focus of this study was to identify assistive technology supports for struggling readers, only 10.87% of the respondents identified their primary teaching assignment as ‘Mostly reading support’. It is quite possible that teachers are teaching reading in addition to other subject matter as 30.43% of the teachers responded that they are teaching ‘Multiple support areas’.
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<td></td>
<td>Master’s degree</td>
<td>64</td>
<td>69.57</td>
</tr>
<tr>
<td></td>
<td>Doctoral degree</td>
<td>3</td>
<td>3.26</td>
</tr>
<tr>
<td>Years as a special education teacher</td>
<td>0-4</td>
<td>16</td>
<td>17.39</td>
</tr>
<tr>
<td></td>
<td>5-9</td>
<td>25</td>
<td>27.17</td>
</tr>
<tr>
<td></td>
<td>10-15</td>
<td>24</td>
<td>26.09</td>
</tr>
<tr>
<td></td>
<td>16-20</td>
<td>11</td>
<td>11.96</td>
</tr>
<tr>
<td></td>
<td>More than 20</td>
<td>16</td>
<td>17.39</td>
</tr>
<tr>
<td>Current teaching assignment</td>
<td>Mostly math support</td>
<td>19</td>
<td>20.65</td>
</tr>
<tr>
<td></td>
<td>Mostly reading support</td>
<td>10</td>
<td>10.87</td>
</tr>
<tr>
<td></td>
<td>Other subject area support</td>
<td>11</td>
<td>11.96</td>
</tr>
<tr>
<td></td>
<td>Multiple support areas</td>
<td>28</td>
<td>30.43</td>
</tr>
<tr>
<td></td>
<td>Life Skills</td>
<td>10</td>
<td>10.87</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>14</td>
<td>15.22</td>
</tr>
</tbody>
</table>

Note. \( n = 92 \) total respondents
As identified in previous chapters, the research questions are:

RQ1. What do special education teachers know about assistive technology?

RQ2. Can special education teachers identify the names of the assistive technology applications for reading support?

RQ3. What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?

The survey used in this study was designed to identify teacher knowledge levels related to assistive technology/reading support and to determine if professional development is needed in these areas.

Following the 4 demographic questions, questions 5 through 15 were able to be answered in a Likert-type Scale format with possible answers of ‘No knowledge’, ‘Some knowledge’, ‘Average knowledge’, ‘Above average knowledge’ and ‘Extensive knowledge’. Identified values were ‘0’ (No knowledge), ‘1’ (Some knowledge), ‘2’ (Average knowledge), ‘3’ (Above average knowledge) and ‘4’ (Extensive knowledge).

Questions 16 through 19 asked about professional development time provided by the school district. Possible answers included ‘None’, ‘1-10 hours’, ’11-20 hours’, and ‘More than 20 hours’.

Lastly, Question 20 is open-ended and allows respondents to add their thoughts related to anything not asked in the survey concerning AT, reading and/or professional development.

On the next page, Table 2 compares each survey question to the corresponding research question(s).
<table>
<thead>
<tr>
<th>SURVEY QUESTION</th>
<th>RQ1</th>
<th>RQ2</th>
<th>RQ3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Definition of AT</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Determining potential benefits and uses of AT for students with disabilities</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7. Use of the Internet to engage students with disabilities in independent learning</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8. Use of software programs to engage students with disabilities in independent learning</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9. Use of handheld device applications (apps.) to engage students in independent learning</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>10. Collaboration with IEP team members to determine AT needs and implement AT supports</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>11. The National Reading Panel (2000) addressed five pillars for reading success. I can identify each of these five domains</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>12. Collaboration with IEP team members to determine student (reading) needs and potential benefits and uses of AT</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>13. Use of text reading programs utilizing technology to support reading (e.g. Kurzweil 3000, Read Aloud)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>14. Use of commercial programs to support reading (e.g. READ 180, Accelerated Reader)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>15. Use of handheld device applications (apps.) to support reading</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>16. How many hours of professional development have you received from your school district in reading assessment/instruction</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>17. How many hours of professional development have you received from your school district in the various types of AT</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>18. How many hours of professional development have you received from your school district in implementing AT</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>19. How many hours of professional development have you received from your school district to determine a student’s AT needs/supports during an IEP meeting</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Note. RQ1=research question 1, RQ2= research question 2 and RQ3= research question 3
Teacher Knowledge of AT

Following the demographical information in the survey, the next set of questions related to teachers knowing and utilizing various forms of AT to assist students. While the answers in Table 3 indicate that most special teachers have an ‘Above Average Knowledge’ of the definition of AT, it appears that they do not have as much knowledge with determining the application of various technology devices to assist students with disabilities.

TABLE 3

Knowledge of AT to assist students

<table>
<thead>
<tr>
<th>SURVEY QUESTION</th>
<th>n</th>
<th>M</th>
<th>S.E.M.</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Definition of AT</td>
<td>90</td>
<td>2.24</td>
<td>.09</td>
<td>.83</td>
<td>-.24</td>
<td>2.51</td>
</tr>
<tr>
<td>6. Determining potential benefits and uses of AT for students with disabilities</td>
<td>89</td>
<td>2.08</td>
<td>.09</td>
<td>.86</td>
<td>-.48</td>
<td>2.26</td>
</tr>
<tr>
<td>7. Use of the Internet to engage students with disabilities in independent learning</td>
<td>90</td>
<td>2.11</td>
<td>.09</td>
<td>.87</td>
<td>-.21</td>
<td>2.32</td>
</tr>
<tr>
<td>8. Use of software programs to engage students with disabilities in independent learning</td>
<td>90</td>
<td>1.84</td>
<td>.09</td>
<td>.85</td>
<td>.08</td>
<td>2.34</td>
</tr>
<tr>
<td>9. Use of handheld device applications (apps.) to engage students with disabilities in independent learning</td>
<td>90</td>
<td>1.69</td>
<td>.09</td>
<td>.87</td>
<td>.13</td>
<td>2.54</td>
</tr>
<tr>
<td>10. Collaboration with IEP team members to determine AT needs and implement AT supports</td>
<td>90</td>
<td>1.96</td>
<td>.09</td>
<td>.90</td>
<td>-.29</td>
<td>2.41</td>
</tr>
</tbody>
</table>

Note. n=number of respondents. M=Mean, S.E.M.=Standard error of the mean  and SD=Standard deviation

When asked about the definition of AT, 90 respondents indicated answers slightly above average with a mean of 2.24. Skewness was -0.24 as 73 respondents answered that they had an ‘Average’, ‘Above average’ or ‘Extensive knowledge’ of AT. There was a
As to whether teachers use the Internet to engage students with disabilities in independent learning, 90 teachers responded. They answered the question similarly to the previous two questions with 40% indicating that they have an average knowledge and a mean score of 2.11. There was a slight negative skew (-0.21) to their answers and a high kurtosis (2.32).

The next question asked teachers about their use of software programs to engage students with disabilities in independent learning. Again, 36 of the 90 teachers (40%) indicated that they had an average knowledge level. The mean score was 1.84 as there was a slightly positive skew (.08) to their answers. Thirty three teachers (combined) answered that they had below average knowledge while 21 teachers indicated an above average knowledge level. The kurtosis value of 2.34 was similar to other question responses.

Next, one of the more interesting question responses was about teachers’ knowledge of their use of handheld device applications (apps.) to engage students with disabilities in independent learning. While 35 teachers of the 90 teachers that responded
(38.89%) indicated average knowledge, 6 indicated that they had no knowledge and 33 indicated that their knowledge was below average. This resulted in a positively skewed distribution (0.13) and the mean score of 1.69 was the lowest of all responses in this section. The high kurtosis of 2.54 was the greatest for all responses in this section. The survey results show that teachers are lacking with their knowledge of AT apps. to engage students with disabilities.

Ironically, the Standard Error of the Mean (S.E.M.) was .09 for all questions in Table 3 and occurred because of rounding. The actual S.E.M. values were: Question 5=.087, Question 6=.090, Question 7=.091, Question 8=.0892, Question 9=.091 and Question 10=.094.

One of the key questions was #10. The question asked whether teachers have knowledge of AT to collaborate with IEP team members to determine AT needs and implement AT supports. The mean score of 1.96 was very slightly below average. The answers indicated a slightly negative skew (-0.29) with 5 of the 90 survey respondents indicating that they had no knowledge in this area. The kurtosis was consistent (2.41) with other questions in this section; however, the standard deviation of .90 was the greatest of all other questions in this section. There were an equal number of respondents (27) that indicated they had knowledge above or below the average special education teacher.

**Teacher Knowledge of Reading and AT**

To determine the special education teachers’ knowledge of reading and their knowledge of the potential benefits of using technology to assist reading instruction, a series of
questions were asked. There was a broad divergence in knowledge among the teachers’ knowledge levels. As Table 4 indicates (on the next page), with the exception of ‘Collaborating with IEP team members to determine student (reading) needs and potential benefits and uses of AT’, almost all answers scored below the average knowledge level and the lowest (mean) scored question on the entire survey was related to ‘Identifying the National Reading Panel’s five reading domains’.

This table provides valuable information in answering Research Question 2 – “Can special education teachers identify the names of the assistive technology applications for reading support?” It is apparent from their responses that they do not use various AT devices in their instruction to support reading.
### TABLE 4

**Knowledge of Reading and AT**

<table>
<thead>
<tr>
<th>SURVEY QUESTION</th>
<th>n</th>
<th>M</th>
<th>S.E.M.</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. The National Reading Panel (2000) addressed five pillars for reading success. I can identify each of these five domains</td>
<td>89</td>
<td>1.29</td>
<td>.13</td>
<td>1.20</td>
<td>.65</td>
<td>2.45</td>
</tr>
<tr>
<td>12. Collaboration with IEP team members to determine student (reading) needs and potential benefits and uses of AT</td>
<td>88</td>
<td>1.99</td>
<td>.10</td>
<td>.98</td>
<td>-0.05</td>
<td>2.41</td>
</tr>
<tr>
<td>13. Use of text reading programs utilizing technology to support reading (e.g. Kurzweil 3000, Read Aloud)</td>
<td>89</td>
<td>1.63</td>
<td>.10</td>
<td>.98</td>
<td>.14</td>
<td>2.44</td>
</tr>
<tr>
<td>14. Use of commercial programs utilizing technology to support reading (e.g. READ 180, Accelerated Reader)</td>
<td>89</td>
<td>1.64</td>
<td>.12</td>
<td>1.17</td>
<td>.38</td>
<td>2.30</td>
</tr>
<tr>
<td>15. Use of handheld device applications (apps.) to support reading</td>
<td>89</td>
<td>1.44</td>
<td>.10</td>
<td>.92</td>
<td>.09</td>
<td>2.18</td>
</tr>
</tbody>
</table>

Note. *n*=number of respondents. *M*=Mean, *S.E.M.*=Standard error of the mean  and *SD*=Standard deviation

This section assessed teachers’ knowledge of reading and AT. The first question wanted to know if teachers were able to identify the 5 domains addressed in the National Reading Panel’s (NRP) 2000 report. Eighty-nine teachers responded to this question with a highly positive skew (.65). Fifty-six of the 89 responses (62.9%) indicated a below average knowledge in this area with a mean of 1.29. The standard deviation of 1.20 and kurtosis of 2.45 were the highest of all questions in this section. Survey responses show that teachers do not have much knowledge with the NRP’s five domains.

The next question assessed teachers’ knowledge of collaboration with IEP team members to determine student (reading) needs and potential benefits and uses of AT. Answers to this question were the most symmetric of all survey questions. This is
supported by a mean of 1.99, a skewness of -0.05. The kurtosis of 2.41 was high, similar to other previous questions. Eighty-eight teachers responded to this question.

Almost the same number of teachers (30) responded that they had a below average knowledge of text reading programs to support reading, as those that responded (31) that they had an average knowledge. Eighty nine educators responded to this question resulting in a mean of 1.63 and a positive skew of .14. The kurtosis of 2.44 is leptokurtic, also similar to other questions.

The use of commercial programs to support reading resulted in responses with a mean of 1.64. The most common answer was ‘some knowledge’ (30 of 89 responses) and a positive skew of .38. The standard deviation of 1.17 and kurtosis of 2.30 were the second highest of statistical calculations for this question category. Eighty nine teachers responded to this question with a wide representation of answers.

Lastly, 89 teachers responded to the last question in this category about teacher knowledge use of handheld devise applications (apps.) to support reading. Not one person indicated that they had extensive knowledge and only 12 indicated that they had above average knowledge. The kurtosis of 2.18 was the lowest in this question section; however, it was still leptokurtic. The most common answer of ‘some knowledge’ had 34 responses (38.2%). The mean score response was 1.44 was the lowest scoring question relating to AT for reading. The skewness of .09 was just slightly positive.

As stated earlier, the responses in this category suggest that surveyed teachers are not as knowledgeable in reading and various AT devices to support reading.
**Teacher Professional Development in Reading and AT**

The next four questions measured the professional development hours that teachers received from the school district related to reading, their use of AT, their implementation of AT and determining AT needs during an IEP meeting. For example, survey question 16 reads: ‘How many hours of professional development have you received from your school district in reading assessment/instruction?’ Similarly, question 19 reads, “How many hours of professional development have you received from your school district to determine a student’s AT needs/supports during an IEP meeting?”

From all responses in Table 5, it is apparent that professional development is lacking in both AT and reading. More than 86 percent of all respondents indicated that they receive 0 to 10 hours of professional development provided by their school district in reading and/or AT; this was consistent for every question. This data helps to answer Research Question 3 (RQ3) -- *What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?*
### TABLE 5

Professional development hours received from your school district in reading/assessment and AT

<table>
<thead>
<tr>
<th>SURVEY QUESTION</th>
<th>RESPONSE (hours)</th>
<th>COUNT</th>
<th>PERCENT</th>
<th>CUMULATIVE PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Reading assessment/instruction</td>
<td>None</td>
<td>25</td>
<td>28.41</td>
<td>28.41</td>
</tr>
<tr>
<td></td>
<td>1-10</td>
<td>51</td>
<td>57.95</td>
<td>86.36</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>8</td>
<td>9.09</td>
<td>95.45</td>
</tr>
<tr>
<td></td>
<td>More than 20</td>
<td>4</td>
<td>4.55</td>
<td>100</td>
</tr>
<tr>
<td>17. Various types of AT</td>
<td>None</td>
<td>34</td>
<td>38.64</td>
<td>38.64</td>
</tr>
<tr>
<td></td>
<td>1-10</td>
<td>45</td>
<td>51.14</td>
<td>89.78</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>8</td>
<td>9.09</td>
<td>98.87</td>
</tr>
<tr>
<td></td>
<td>More than 20</td>
<td>1</td>
<td>1.13</td>
<td>100</td>
</tr>
<tr>
<td>18. Implementing AT</td>
<td>None</td>
<td>41</td>
<td>46.59</td>
<td>46.59</td>
</tr>
<tr>
<td></td>
<td>1-10</td>
<td>42</td>
<td>47.73</td>
<td>94.32</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>5</td>
<td>5.68</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>More than 20</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>19. Determining a student’s AT supports/needs during an IEP meeting</td>
<td>None</td>
<td>52</td>
<td>59.77</td>
<td>59.77</td>
</tr>
<tr>
<td></td>
<td>1-10</td>
<td>32</td>
<td>36.78</td>
<td>96.55</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td>3</td>
<td>3.45</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>More than 20</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. Count=88 for survey questions 16, 17 &18. Count=87 for survey question 19

---

**Open-ended Text Responses**

The last section of the online survey was an open-ended question that allowed participants to provide written responses for items they thought were omitted from the survey relating to AT, reading and/or professional development. Twenty-nine teachers provided written text responses.
Answers varied in their length and content. There were five apparent themes to their responses: (1) amount of training, (2) location of training, (3) emphasis of AT, (4) lack of resources, and (5) non-applicability of the survey.

As for the amount of training, one teacher wrote that, “Other than college classes, no additional review” while another wrote, “We receive very little training in the area”. One teacher referenced that there “…are not many (training) options are available for us” and another stated, “Hopefully there will be a future movement towards in-servicing special education teachers and research based AT software and professional development.”

Professional development (training) was obtained in and outside of respondents school districts. One educator wrote that that iPads are being implemented for instruction and that the district has been “very supportive”. Another indicated that he/she received training in a previous school district while two others wrote that the Intermediate Unit (IU) had collaborated with him/her. In contradiction, a different teacher wrote that “involving local IUs with districts regarding (the) AT evaluation process is a missing piece”. Two educators obtained professional development on their own; one went to a Pennsylvania Training and Technical Assistance Network (PATTAN) workshop while the other attends the Special Education Leadership Conference each year.

Whether or not school districts emphasize AT or professional development varied in responses as well. One person wrote, “(there is) not enough emphasis is placed on AT”, while another indicated “I do not feel that I am as knowledgeable as I should be”. One survey respondent indicated, “there does not seem to be a focus on AT unless there is a specific concern regarding a specific student”. Interestingly, one person referenced
the overall technology use in classrooms in his/her school district. This person indicated that students are “exposed to technology daily in the classroom” and that AT doesn’t seem as prevalent because of the use of similar devices for all students.

Unfortunately, time and money appear to hamper assisting students. “Unfortunately, the funds are not available to increase the use of handheld AT; therefore professional development has been limited” was one response. Another teacher wrote that “we have limited funds” and that “AT is probably expensive and should only be pursued if absolutely necessary”. With respect to time, one person wrote about his/her school district’s co-teaching model of assisting students with special needs and said “There is zero to very little time to work with students with reading disabilities.” One person wrote that high tech AT would be difficult because there are “not enough technology resources”.

The survey seemed to miss the mark with several educators as two indicated that they are involved with math and that their professional development has been limited. One teacher did not work with students who are in need of AT, but thought that their building was behind in AT. Interestingly, one educator e-mailed me about completing the survey because she works with gifted students and wasn’t sure if she should complete it. Apparently, she did not see any relevance between gifted (special education) and the research topic. A similar response was provided by a different gifted education teacher for the open-ended response that “AT does not apply to my occupation”.

57
CHAPTER V
CONCLUSIONS

Introduction

The purpose of this research study was to evaluate whether high school special education teachers in Southwestern Pennsylvania have knowledge of assistive technology (AT) to assist struggling readers. Federal law mandates that school districts provide resources to students with disabilities that allow them to perform functional capabilities that they could not perform without. This study was cultivated from the body of literature related to AT, reading, and professional development.

Unfortunately, it is utopian to believe that all special education teachers, in all school districts, have all of the knowledge of AT resources, to assist all students with disabilities. With public school districts facing difficult budgetary decisions, technology, curriculum and professional development have competed for limited funds. These fiscal decisions may have hindered school districts from actually providing research-based professional development, AT resources and best-practice reading instruction. Several teachers identified ‘funding’ in their open-ended responses as a reason that their school districts are not offering professional development in these areas.

Twenty-nine school districts were contacted and 28 responded to this research study. A total of 94 of 201 special education teachers responded (46.77%) to a survey posted on Surveymonkey. The responses rate was much greater than the 30% average for online surveys (University of Texas-Austin, 2007, Ipathia, Inc, 2009). The survey started on May 21, 2013 and closed on May 31, 2013 and consisted of demographic questions, knowledge-based questions and one open-ended question.
To that end, the findings of special education teachers’ knowledge and pedagogy of AT and reading are addressed in this research study as well as professional development recommendations. Each research question will be reviewed along with the survey findings.

Findings

Research Question 1 (RQ1):

*What do special education teachers know about assistive technology?*

Various types of AT were listed for teachers in this research study and it is apparent that their knowledge and skills levels are wide ranging. While many respondents to the ‘In-Service Special Education Teacher Assistive Technology/Reading Knowledge Survey’ indicated that they have some knowledge of the definition of AT (Table 3), the remaining answers confirmed the work of Derer, Polsgrove and Rieth (1996) who found that teachers lacked knowledge, skills and professional development towards AT implementation. The overall responses for questions about determining, implementing and using and AT generated mean scores ($M=2.08, 2.11, 1.84, 1.69 \& 1.96$) that were all less than the general question about the ‘Definition of AT’ ($M=2.24, SD=.83$). The range for these scores was 0 to 4. This shows that the teachers had a general knowledge of AT, but less knowledge when it came to the application (knowledge) of AT.

The special education teachers also showed to have a comfort level with using the Internet to assist students with disabilities in independent learning ($M=2.11, SD=.87$); however, they do not feel as comfortable using software programs ($M=1.84, SD=.85$) and
even less comfortable using handheld device applications (apps.) \((M=1.69, SD=.87)\) to assist students.

These results show that it is a challenge for special education teachers to have a broad knowledge about different types of AT. This data reaffirms the work of Marino, Marino & Shaw (2006) who wrote that even experienced special educators had difficulty staying current with the many different resources that are available for AT.

While federal special education special education law (IDEA, 2004) and Pennsylvania legislation (PA Code Chapters 14 & 711) require that educators provide access to supplementary aids for special education students, it is apparent that many educators do not have a basic knowledge of AT to assist students. The data from this study also indicates that teachers’ knowledge of AT devices is somewhat different from teachers’ ‘application knowledge’ of the AT devices.

Research Question 2 (RQ2):

*Can special education teachers identify the names of the assistive technology applications for reading support?*

Table 4 shows that the survey respondents’ answers to their knowledge of reading and AT to assist with reading is lacking. Responses in this category indicate a below average mean for all questions. The questions are: Teachers can identify 5 NRP domains \((M=1.29, SD=1.20)\), Collaborate with IEP team to determine (reading) needs and AT \((M=1.99, SD=.98)\), Use of text reading programs utilizing technology to support reading \((M=1.63, SD=.98)\), Use of commercial reading programs utilizing technology to support reading \((M=1.64, SD=1.17)\), and Use of handheld device apps to support reading
This should not be surprising as only 10 of the 92 total respondents (10.9%) identified their current teaching assignment as ‘Mostly reading support’. Twenty-eight of the 92 teachers (30.4%) identified ‘Multiple support areas’ for their current teaching assignment; this too could include reading as a teaching assignment (Table 1).

Research has been limited for using AT to assist with reading; however the National Reading Panel (2000) indicates that using technology is a life skill for literate people. Text reading programs, commercial reading programs and handheld device applications (apps.) were identified as 3 areas of AT to assist with reading. For all 3 questions, almost 50% of all teacher responses were below the average knowledge level.

When asked about teachers’ use of handheld device applications (apps.) to assist with reading, teachers answered that they had ‘No knowledge’ \(n=14\) or only ‘Some knowledge’ \(n=34\). This was also a weakness for the previously mentioned survey question about using handheld device applications (apps.) to engage students with disabilities in independent learning. For that question, 6 teachers indicated that they had ‘No knowledge’ and 33 answered that they only had ‘Some knowledge’. The results from both of these questions reveal that teacher knowledge about handheld device applications (apps.) is deficient.

Teachers responded to the survey question about collaborating with IEP team members to determine student reading needs and AT benefits in an almost perfect bell-curve distribution \((M=1.99, SD=.98)\). This represents a broad distribution of teacher experiences with identifying student reading needs, benefits of AT and collaborating with the IEP team. This data begs the question as to whether teachers are knowledgeable about
AT for reading support or are relying on other IEP team members’ knowledge of AT and reading to make decisions.

In their open-ended responses some special education teachers cited the Intermediate Unit as a resource to their district when dealing with students that might benefit from AT support.

The results of this research study suggest similar implications to the meta-analysis study of Stetter and Hughes (2010) who wrote that there is still a need to study computer-assisted instruction (CAI) and its effects on reading.

Research Question 3 (RQ3):

What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?

Teachers in this study responded that their professional development is minimal with almost 90% of respondents indicating that over the last two years, they received less than 10 hours of professional development in reading assessment, identifying various types of AT, implementing AT and determining a student’s AT needs/supports in an IEP meeting. These results are similar to Marsters’ (2011) study in that educators’ knowledge of AT and skills falls short of the Quality Indicators of Assistive Technology (QIAT) best practice. While Bean and Lillenstein (2012) state that school personnel should have “essential skills and competencies” for literacy instruction, this research study would indicate that this is not occurring.

It is concerning that professional development for reading/assessment of AT is lacking. This is consistent with the research conducted ten years earlier by Michaels and
McDemott (2003) who reviewed pre-service teacher preparation with respect to AT implementation, integration and continued support of students. Their results suggested that graduates were leaving graduate special education teacher preparation programs without the critical AT competencies to be successful in the prospective teaching positions. Apparently from this current research study, educators are not obtaining professional development when they are in-service special education teachers either.

Some of the open-ended responses provided information that a few teachers engaged in their own professional development through outside workshops. To the contrary, a few teacher responses were “We receive very little training in the area”, “…(after college classes) no additional review” and “I would welcome more professional development”.

**Delimitations**

1. The survey instrument was constructed from other surveys. The researcher obtained permission from Michaels & McDermott (2003) and Marsters (2011) to use/modify their existing surveys.

2. The survey was administered to 28 school districts in Southwestern Pennsylvania. Results might be different in a different geographical region of the United States.

2. There were 92 qualified special education teacher surveys completed. This number might not be representative of a larger sampled population.

3. The survey was only given to public school special education teachers. Results might be different if administered to private, parochial or charter school special education teachers.
4. The survey was administered to high school special education teachers. Survey results might be dissimilar if administered to elementary and/or middle school special education teachers.

5. While an attempt was made to identify high school special education teachers, it became apparent during survey administration that ‘gifted’ support teachers did not identify themselves as special education teachers. Some principals might not have provided their gifted support teachers’ names as they are might not be certified as a special education teacher.

6. This survey was quantitative in nature. Questions 1-19 provided answers that allowed the researcher to descriptive statistical data. Question #20 was the only open-ended question in the survey. The responses obtained might be subject to different interpretations.

Limitations

1. The survey instrument used was constructed by using the survey instruments of Michaels & McDermott (2003) and Marsters (2011). Permission was obtained to use their existing surveys and some of the questions asked in this survey were identical to survey questions utilized in their survey instrument.

Recommendations for Further Research

This research study was concerning AT, reading and professional development. As the results suggest, professional development is needed for special education teachers in AT and reading. What if only reading teachers and/or special education teachers that
primarily support reading were studied? Would their knowledge about AT and reading be greater than this population? Are they more knowledgeable about identifying names of AT for reading support? Are these teachers receiving more professional development than special education teacher who teach multiple areas?

Another question that begs additional study is how districts determine their professional development needs. Obviously, this study implores that school districts offer more professional development to teachers. Why isn’t this occurring? What percentage of professional development time is devoted to special education instructional practices? Are there ‘model’ school districts with special education staff that received extensive training to advance their knowledge of AT to assist students with reading difficulties? These questions could be additional studies building from the current research.

Summary

The results of the ‘In-Service Special Education Teacher Assistive Technology/Reading Knowledge Survey’ indicate that special education teachers have an average knowledge of AT and determining their use to assist students. They have a below average knowledge of reading and AT to engage struggling readers. One of the weakest areas of teacher knowledge was related to handheld device applications (apps.). This weakness might be because apps. have only become more prevalent in the last 5 years, or it might be because apps. are seldom taught to others; they are usually learned through self-discovery.
The findings of this research study are similar to others in that professional development of AT is necessary and that there is a ‘critical need’ for assessing and identifying if AT can assist student with disabilities.

The ever-changing technology in schools makes it difficult for special education teachers to stay ‘current’ with their both their instructional practices and AT knowledge. School districts need to invest in their special education teachers with on-going professional development related to best-practice AT reading pedagogy.
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APPENDIX ‘A’ – Michaels and McDermott
Special Education Teacher Preparation Survey (2003)

Special Education Teacher Preparation Survey
Assistive Technology Integration

Craig A. Michaels, Ph.D., Principal Investigator, Programs in Special Education
718-997-5266 718-997-5246 dromichaels@aol.com
(voice) (fax) (e-mail)

QUEENS COLLEGE
City University of New York
Department of Educational and Community Programs
65-30 Kissena Boulevard
Flushing, NY 11367-1597
Special Education Teacher Preparation Survey

Assistive Technology Integration

Directions: PLEASE, read each statement and consider the degree to which your special education teacher preparation program is preparing your graduates to use assistive and instructional technology in the teaching of and learning by students with disabilities. This survey asks questions related to three areas associated with assistive technology (AT) preparation: assistive technology knowledge, assistive technology usage, and assistive technology decision-making and implementation.

(a) Using the scale on the left of each item, determine the CURRENT ATTAINMENT LEVEL, the degree to which the item is currently addressed within your program (1 = "No Level of Attainment" and 7 = "Completely Attained").

(b) Using the scale on the right of each item, consider the IMPORTANCE, how critical you believe that knowledge, skills, and dispositions within this area are for special education teachers in relation to the future full citizenship of students with disabilities (1 = "Not Important At All" and 7 = "Extremely Critical").

(c) Respond to each of the two open-ended questions following the survey items.

(d) Complete the demographic information requested below.

Thank you

<table>
<thead>
<tr>
<th>Demographic Information</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
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<th>Age:</th>
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<th>Years in current position:</th>
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<th>Special Education Degrees Offered:</th>
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<tr>
<td>□ Undergraduate</td>
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<tr>
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<tr>
<td>□ Doctoral</td>
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<tr>
<th>Type of Institution:</th>
<th>Approximate number of students in special education program:</th>
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<td>Undergraduate</td>
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<tr>
<td>□ University</td>
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<td>□ Private</td>
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<tr>
<td>□ Other</td>
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*This study is supported in part by a PSC-CUNY grant from the Research Foundation of the City University of New York.
### Special Education Teacher Preparation Survey

**Assistive Technology Integration**

<table>
<thead>
<tr>
<th>CURRENT ATTAINMENT LEVEL</th>
<th>OUR SPECIAL EDUCATION GRADUATES HAVE THE KNOWLEDGE, SKILLS AND DISPOSITIONS TO:</th>
<th>IMPORTANCE</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Define AT &amp; describe its potential impact on the lives of persons with disabilities.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Describe the transdisciplinary nature of AT planning &amp; application.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Describe a variety of AT devices &amp; their potential uses with students with disabilities.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Describe the impact of AT legislation &amp; policy on service delivery.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Describe the potential uses &amp; benefits of AT in school, community &amp; leisure environments.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Describe strategies for determining AT funding potential &amp; establishing AT funding eligibility.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Use a variety of AT hardware devices &amp; software applications to support students' individual needs.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Use AT to increase access to the general education curriculum for all students.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Use computer-based instruction, educational software programs &amp; other media to aid all students.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Use differentiated lesson plans to infuse instructional &amp; assistive technology into curriculum.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Use AT, the internet &amp; other media to actively engage students in research &amp; independent learning.</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td></td>
<td>Use AT to promote access within school, community &amp; leisure environments.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Implement AT interventions using a process of assessment, self-reflection &amp; impact evaluation.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Serve as a member of a transdisciplinary team conducting AT assessments.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Collaborate with other members of a team to determine AT needs &amp; implement AT supports.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Serve as a resource for AT information, consultation &amp; technical assistance to colleagues &amp; families.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Facilitate student/family involvement &amp; collaboration in AT decision-making.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Facilitate the selection of AT solutions based on student/family needs &amp; preferences.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>CURRENT ATTAINMENT/LEVEL</td>
<td>OUR SPECIAL EDUCATION GRADUATES ARE PROVIDED WITH AT KNOWLEDGE, SKILLS AND DISPOSITIONS WITHIN:</td>
<td>IMPORTANCE</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
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<tr>
<td>1 2 3 4 5 6 7</td>
<td>FOUNDATION courses.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
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<td>1 2 3 4 5 6 7</td>
<td>NATURE &amp; NEEDS courses.</td>
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<td>1 2 3 4 5 6 7</td>
<td>CURRICULUM &amp; INSTRUCTION courses.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7</td>
<td>INTERNSHIP &amp; FIELDWORK placements.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**Briefly describe how AT knowledge, skills and dispositions are currently addressed within your special education program:**

- 
- 
- 
- 

**Briefly describe any future changes or enhancements to promote AT knowledge, skills and dispositions planned within your special education program:**

- 
- 
- 
- 

82
APPENDIX ‘B’ – Marsters’ AT Survey (2011)

1. Please take 20 minutes of your time to complete this questionnaire on assistive technology (AT). Your input is critical in the effort to improve REMOVED use of AT. This research is a requirement of the doctoral degree at the University of Maryland, College Park. If you decide to participate in this survey, there are no known risks and responses will not be personally linked to you. No personally identifiable information will be kept. If you complete the survey, you will be eligible for a $200 donation to your school that can be used for classroom supplies or equipment. There will be two drawings at the conclusion of the study as a token of appreciation for your time. If you have any questions about the research study itself, please contact my advisor Dr. Philip J. Burke, 1308 Benjamin, University of Maryland, College Park, MD 20742, 301-405-6515 pjburk@umd.edu. If you have questions about your rights as a research subject, please contact: Institutional Review Board Office, University of Maryland, College Park, MD 20742; email: irb@deans.umd.edu; telephone: 301-405-0678. This research has been reviewed according to the University of Maryland College Park IRB procedures for research involving human subjects. Your participation indicates that you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily chose to participate in this research project.

2. What is the highest level of education you have completed?
   1. 4-year College Degree
   2. Master's Degree
   3. Doctoral Degree

3. What is your current district placement?
   1. Choice 1
   2. Choice 2
   3. Choice 3
   4. Choice 4
   5. Choice 5

4. Current primary teaching position:
   1. Special Education Teacher LI/MM
   2. Special Education Teacher LI/MS
   3. Special Education Teacher EI
   4. Special Education Teacher VI
   5. Special Education Teacher PSCD
   6. Speech Language Pathologist
   7. Occupational Therapist
   8. Physical Therapist
   9. Special Education Teacher HI

83
5. Special education populations you primarily work with:
1  CAT-A
2  CAT-B
3  CAT-C
4  CAT-D
5  CAT-E

6. Grade levels you primarily work with:
1  Elementary
2  Middle
3  High
4  Preschool

7. Amount of years teaching in special education:

8. Estimate the amount of assistive technology training in hours you have received in the last 2 years:
1  0
2  1-10
3  10-20
4  20-30
5  30-40
6  Greater than 40 hours

9. Do you network or share ideas with others in the field of AT (ListServ, AT Professional organizations, other staff members, etc.)
1  Yes
2  No

10. Please list how you network with others:

11. Do you have any specialized assistive technology training or certifications
    (College course work, school level professional development, RESNA, ATP, ATACP, etc.)
1  Yes
2  No

12. Please list specialized training or certifications:
    Prompt: Assistive technology is 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.
The following questions ask about your knowledge and use of computer applications and assistive technology devices.

13. My use of assistive technology computer applications:

Likert Scale:
Unable to use
Able to use with direct or live support
Able to use with written or web support
Can implement basic features
Can implement all features proficiently

1. Word Processing (examples: Microsoft Word, Appleworks, etc.)
2. Multimedia programs for student production (examples: KidPix, PowerPoint, Keynote, etc.)
3. Text to speech word processors (examples: Intellitalk, Write Outloud, Text Help, Read and Write etc.)
4. Voice Input Word Processors (examples: Dragon Naturally Speaking, Dragon Dictate, etc.)
5. Using multimedia (pictures and sound) to support language arts and math (examples: Hyperstudio, PowerPoint, Intellipics Studio, SMART Notebook, etc.)
6. General accessibility options available in Windows and Mac (examples: screen magnification, latch keys, variable keyboard response rates, left handed mouse, etc.)
7. Technology to support student writing process in planning and idea generation (outlining and semantic mapping software, multimedia applications, prompting programs, (examples: Draft Builder, Kidspiration and Inspiration)
8. Technology to support the writing process in transcription and sentence generation (word prediction, alternate keyboard formats, (example: Co-Writer, Classroom Suite)
9. Technology to support the mechanics of the writing process (example: spell and grammar checkers, etc.)
10. Computer technology to support reading: text reading programs (examples: Kurzweil 3000, Text Help, Read Outloud, WYNN, etc.)
11. Commercial Programs for Reading/Language Arts (examples: Grammar Blaster, Accelerated Reader, Reader Rabbit, Edmark, Let’s Go Read!, Jump Start, Bailey’s Book House, etc.)
12. Commercial Programs for Math (examples: Math Pad, Math Blaster, Millie’s Math House, etc.)
13. Commercial Programs for phonological awareness (example: Earobics)
14. Commercial Cross-Curricular Adaptive Programs (examples: Classroom Suite and Boardmaker 6.0)
14. My knowledge of assistive technology computer applications:

Likert Scale:
No Knowledge
Little Knowledge
Some Knowledge
Good Knowledge
Extensive Knowledge

1 Word Processing (examples: Microsoft Word, Appleworks, etc.)
2 Multimedia programs for student production (examples: KidPix, PowerPoint, Keynote, etc.)
3 Text to speech word processors (examples: Intellitalk, Write Outloud, Text Help, Read and Write etc.)
4 Voice Input Word Processors (examples: Dragon Naturally Speaking, Dragon Dictate, etc.)
5 Using multimedia (pictures and sound) to support language arts and math (examples: Hyperstudio, PowerPoint, Intellipics Studio, SMART Notebook, etc.)
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11 Commercial Programs for Reading/Language Arts (examples: Grammar Blaster, Accelerated Reader, Reader Rabbit, Edmark, Let’s Go Read!, Jump Start, Bailey’s Book House, etc.)
12 Commercial Programs for Math (examples: Math Pad, Math Blaster, Millie’s Math House, etc.)
13 Commercial Programs for phonological awareness (example: Earobics)
14 Commercial Cross-Curricular Adaptive Programs (examples: Classroom Suite and Boardmaker 6.0)
15. My use of assistive technology devices:
Likert Scale:
Unable to use
Able to use with direct or live support
Able to use with written or web support
Can implement basic features
Can implement all features proficiently

1 Pens/pencils with adapted grips
2 Adapted paper (examples: raised lines, graph paper, multi-colored lines)
3 Portable word processor(example: AlphaSmart 3000, Dana, NEO) 5
4 Alternate keyboard (example: IntelliKey, Discoverboard, TASH)
5 Talking calculators/adaptive calculators (example: Coinulators, Money calculators, large key calculators)
6 Image scanners
7 Adaptive or electronic books (examples: BookWorm, Leap pads, Leap desks, books on tape/CDmp3)
8 Note taking devices (example: digital audio recorders)
9 Auditory Cuing Devices (examples: Time Pad, Digipad)
10 Presentation Devices (examples: SMARTboard, Infocus)
11 Switches (examples: Big Red, Jelly Bean switches)
12 Adaptive toys
13 Alternate computer access (example: Touch Windows, track balls, mini keyboard, etc.)
14 Picture Exchange Communication Systems
15 Single and multiple message communication devices (example BIGmack, LITTLEmack, Super Talker Communicator)
16 Mid-tech voice output communication devices (examples: GoTalk 4 and 9)
17 High-tech voice output communication devices (examples: Macaw, ChatPC, Dynavox)
18 Amplification systems (examples: Radium Sound field, Light speed)
19 Magnification devices (examples: CCTV, computer magnification)
20 Electronic braille devices (examples: Braille Talk, Electric Perkins Brailler)
21 Adapted seating, desks, or bolsters
16. My knowledge of assistive technology devices:
Likert Scale:
Unable to use
Able to use with direct or live support
Able to use with written or web support
Can implement basic features
Can implement all features proficiently

1 Pens/pencils with adapted grips
2 Adapted paper (examples: raised lines, graph paper, multi-colored lines)
3 Portable word processor (example: AlphaSmart 3000, Dana, NEO) 5
4 Alternate keyboard (example: IntelliKey, Discoverboard, TASH)
5 Talking calculators/adaptive calculators (example: Coinulators, Money calculators, large key calculators)
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19 Magnification devices (examples: CCTV, computer magnification)
20 Electronic braille devices (examples: Braille Talk, Electric Perkins Brailler)
21 Adapted seating, desks, or bolsters
Prompt: This section will ask questions about your knowledge and experiences with various assistive technologies (AT), including how services are selected and supported within REMOVED. For the purpose of this section AT will be grouped into low and high tech categories that are consistent with AT guidance found in the REMOVED Special Education Procedural Guide.

Examples of low tech devices:
Include hand-held magnifying glasses, headphones for a computer, large button phones, talking calculator, adapted toys, highlight text (e.g., highlight tape and markers, rulers), pen/pencil with adapted grip, aids to find materials (e.g., index tabs, color coded folders), Velcro straps, etc.

Examples of high tech devices:
Include portable word processors such as Alpha Smarts, augmentative communication devices, laptop computers, powered wheelchairs, alternative keyboards, assistive listening devices, switch interfaces, Braille printers etc.

17. Thinking about your skills with low tech AT, how satisfied are you:
Likert Scale:
Very Satisfied
Satisfied
Neutral
Dissatisfied
Very Dissatisfied

1 with your ability to make informed AT suggestions for students with disabilities?
2 with your ability to include AT services within the IEP?
3 with your ability to evaluate the effectiveness of AT services for a student with disabilities?
4 with the AT knowledge of the CSC team?
5 with your ability to use AT in the general education setting?
6 with your ability to use AT in the special education setting?

18. Thinking about your skills with high tech AT, how satisfied are you:
Likert Scale:
Very Satisfied
Satisfied
Neutral
Dissatisfied
Very Dissatisfied

1 with your ability to make informed AT suggestions for students with disabilities?
2 with your ability to include AT services within the IEP?
3 with your ability to evaluate the effectiveness of AT services for a student with disabilities?
4 with the AT knowledge of the CSC team?
5 with your ability to use AT in the general education setting?
6 with your ability to use AT in the special education setting?

19. With respect to low tech AT, how effective do you consider:
   Likert Scale:
   Very Effective
   Effective
   Neither Effective nor Ineffective
   Ineffective
   Very Ineffective

   1 District policy and support for AT?
   2 REMOVED Procedural Guidance for AT?

20. With respect to high tech AT, how effective do you consider:
   Likert Scale:
   Very Effective
   Effective
   Neither Effective nor Ineffective
   Ineffective
   Very Ineffective

   1 District policy and support for AT?
   2 REMOVED Procedural Guidance for AT?

21. Within the last two years have you needed assistance from the district regarding
   AT?
   1 Yes
   2 No

22. Where you able to get the AT assistance you needed from the district?
   1 Yes
   2 No

23. Overall, how satisfied were you with the AT assistance you received?
   1 Very Dissatisfied
   2 Dissatisfied
   3 Neutral
   4 Satisfied
   5 Very Satisfied
24. Choose up to three important options for improving low tech AT use in REMOVED.
1 staff training to use AT devices
2 staff training on how to conduct AT assessments
3 staff training on how to appropriately consider and include AT within the IEP
4 staff training on how to implement AT in the general education setting
5 staff training on how to implement AT in the special education setting
6 staff training on how to measure the success of AT implementation
7 staff training to troubleshoot or initiate repairs of broken or malfunctioning equipment
8 increased lending library inventory of low tech devices
9 nothing is needed (Only check this one)

25. Choose up to three important options for improving high tech AT use in REMOVED.
1 staff training to use AT devices
2 staff training on how to conduct AT assessments
3 staff training on how to appropriately consider and include AT within the IEP
4 staff training on how to implement AT in the general education setting
5 staff training on how to implement AT in the special education setting
6 staff training on how to measure the success of AT implementation
7 staff training to troubleshoot or initiate repairs of broken or malfunctioning equipment
8 increased lending library inventory of high tech devices
9 nothing is needed (Only check this one)
26. Choose up to three options that are currently working to improve low tech AT use in REMOVED.
1 staff training to use AT devices
2 staff training on how to conduct AT assessments
3 staff training on how to appropriately consider and include AT within the IEP
4 staff training on how to implement AT in the general education setting
5 staff training on how to implement AT in the special education setting
6 staff training on how to measure the success of AT implementation
7 staff training to troubleshoot or initiate repairs of broken or malfunctioning equipment
8 increased lending library inventory of low tech devices
9 nothing is working (Only check this one)

27. Choose up to three options that are currently working to improve high tech AT use in REMOVED.
1 staff training to use AT devices
2 staff training on how to conduct AT assessments
3 staff training on how to appropriately consider and include AT within the IEP
4 staff training on how to implement AT in the general education setting
5 staff training on how to implement AT in the special education setting
6 staff training on how to measure the success of AT implementation
7 staff training to troubleshoot or initiate repairs of broken or malfunctioning equipment
8 increased lending library inventory of high tech devices
9 nothing is working (Only check this one)

28. Thank you for taking the time to participate in this online survey. Please leave your e-mail address if you would like to be considered for the 200 dollar school funds drawing. Two separate prize drawings will be held at the conclusion of the survey deadline. Your assistance in this research is highly appreciated.
Note: All references to the school system, district, or school have been replaced with REMOVED.
APPENDIX ‘C’ – Researcher’s Survey Instrument

In-Service Special Education Teacher
Assistive Technology/Reading Knowledge Survey

The survey is divided into several sections and asks that you read each statement and answer questions as they relate to your professional knowledge/application of:

(1) Assistive Technology (AT)
(2) Assessing/supporting student reading through AT
(3) Professional development addressing AT and reading

A. This section addresses demographic information

1. Gender:
   - Male
   - Female

2. Highest level of education completed:
   - Bachelor’s (4 year)
   - Master’s degree
   - Doctoral degree

3. Years as a special education teacher:
   - 0-4 years
   - 5-9 years
   - 10-15 years
   - 16-20 years
   - More than 20 years

4. I would define my current teaching assignment as:
   - Mostly math support
   - Mostly reading support
   - Other subject area support
   - Multiple support areas
   - Life skills
   - Other
FOR THE NEXT SEVERAL SECTIONS, USING THE SCALE AT THE RIGHT OF EACH ITEM, INDICATE YOUR CURRENT KNOWLEDGE LEVEL

B. This section addresses Assistive Technology (AT)

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<thead>
<tr>
<th></th>
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<th>Extensive Knowledge</th>
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<td>0 1 2 3 4</td>
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1. Definition of AT
2. Determining potential benefits and uses of AT for students with disabilities
3. Use of the Internet to engage students with disabilities in independent learning
4. Use of software programs to engage students with disabilities in independent learning
5. Use of handheld device applications (apps.) to engage students with disabilities in independent learning
6. Collaboration with IEP team members to determine AT needs and implement AT supports

C. This section addresses assessing/supporting student reading through AT

<table>
<thead>
<tr>
<th></th>
<th>No Knowledge</th>
<th>Extensive Knowledge</th>
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1. The National Reading Panel (2000) addressed five pillars for reading success. I can identify each of these five domains
2. Collaboration with IEP team members to determine student (reading) needs and potential benefits and uses of AT
3. Use of text reading programs utilizing technology to support reading (e.g. Kurzweil 3000, Read Aloud)
4. Use of commercial programs to support reading (e.g. READ 180, Accelerated Reader)
5. Use of handheld device applications (apps.) to support reading
D. This section addresses professional development with respect to AT and reading  NOTE: Please reference the last two years for all questions

1. How many hours of professional development have you received from your school district in reading assessment/instruction?  
   - None
   - 1-10 hours
   - 11-20 hours
   - More than 20
   
2. How many hours of professional development have you received from your school district in the various types of AT?  
   - None
   - 1-10 hours
   - 11-20 hours
   - More than 20
   
3. How many hours of professional development have you received from your school district in implementing AT?  
   - None
   - 1-10 hours
   - 11-20 hours
   - More than 20
   
4. How many hours of professional development have you received from your school district to determine a student’s AT needs/supports during an IEP meeting?  
   - None
   - 1-10 hours
   - 11-20 hours
   - More than 20

E. Please answer the following open-ended question:

1. Please add your thoughts related to anything not asked in this survey concerning AT, reading and/or professional development.
APPENDIX ‘D’ – Principal Letter

DUQUESNE UNIVERSITY
INSTRUCTIONAL TECHNOLOGY PROGRAM
DEPARTMENT OF INSTRUCTION AND LEADERSHIP IN EDUCATION
327 FISHER HALL

May 14, 2013

Dear Principal,

I am a doctoral candidate at Duquesne University as well as the Principal at Elizabeth Forward High School in Elizabeth, Pennsylvania. For my dissertation, I am conducting a study related to the use of assistive technology in the classroom. I am requesting your support by allowing me to collect data from the special education teachers in your building.

The purpose of my investigation is to study the assistive technology (AT) knowledge of special education teachers for children with reading difficulties. The results of this study will be used to describe AT knowledge among special education teachers and identify professional development needs as they relate to AT and reading instruction.

I will be contacting you in one week to verify permission to administer the survey and to confirm the names/e-mails of special education teachers in your high school. I will then e-mail the special education teachers and they will be asked to complete an online 20-response questionnaire using SurveyMonkey. The survey should take less than 5 minutes to complete. SurveyMonkey is the world’s leading provider of web-based surveys and uses Secure Sockets Layer (SSL) technology to protect user information over the Internet so that data is safe, secure, and available only to authorized persons. SurveyMonkey will issue a code to identify this study as my study.

Responses will be confidential/anonymous and identifying information such as school, name, e-mail address or IP address will NOT be collected. Although the results of the survey may be used for scholarly purposes, only aggregate results will be reported.

If you have any questions about this research project, you may contact me at (412) 398-1444, Dr. David Carbonara, Research Chair at (412) 396-4039 or Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board at (412) 396-1151.

I will be contacting you by telephone as a follow-up to this letter. Thank you!

Respectfully,

Randal Sydeski
Doctoral Candidate
Duquesne University

Duquesne University
IRB - Protocol 13-64
Approval Date: May 10, 2013
Renewal Date: May 10, 2014

Education for the Mind, Heart, and Spirit
My name is Randal Sydeski and I am a doctoral candidate at Duquesne University. I previously contacted your building principal to request permission for participation in my dissertation study.

The purpose of my study is to better understand special education teachers’ knowledge of assistive technology (AT) as it relates to reading instruction. The survey will ask you about your knowledge and skills in your capacity as a special education teacher.

There will be no risk by your participation in this study. All information will be completely confidential and anonymous. Your privacy and research records will be kept confidential to the extent of the law. This project has been reviewed and approved by the Institutional Review Board (IRB) at Duquesne University and I have completed the necessary Collaborative Institutional Training Initiative (CITI) certification courses. There are no known risks associated with completing this survey. Your participation in this study is voluntary and you may withdraw from the study at any time. You can take this survey anytime and anywhere within three weeks of receiving the link below.

Using SurveyMonkey, you will first be asked to complete an informed consent page. Following that, the online survey consists of twenty (20) questions and should only take five (5) minutes to complete.

**TITLE OF STUDY:**

“A study of special education teachers' knowledge of assistive technology (AT) for children with reading difficulties”

**RESEARCH QUESTIONS:**

1. What do special education teachers know about assistive technology?

2. Can special education teachers identify the names of the assistive technology applications for reading support?

3. What professional development is needed for special education teachers to identify the names of assistive technology applications for reading support?

Link to survey: [SURVEY MONKEY LINK](#)

If you have any questions about this research project, you may contact me at (412) 398-1444, Dr. David Carbonara, Research Chair at 412-396-4039 or Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board at 412-396-1151.

Thank you.
APPENDIX ‘F’ – Follow-up e-mail to special education teachers

Last week, I contacted you with an e-mail requesting your participation in my dissertation study about special education teachers’ knowledge of assistive technology (AT) as it relates to reading instruction.

If you have already completed this online survey, I am truly appreciative. If you have not completed the survey, I am requesting that you please take 5 minutes to do so. Your responses are important in allowing me to complete my dissertation study and will add to the field of research.

As a fellow educator, I realize that your time is valuable and I want to thank you in advance for your participation.

Link to survey:  
SURVEY MONKEY LINK

Respectfully,

Randal Sydeski
Doctoral Candidate
Duquesne University
APPENDIX ‘G’ – Communication with Dr. Craig Michaels

Division of Education | Department of Educational and Community Programs

April 19, 2012

Randal Sydeski
Doctoral Candidate
Duquesne University
Pittsburgh, PA

REGARDING: Permission to Use Survey Instrument: “Special Education Teacher Preparation Survey—Assistive Technology Integration”

Dear Mr. Sydeski:

I understand that you are the Principal of Elizabeth Forward High School and a doctoral student at Duquesne University. I also understand that you will be completing your dissertation in relation to the understanding of special education teachers about current technologies (e.g., I Pads, iPhones, and MACs) and their knowledge of assistive technology more specifically. I also understand that you are requesting permission to modify and use the above-mentioned survey instrument as part of your study.

You have my permission to use the survey for this purpose. You will note that I have sent the survey along with this letter via e-mail to you (as a PDF file).

You also requested contact information for my co-author Jennifer McDermott. The last e-mail address I have for her is jwennie8@gmail.com

Good luck, and please keep me informed about your progress. I would love to see your dissertation as well, when it is completed.

Sincerely,

Craig A. Michaels, Ph.D.
Professor, Graduate Programs in Special Education
Chairperson, Department of Educational and Community Programs
APPENDIX ‘H’ – Communication with Dr. Aaron Marsters

From: Marsters, Aaron, Dr., CIV, OSD/DoDEA-Europe, Dr., CIV, OSD/DoDEA-Europe <Aaron.Marsters@eu.dodea.edu>
To: rsydeski <rsydeski@aol.com>
Subject: RE: Contact
Date: Wed, Jun 13, 2012 9:43 am

Randal,

Thank you for the interest in my study. It is nice to know that someone besides my advisor read it. Your research on AT and reading sound interesting. I would tend to agree on your premise. I look forward to reading your finished product and recommendations for the field.

You are more than welcome to use/modify my survey instrument.

Regards,

Aaron E Marsters
Instructional System Specialist for Assistive Technology
DoDDS-Europe
Tel: (49) 611-380-7476
DSN: 314-338-7476
Fax: (49) 611-380-7575

Join the DoDEA Assistive Technology Intersect Group
Dr. Marsters,

I am extremely grateful that you contacted me. Thank you. Just to tell you something about myself, I am a doctoral candidate at Duquesne University (Pittsburgh, PA). Professionally, I am the Principal of Elizabeth Forward High School.

In the course of my doctoral research, I came across your dissertation, "An exploratory study of the assistive technology knowledge, skills, and needs among special education teachers and related service personnel". Oddly/ironically I am in the process of conducting a similar research study and possibly adding 'Reading' to the mix of special education teachers' knowledge related to assistive technology. My premise is that in-service teachers lack the knowledge and training to stay current with meeting the (reading) needs of their special education students.

I was wondering and am requesting if I could use/modify your survey instrument as it relates to my research. Thank you for your consideration and I look forward to hearing from you.

Yours in education,

Randal Sydeski
APPENDIX ‘I’ – IRB approval letter

DUQUESNE UNIVERSITY
Office of Research
301 ADMINISTRATION BUILDING • PITTSBURGH, PA 15282-0202

Dr. Joseph C. Kush
Chair, IRB–Human Subjects
Office of Research
Phone (412) 396-6126 Fax (412) 396-5176
E-mail: kush@duq.edu

May 10, 2013

Re: The impact of a study of special education teachers’ knowledge of assistive technology for children with reading difficulties. – (PROTOCOL # 13-64)

Dr. David Carbonara
School of Education
Duquesne University
Pittsburgh PA 15282

Dear Dr. Carbonara,

Thank you for submitting the research proposal of you and your student Mr. Randal Sydeski to the Institutional Review Board at Duquesne University.

Based on the review of IRB representative Dr. David Delmonico and my own review, your study is approved as Exempt based on 45-CFR-46.101.b.1 regarding research conducted in established or commonly accepted educational settings, involving normal educational practices.

The consent form is attached, stamped with IRB approval and expiration date. You should use the stamped form as the original for copies you display or distribute.

The approval pertains to the submitted protocol. If you wish to make changes to the research, you must first submit an amendment and receive approval from this office. In addition, if any unanticipated problems arise in reference to human subjects, you should notify the IRB chair before proceeding. In all correspondence, please refer to the protocol number shown after the title above.

Once the study is complete, please provide our office with a short summary (one page) of your results for our records.

Thank you for contributing to Duquesne’s research endeavors.

Sincerely yours,

Joseph C. Kush, Ph.D.

C: Dr. David Delmonico
IRB Records
APPENDIX ‘J’ – Informed Consent

The purpose of this research project is to better understand special education teachers’ knowledge of assistive technology (AT) as it relates to reading instruction. This research project is being conducted by Randal Sydeski, a doctoral candidate at Duquesne University. You are invited to participate in this research project because you are an in-service special education teacher.

Your participation in this survey is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized.

The procedure involves filling an online survey that will take approximately 5 minutes. Your responses will be confidential/anonymous and identifying information such as your name, email address or IP address will not be collected. The survey questions will be about your knowledge of assistive technology, reading instruction and professional development.

All data is stored in a password protected electronic format. To help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only and may be shared with Duquesne University representatives. Only aggregate results will be disseminated.

There are no potential risks by participating in the survey and potential long-range benefits could possibly include professional development in the areas of reading with assistive technology through your employer.

If you have any questions about the research study, please contact Randal Sydeski at 412-398-1444, Dr. David Carbonara, Research Chair at 412-396-4039 or Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board at 412-396-1151. This research has been reviewed according to Duquesne University IRB procedures for research involving human subjects.

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "AGREE" button below indicates that:

• you have ready the above information
• you voluntarily agree to participate

If you do not wish to participate in the research study, please decline participation by clicking on the "DISAGREE" button.

☐ AGREE
☐ DISAGREE
This is the email address we have for you: Rsydeski@aol.com. If this is not correct, click here to edit your email address and other account information including your security question and answer.

You are affiliated with 1 participating institution(s) on the CITI website. You will have at least one grade book per institution to track your progress in meeting the institution’s coursework requirements (see below).

Duquesne University

You have enrolled for the following courses:

<table>
<thead>
<tr>
<th>My Courses</th>
<th>Status</th>
<th>Completion Reports</th>
<th>CE Credit Status</th>
<th>Voluntary Satisfaction Survey</th>
</tr>
</thead>
<tbody>
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<td>Passed - 06/19/12</td>
<td>Print</td>
<td></td>
<td>Register for CE Credits</td>
</tr>
<tr>
<td>IRB Members - Basic/Refresher, Basic Course</td>
<td>Passed - 06/21/12</td>
<td>Print</td>
<td></td>
<td>Completed</td>
</tr>
</tbody>
</table>
Add a course or update your learner groups for Duquesne University

LEARNER TOOLS FOR Duquesne University

- Optional Modules (completion is completely voluntary and will not count toward a completed course)
- Update my profile for Duquesne University
- See a list of all modules that you have completed (goes back to approximately May 2005)
- Click here to see your previously completed coursework for Duquesne University
- Remove my affiliation from Duquesne University