HOW ARE TEACHERS IN CHAUTAUQUA COUNTY IMPLEMENTING THE ACCOMMODATION OF ASSISTIVE TECHNOLOGY TO IMPACT THE ACADEMIC ACHIEVEMENT OF ELEMENTARY STUDENTS WITH DISABILITIES?

by

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CERTIFICATION OF THESIS/PROJECT CAPSTONE WORK

We, the undersigned, certify that this project entitled HOW ARE TEACHERS IN CHAUTAUQUA COUNTY IMPLEMENTING THE ACCOMMODATION OF ASSISTIVE TECHNOLOGY TO IMPACT THE ACADEMIC ACHIEVEMENT OF ELEMENTARY STUDENTS WITH DISABILITIES? by EMILY PALKA, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

5/8/2017

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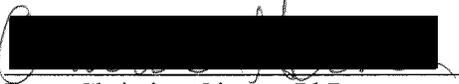Department of Curriculum and Instruction

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HOW ARE TEACHERS IN CHAUTAUQUA COUNTY IMPLEMENTING THE ACCOMMODATION OF ASSISTIVE TECHNOLOGY TO IMPACT THE ACADEMIC ACHIEVEMENT OF ELEMENTARY STUDENTS WITH DISABILITIES?

ABSTRACT

With the passage of the Individuals with Disabilities Education Act (IDEA) in 2004, Assistive Technology (AT) has become a device or service teachers can implement into their classroom in order to better serve the needs of their students. Research has shown that technology is on the rise: more schools are implementing AT devices and services and more teacher preparation programs are introducing future teachers to the different types of AT available. This study looks into the different AT used within two rural schools in Chautauqua County: School 1 (S1) having a high population of students with visual impairments and School 2 (S2) with a population of students with a variety of disabilities. The results show both schools use different types and amounts of AT. S1 uses a large variety of AT to assist the students with visual impairments. S2 uses a very small variety of AT, with hopes more AT will become available to the students. Future research could continue the exact study and visit the remaining school districts and speak with their special educators on the types of AT they are presently using in their classroom. Future research could also follow up with S1 and S2 to see if any technology has evolved or been replaced, since technology is always evolving.

Table of Contents

How Are Teachers in Chautauqua County Implementing the Accommodation of Assistive Technology To Impact the Academic Achievement of Elementary Students With Disabilities?

Introduction

With the passage of the Individuals with Disabilities Education Act (IDEA) in 2004, educators were required to meet the needs of all students in their inclusive classrooms (Individuals with Disabilities Education Improvement Act, 2004). Assistive technology is one accommodation that teachers can integrate into the classroom in order to serve the students. The problem that drives this study is that elementary students with disabilities (SWD) are still scoring below average on Mathematics and Reading state assessments, even with the implementation of assistive technology (National Assessment of Educational Progress, 2015). In 2016, in New York State alone, only 8% of SWDs tested scored at a proficient level 3 or 4 on the English Language Arts (ELA) state assessments and only 11% on the Mathematics state assessment (New York State Education Department, 2016). If teachers across the nation increase the use of AT as an accommodation in the classroom, then they can assist students in increasing their scores on the Mathematics and Reading state assessments.

The term "students with disabilities" comes from the single IDEA (2004) term, "child with a disability." According to IDEA (2004), the term "child with a disability" is defined as:

> a child—
>
> (i) with mental retardation, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to in this title as `emotional disturbance'), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and
>
> (ii) who, by reason thereof, needs special education and related services. (Part A, Section 602)

This law is not up to date with the terminology in relation to the discrete categories, such as mental retardation. In the definition, there are 10 categories in which students must be identified in order to receive special education services. According to Gargiulo (2015), there are now 13 categories: Autism, deaf-blindness, developmental delay, emotional disturbance, hearing impairments including deafness, intellectual disability, multiple disabilities, orthopedic impairments, other health impairments, specific learning disabilities, speech or language impairments, traumatic brain injury, and visual impairments including blindness.

In recent years, plenty of contemporary literature has been published that has focused on the importance of the accommodation of assistive technology, its impact, and how it's being implemented into the classroom in order to promote academic achievement with elementary SWD. Davis (2016) noted that, "Mobile technologies in particular have the ability to resonate with and support the instruction of special education students" (p. 2). Along with the students, special education teachers are more likely to use mobile apps than general education teachers are, but unfortunately are not receiving proper training on the various technologies for instructional purposes (Davis). In order for teachers to implement the accommodation of AT successfully into their instruction, they need the proper training or else the students will not fully benefit from the technology.

Sources have defined the term "accommodation" in various ways. According to the IRIS Center (2004), for example, the term "Accommodation" is defined as, "a service or support that helps a student to fully access the subject matter and instruction, and to accurately demonstrate what he or she knows related to the child's disability across the entire general education curriculum" (p. 11). The use of AT has exploded in recent decades. According to the Pearson Student Mobile Device Survey (Poll, 2014), 44% of elementary school students used

smartphones, compared to last year's 36%, and 66% of elementary school students used tablets, compared to last year's 52% (p. 24). Of that same study, 71% of elementary school students want to use technology more than they already do in the classroom (p. 18). A simple AT accommodation teachers can easily implement into the classroom is providing SWD iPads. IPads can be used for various tasks and needs, including assisting a child with a speech or language impairment in participating in a classroom discussion or a simple conversation.

The term "Assistive Technology" (AT) is defined as both a device and a service. An AT device is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (Assistive Technology Act, 2004, Section 3, p. 118) but the device "does not include a medical device that is surgically implanted, or the replacement of such device" (p. 118). In order to qualify for an AT service or device, the student must be classified as a "child with a disability," meaning the child must be diagnosed within one of the 13 categories included by IDEA.

Since IDEA (2004) requires teachers of inclusive classrooms and special education teachers to provide students with accommodations and modifications according to their Individualized Education Plan (IEP), AT is something they can implement to help assist SWD in their education. AT would be more of an accommodation, "a service or support that helps a student to fully access the subject matter and instruction, and to accurately demonstrate what he or she knows related to the child's disability across all of the general education curriculum," since AT assists the student in gaining the general curriculum (The IRIS Center, 2004, p. 11).

AT is something that is so useful to this generation because technology is becoming more and more relevant to everyday life. According to Gargiulo (2015), statistics have suggested that

students are spending more time on technology outside of school, which is leading their generation to be called "the iGeneration" (p. 131). Sze (2009) analyzed the literature associated with AT, evaluating each source according to the types of disability, the learning objectives and tasks, the types of assistive devices available, the application, and the competency in matching the assistive technology with a specific disability. From this analysis, the results showed pre-service teachers have a low comfort level of assistive technology in an inclusive classroom, the research is limited to faculty development and need assessment focus, and technology interventions are scattered, vague, incomprehensible, and non-specific.

In order for AT to be implemented successfully, the educator or school personnel may take into account the Basic Ergonomic Equation (Baker, 1986). Baker created an equation based on the successful implementation of AT and the factors that contribute the success: Success or Failure of AT Use (S) = Motivation of AT user to pursue task (M) / Physical effort, Cognitive effort, Time load, and Linguistic effort (P+C+L+T). For the implementation of AT to be successful, the educators must take into account the motivation of the student, his/her physical effort, his/her cognitive effort, his/her time load, and his/her linguistic effort.

A rural area is stretch of land that has few homes or other buildings, and a low population density (National Geographic). According to Ault, Bausch & McLaren (2013), students in rural school districts use AT across their curriculum, but there are fewer devices used when compared with those who do not live in rural areas. Since AT is an accommodation used in Individualized Education Plans (IEPs), in rural school districts, AT experts attended fewer IEP meetings, and teachers reported the students have access to the AT they need; however, the teachers feel they need more training on the available AT in order to successfully implement them to their students (Ault, Bausch & McLaren).

The main purpose of my project is to investigate the kinds of AT and the ways in which teachers in three rural schools are implementing AT in the field in order to impact the academic achievement of SWD. As technology evolves, AT will do the same. With the data of low test scores stated above and technology consistently evolving, the topic of how and what AT teachers are implementing to impact of the accommodation of assistive technology on the academic achievement of elementary students with disabilities is very relevant for educators today. The topic of this project interests me because technology use is on the rise, especially with elementary students. During my teaching and life experiences, I have noticed that elementary aged children, both traditional students and SWD, become more exciting, willing to learn, and show more interest when they are able to use technology in and outside of the classroom.

This project can assist teachers in implementing useful technology into the classroom in order to create an effective delivery of curriculum for their students with disabilities. More specifically, this study addresses the following research questions: "How are teachers in Chautauqua County implementing the accommodation of assistive technology to impact the academic achievement of elementary students with disabilities?" and "What assistive technology devices and services are schools/teachers implementing to impact the academic achievement of elementary students with disabilities?"

In the next section, I will review the relevant research related to the problem that I have discussed above. The following studies show how educators across the nation have implemented various types of AT in order to impact the academic achievement of elementary SWD.

Literature Review

In the introduction, I emphasized the problems surrounding the use of Assistive Technology (AT) as an accommodation for Students with Disabilities (SWD). With recent test

scores being so low, this project emphasizes how and what kinds of AT schools in the surrounding area are using in order to benefit their SWD. AT devices have been around since the 1800s, when the ear trumpet was invented to assist people in hearing (Alexander, 1998), and have evolved into no-tech (graphic organizers), low-tech (pencil grips), mid-tech (calculators), and high-tech (iPad) devices (Gargiulo, 2015, p. 137). Before describing the procedures involved in my study in the next section, I will provide in this section a brief literature review around four relevant topics: (a) technology on the rise (b) specific areas of disabilities, (c) personal factors, and (d) teacher preparation.

Technology on the Rise

With the Common Core State Standards (CCSS) being a huge influence on Students with Disabilities education today, many teachers have to implement accommodations, which include AT, in order to have them attain the same high standards of the other traditional students in the classroom. In Kentucky, for example, about 98,000 students have been diagnosed with disabilities ranging from dyslexia to severe cognitive impairments (Clark, 2016). For schools to really reach SWD, they have to change the way they interact with them when it comes to the learning process; a change that includes AT. At Jefferson County Public Schools in Kentucky, they provide iPads to "qualifying students with disabilities" since they have SWD ranging from learning disabilities to autism (p. 5). This school district not only has tremendous access to AT devices but they are also well staffed to provide a wide range of AT services.

Technology is on the rise, which means that many experts are looking into AT and its benefits for teachers working with SWD. According to Lynch (2016), "Whether high tech or simple in design, assistive technology has the ability to transform the learning experiences for the children who benefit" (p. 1). AT can help benefit students from birth through grade 12 in a

variety of areas: Reading, writing, mathematics, science, social studies, life skills, and organization and management skills (Gargiulo, 2015, p.139-146). Since AT is becoming a common accommodation for SWDs, common AT categories are being integrated into various classrooms in order to meet the needs SWDs: alternative input devices, text-to-speech options, sensory enhancers, and screen readers. (Lynch).

Specific Areas of Disabilities

Many researchers are also looking more closely into specific areas where they believe AT would benefit SWD. The following literature is from three out of the thirteen IDEA recognized disabilities: Specific disabilities, Autism, and Orthopedic Impairment. These specific disabilities were chosen because of the range of percentages of students for each category. According to National Center for Education Statistics (2016), 35% of children ages 3-21 who are served under IDEA have been diagnosed with a Specific learning disability, 8% has been diagnosed with Autism, and 1% has been diagnosed with an Orthopedic Impairment.

Specific learning disabilities.

According to Gargiulo (2015), the term "learning disability" is defined as "a disability in which there is a discrepancy between a person's ability and academic achievement; individual possessed average intelligence" (p. 207). If a child has a severe discrepancy between achievement and intellectual ability in oral expression, listening comprehension, written expression, basic reading skills, reading comprehension, Mathematics calculation, or Mathematics reasoning, then he/she can be identified as having a learning disability (Gargiulo, 2015).

Many researchers have documented the work of teachers in using AT with students with learning disabilities. Gonzalez-Ledo, Barbetta, and Unzueta (2015), produced a study based on

writing performance, however focused on the effects of a computer graphic organizer on the students narrative writing. Four fourth and fifth grade boys enrolled in a suburban private religious elementary school located in a Southern Florida community, with specific learning disabilities participated in the study. Throughout the study, four variables were measured: total number of words, total minutes planning, number of common story elements, and organization. The results revealed that the computer graphic organizers had a positive effect on three of the four variables; the participants wrote more words, planned for longer periods of time, and included more story elements in their writing. There was minimal to no improvements in organization for all four participants.

As stated above, students who have difficulty with Mathematics calculation, or Mathematics reasoning can be identified as having a learning disability. Bouck and Bouck (2008) conducted a study that explored the Mathematics performance of 89 sixth grade students, both with and without disabilities, when given a calculator to use as an accommodation. The study was conducted using a pre-posttest method. All students were not allowed to use a calculator on the pretest, however approximately half of the students were allowed access to a calculator on the posttest. The results showed that the SWD didn't perform as well on the posttest as the students without disabilities, however did improve their score when given access to a calculator.

Autism spectrum disorder.

To continue the discussion of specific areas of disabilities, the company Apple created a video for Autism Awareness month: "Dillon's Path" (2016). Autism Spectrum Disorder (ASD) is defined as "a developmental disorder characterized by abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and

interest" (Gargiulo, 2015, p. 329) and is "the fastest-growing developmental disability" (p. 330).

About 1 to 1.5 million people in the United States have been diagnosed with ASD (Gargiulo).

This video looks at Dillon, a young boy who has been diagnosed with ASD. According to

Gargiulo (2015), ASD is "a developmental disorder characterized by abnormal or impaired

development in social interaction and communication and a markedly restricted repertoire of

activity and interest" (p. 329). To promote awareness for both ASD and Apple products, Apple

created this video to show the world how Apps on Apple products can help break down the

communication barrier between people with ASD and the world around them. Dillon's mother

stated that, "If you're just going off of what you see on the outside, the assumption of often that

there is, you know, that there's lack of intelligence…Not being able to speak isn't the same as

not having something to say" (Apple, 2016, 1:02-1:20). These Apps can not only help students

with ASD in the area of their communication, but can also help other SWD that have

communication disorders and to help integrate them into an inclusive classroom where they can

be a part of the traditional classroom environment and show their intelligence.

Not only do children with ASD struggle with communication, they also struggle with

emotional recognition. Lacava, Golan, Baron-Cohen, and Myles (2007) conducted a study that

explored the use of assistive technology in order to teach emotion recognition (ER) to children

who had Asperger's Syndrome. According to the DSM-5 (American Psychiatric Association,

2013), Asperger's is no longer being recognized as a diagnosis. Asperger's now falls into the

diagnosis of ASD. Eight children from ages 8 through 11, two girls and six boys, who were

diagnosed with Asperger's syndrome were the participants. The pre and post ER testing was

conducted at "a suburban campus of a major Midwestern university" (p. 176), using three

different software instruments: "Cambridge Mindreading Face-Voice Batter for Children,"

"Children Feature-Based Auditory Task," and "Reading the Mind in Films Test- Children's Version" (p. 177) The computer software used during the 10 week intervention period, at either the home of the participants or their school, was "Mind Reading: The Interactive Guide to Emotions." The results showed that the participants improved on face and voice ER for both basic and complex emotions.

Orthopedic impairment.

According to The Individuals with Disabilities Education Act (IDEA) of 2004, an Orthopedic Impairment is defined as "a severe orthopedic impairment that adversely affects a child's educational performance. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures)" (Part A, Section 602). If a student has a difficulty moving around due to a disability, they qualify for special education services, therefore qualifying for the accommodation of AT. According to Coleman (2011), there are various issues that teachers, especially Special Education teachers, run into that may impede the successful implementation of AT: AT is not matching the specific needs of the user, lack of training when using the AT devise, lack of time set aside and the consistency using the AT, psychosocial, cultural, and environmental factors, and lack of motivation and effort to use that AT. To follow up on these issues Coleman (2011) created a check list for educators and school personnel to use when implementing AT for students with orthopedic impairments and to ensure their implementation is successful.

As stated above, there are many disabilities that fall under the category of Orthopedic Impairment. Duchenne Muscular Dystrophy (DMD), "a genetic disorder characterized by

progressive muscle degeneration and weakness," is also a disability that belongs in the category

of Orthopedic Impairment, therefore allowing students who have this disability to receive

accommodations such as AT (Duchenne Muscular Dystrophy, 2016). Heller, Mezei, and Avant

(2008) looked at how educators can meet the AT needs of students with this disability. Heller,

Mezei, and Avant provided information that can assist school district AT teams as they develop

and implement AT plan for their students with DMD. The article looked at the unique needs of

students with this disability in regards to AT through three case students, each addressing the

different AT needs for each individual student, how the students' needs changed as the disease

progressed, and why different kinds of AT were rejected.

Personal Factors

AT not only assists SWD in an educational setting; it can also help these students show

and be who they really are as a person. The Utah Center for Assistive Technology has helped

spread awareness of the variety of AT that is available to SWDs, through an open house exhibit,

to use not only in their academics, but in their everyday lives (Cortez, 2016). Cortez commented:

"The open house is intended to help community members and service providers learn about the

latest technology, devices and program offerings that can enhance the quality of lives of people

with a wide array of disabilities" (p. 1). Vendors from a variety of companies came to show and

demonstrate their products that help people with disabilities with tasks that are a part of their

daily lives, such as using tablets similar to the tablet Dillon uses for communication or getting up

and down the stairs. Cortez concluded: "Assistive technologies help people with cognitive and

physical disabilities reach their highest communication potential" (p. 1). As stated above, an AT

device 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 functional

capabilities of a child with a disability" (Assistive Technology Act, 2004, Section 3, p. 118), but the device "does not include a medical device that is surgically implanted, or the replacement of such device" (p. 118). An AT device doesn't necessary have to be something that is technology based; an AT could also be a service animal. Cortez explained that dogs are not only used for people who have visual impairments but are also used for people who are in wheelchairs or for social interactions: "Koroulis, a junior high teacher, said she takes Newt [her dog] to school to expose him to a wide array of experiences" (p. 2).

Teacher Preparation

Since AT is on the rise as accommodations, teachers need to be connected with technology and the various AT resources available in order to effectively use them in their classrooms or with students' education programs. According to Davis (2015), "Special education teachers are more likely to use mobile apps with their students than general education teachers, but are not receiving enough formal training on the use of mobile technology for instructional purposes" (p. 1). Teacher preparation programs are now including coursework and workshops that provide teachers with the knowledge and support for AT. According to Connor & Beard (2015), "to be comfortable with utilization of any technology, the teacher needs the opportunity for hands-on practice in the both the university and real work classroom" (p. 641). Jacksonville State University, for instance, has begun to provide workshops and hands-on training to teacher candidates in their Curriculum and Instruction program and to local teachers (Connor & Beard). In order for Jacksonville's teacher candidates to build real life experiences, the university trains teachers how to appropriately use mini-iPads and lends the technology to the teacher candidates to use during the practicum and internship settings. Since the technology workshops are not happening specifically in the coursework of the teacher candidates, following the scheduled

workshops, professors integrate the information learned from the workshop for continuous feedback from the teacher candidates. The professors are also allowed to request the technology used at these workshops to provide more hands-on learning and training for the teacher candidates. Conner and Beard reported: "Not only are teachers and teacher candidates being trained in the use of current technology and in the development of inexpensive alternative switches for classroom use, these methodologies are being utilized in the public school classroom setting" (p. 642). Hands-on learning different types of technologies will help teachers implement and consistently use technology in their classroom, assisting in their students' academic achievement.

Other universities have created ways for pre-service teachers to learn more on AT. The University of Iowa's College of Education recently created four separate offices dedicated to technological preparation for pre-service teachers: Teacher Leader Center, Education technology Center, Iowa Center for Assistive Technology Education and Research, and I-SERVE (McCarthy, 2016). According to Christopher Morphew, the executive assistant dean of the College of Education, "across the space really is a focus on using technology to improve teacher education and better equip our students so when they get out in the classroom they are ready to hit the ground running with regards to using technology" (Quoted in McCarthy, p. 1). One piece of technology this article focused on is a "Double robot," which uses iPad technology to connect students who have to stay at home due to a disability with a real classroom. McCarthy reported: "A homebound student can log into an app on a simple Wi-Fi connection and move the robot around the room. A microphone and speaker system also allows the homebound student to interact personally with fellow students and teachers" (p. 2). This article also mentioned how well skilled these pre-service teachers are at using a SMARTBoard. Getting to know the works

of a SMARTBoard can really help classrooms evolve from traditional lecture setting classrooms to interactive, hands on classrooms (McCarthy, 2016).

  In conclusion, this illustrative literature review suggests that there is an abundance of different AT that can be implemented into classrooms to impact the academic achievement of SWD. Although there is an ample amount of research published that discusses the ways in which the accommodation of AT impacts SWD's academic achievement across the nation, there has been little to no research done on the impact of AT on SWD's academic achievement in rural areas of New York State. According to the New York State website (n.d.), there are 12 counties across the state that are considered "rural counties." This study looked at three elementary schools in three different school districts in one county of New York State: Chautauqua County. Chautauqua County, "occupies the extreme southwest corner of [New York State]" (Chautauqua County, NY - Official Website, n.d.). Between its two cities, Jamestown and Dunkirk, and fifteen villages, it houses 18 city and central school districts (New York State Education Department, 2016).

  The purpose of the present study, therefore, is to examine the ways in which special education teachers in three of the Chautauqua County school districts are implementing the accommodation of AT in order to positively affect the academic achievement of SWD. The primary research questions are: (a) How are teachers in Chautauqua County implementing the accommodation of assistive technology to impact the academic achievement of elementary students with disabilities? and (b) What assistive technology devices and services are schools/teachers implementing to impact the academic achievement of elementary students with disabilities?

In the next section, I will review the methods I used to conduct this study. The following methods will assist me in finding data of how teachers and schools in Chautauqua County are implementing AT and what types of AT are available in order to impact the academic achievement of elementary SWD.

Method

In the previous section, I reviewed the literature concerning the implementation of useful Assistive Technology (AT) in the classroom in order to create an effective delivery of curriculum for their students with disabilities (SWD). I based my review of the literature on the different AT available for some of the 13 disability categories that are recognized by the Individuals with Disabilities Education Act (IDEA), and teacher preparation for using and implementing different types of AT in the classroom. Overall, the literature suggested that there is ample amount of AT that can be implemented into classrooms to impact the academic achievement of students with disabilities; however, there is little to no research done on the impact of AT on SWD's academic achievement in rural areas of New York State.

The following section will detail the procedures taken for my study. For this research, I interviewed two special education teachers from two different elementary schools in Chautauqua County on their school districts' methods for implementing the accommodation of AT in order to positively affect the academic achievement of SWD. I also interviewed them to find the kinds of AT they are presently using, and the types of AT they wished they could be using in their classrooms and the reasons for these preferences.

Research Frameworks

In order to answer the research questions detailed in the previous chapters, I used a research design that conformed to qualitative research frameworks. Since I interviewed teachers

based on their knowledge of AT, it would be logical that I conduct a qualitative study. According to the Qualitative Research Consultants Association (2016), there are "several unique aspects of qualitative research (that) contribute to rich, insightful results," one of them being "synergy among respondents, as they build on each other's comments and ideas" (p. 1). From this description, I gather that qualitative research produces more enriched, descriptive, and "naturally occurring" results, rather than emphasizing on "numbers, measurements, deductive logic, control, and experiments" (McMillan, 2012, pp. 11-12).

When reviewing quantitative research, studies assume that "there is a single objective reality that can be measured" (p. 273); however, when looking at qualitative data, researchers "believe that there are multiple realities represented in participant perspectives, and that context is critical in providing an understanding of the phenomenon being investigated" (p. 273). Qualitative research more often involves field research, which takes place in a particular setting, for example in educational settings of a school or classroom. Particular settings can influence individual behaviors, so conducting educational research in the traditional educational setting (i.e., a school or classroom), can influence the participants, which then will influence the data gathered (McMillan, 2012).

Research Setting and Subjects

Since I interviewed teachers from different schools, I interviewed them based on which school that they serve (see Appendix A). The teachers I interviewed each come from different backgrounds. School #1's (S1) special education teacher, Teacher #1 (T1), is a woman from an outside education source that visits schools in the surrounding area to help assist students with visual impairments. She has been employed at this outside education source for 36 years and within the past 9 of those years, she has been working with students who attend S1, which is a

rural public education school. I interviewed one teacher at School #2 (S2), also a rural public

education school. Teacher #2 (T2) has been employed at S2 for six years as a special education

teacher. I conducted two separate interviews, since there are two different teachers that are a part

of the study: one face-to-face interview and one virtual interviews. I interviewed S1's special

education teacher at S1, where I was able to see their assistive technology that supports their

SWD. S1 has a high population of students who have visual impairments; during my interview

with the school's special education teacher for the students who have visual impairments, I was

able to see the different types of assistive technology they use daily. I administered the same

questions I asked S1's teacher to T2 through email. S2 has a variety of disabilities in their special

education classrooms.

Sampling Procedures

The two school districts I used for my research project were chosen based on their

percentage of SWD, location to the SUNY Fredonia, and my familiarity of the school districts. In

School 1 (S1), 56 students (10 % of their district's population) in their elementary school are

SWD and 69 students (5% of their district's population) at School 2 (S2) are classified as SWD

(New York State Education Department). The teachers were chosen based on the responses I

received via email after sending out the informed consent forms to all special educators that were

recommended by each school's principal (see Appendix B). The criteria for participation in this

study were:

1. subjects are Special Education teachers in elementary school setting,

   recommended by their principal to participate in the study.

2. subjects include both female and male participants.

3. subjects have somewhat prior experience with AT.

4. subjects need to have at least 1 full year of teaching experience.

Data Collection Procedures

As stated above, this study involved interviewing two Special Education teachers from two Chautauqua County elementary schools on their knowledge of the technology used and the ways in which AT is being integrated into the classroom, which then led me to gain results that later assisted teachers in implementing useful technology in elementary classrooms in order to create an effective delivery of curriculum for their SWD.

According to McMillan (2012), "Good qualitative interviewing had probes and pauses. Establishing trust, being genuine, maintaining eye contact, dressing appropriately, and connecting with the respondent are important" (p. 292). Following this advice, I conducted one face-to-face, open-ended, semi-structured interview and one virtual, structured interview as my major data sources. Conducting the face-to-face interview permitted me to develop rapport and trust with the participant, since the interviews allowed conversation and discussion but also allowed me to ask the questions I wanted to ask in order to gather the data that was needed to answer my research questions. From the questions I planned on asking and the questions I asked when developing additional conversation with the face-to-face participant, I was able to set up one virtual interview for the last participant in order to obtain the same data. I interviewed the teachers for the purpose of finding their knowledge of the ways in which AT is being implemented in their schools, the kinds of AT they are using, and the types of AT they wish they could be using in their classrooms and the reasons for these preferences.

After receiving permission from the Human Subjects Review Committee at SUNY Fredonia (see Appendix C), I sent an email to the principals of the schools chosen, asking to recommend three Special Education teachers, with their contact information, to be a part of the

study via email. Both school principals contacted me back with information. S2's principal

provided me with all of the elementary special educators contact information. I distributed the

informed consent form to all of the Special Education teachers that were attached to that email,

with three responses: one yes and two nos. S1's principal gave me the contact information for the

specialist that comes into the school to work with a select group of SWD. I distributed the

informed consent form to the specialist and received a response of "yes."

The interview data was collected at the end of March and at the beginning of April 2017,

after the ELA state assessments were administered in the schools. Each interview was unique

and different from the other because of the different types of students the special education

teachers work with. T1 specializes in assisting students with visual impairments, therefore the

interview data that was collected was based majority on assisting student who are partially to

fully blind. Since T1's interview was a face-to-face, open-ended, and semi-structured, I prepared

8 questions to ask the special educator to help facilitate our discussions:

1. How long have you been working at your present school?

2. What types of Assistive Technology do you use with your students?

3. Did your school implement the Assistive Technology or did you individually implement
   it?

4. How did you implement the Assistive Technology into your classroom?

5. Since implementing the Assistive Technology, have you seen an impact in your students'
   academic achievement? Is the impact positive or negative?

6. Out of all the Assistive Technology you use, which one do you believe works best with
   your students? Why?

7. Out of all the Assistive Technology you have used in the past, which one do you believe did not work well or had no impact on your students?

8. In your undergraduate, graduate studies, and through Professional development offered by your school or local college, did you have opportunities to be trained on and use different types of technology that could later be implemented into your classrooms?

9. What types of Assistive Technology would you like to see your school or other teachers at your school implementing? Why?

From the response of T1 and how our conversation went, I added additional questions to the special educators of S2's virtual interview such as "What range of disabilities are your students diagnosed with, in relation to the 13 categories of IDEA?" In order to gain the most information on AT, I provided the special educators with the definition of AT, "any item, piece of equipment, or product system that increases, maintains, or improves functional capabilities of individuals with disabilities" (Garguilo, 2015, p. 132), along with examples of different types of AT, ranging from no-tech to high tech, as explained in Chapter 2. I then transcribed S1's interview by hand.

Data Analysis Procedures

According to McMillan (2012), "the goal of the [data] analysis is to discover patterns, ideas, explanations, and 'understandings'… a thorough analysis requires three steps: organization of the data, summarizing the data as codes, and then interpreting the data to search for patterns" (p. 297). My data was collected through interviews to find different teachers' knowledge of the ways in which AT is being implemented in their schools, the kinds of AT they are using, and the types AT they wish they could be using in their classrooms and the reasons for these preferences from several different schools.

I transcribed, organized, and coded the data by school first in order to try and find similar patterns within the same schools. The coding strategy I used is descriptive coding. Saldana (2016) commented that descriptive coding "summarizes the primary topic of the excerpt that follows the same superscript number" (p. 4). Once I found code patterns within each school, I looked at the data found from each individual school found code patterns between both elementary schools. I used both Emic and Etic data when determining and organizing patterns. Emic data is data from participants in their own words and etic data is the researcher's representation of the emic data collected (McMillan, 2012). I kept majority of the data emic, in order to ensure richness and credibility in my results. However, there were points in time where I used etic data to code and categorize the data and results when it came to finding patterns between the two elementary schools.

Conclusions

My hope for this project is that, by organizing and determining patterns in this fashion, I will assist in advancing other Special educators, around the world, in their understanding of AT and how they can implement useful technology into the classroom in order to create an effective delivery of curriculum for their SWD. In my next section I will review the results of my study found from the data collected from the various interviews with the special educators.

<div align="center">

Results

</div>

The previous section discussed the specific methods taken to obtain the data needed to determine the results for my study of the impact of Assistive Technology as an accommodation for elementary students with disabilities. I interviewed two special education teachers from two different schools in Chautauqua County to determine the level of knowledge they had on the use

of Assistive Technology (AT) as an accommodation with students with disabilities (SWD). This

section will review the results gained from the interviews.

Face-to-Face Interview

As stated in the methodology discussion, I interviewed two special education teachers

from two different schools in Chautauqua County: one interview was face-to-face, open-ended,

semi-structured and the other was a virtual, structured interview. The first interview I did was T1

from S1's interview with their special education teacher, which was the face-to-face interview.

During T1's interview, I was able to conduct a conversation with her while asking the

questions that needed to be asked in order to gain the data needed. Since T1 is a specialist from

an outside education source, she specializes in assisting students with visual impairments. During

this interview I was able to see the copious number of different types of AT that she uses with

her students, ranging from low-tech to high tech: Braille Writer, elevated math worksheets,

braille protractor, a cane, braille books, Braille Embosser, Duxbury Program, Key View,

BookShare.org, JAWS Screen Reader, Mini-Guide, GPS Navigator, iPad, Braille Note Apex,

and Braille Note Touch. From the four students T1 assists at S1, all four are using or are learning

to use all of these devices.

According to T1, in order for them to be able to use any of the devices with Braille, "they

have to learn Braille first." The students begin with learning the basics of Braille, and then begin

writing with the Braille Writer, which is a manual type writer for people with visual

impairments. Then they get into the technology of the Braille Note Apex or the Braille Note

Touch, which are the technology versions of the manual Braille Writer. "Both of these do

anything any other laptop or computer will do." The Braille Note Apex and the Braille Note

Touch are the specific AT that two of the students use just as they would use a laptop. These

devices are much easier to use since the students don't have to rely on the vision they have left to

use the laptop and there are fewer keys than on a laptop. There is also a refreshable Braille pad

with which the student is able to read line by line on the Braille Note devices. But that doesn't

mean they don't use a laptop as well. The laptops the students with visual impairments use have

a program called JAWS Screen Reader, which allows the student to use keyboard commands to

navigate through the computer while the computer speaks to the student, informing him or her

the program that is opening or highlighted.

T1 also translates worksheets and reading for her students using the Duxbury Program

and the Braille Embosser. The teachers throughout S1 electronically send T1 the worksheets or

readings the students will be doing over the next couple days or weeks. T1 copies and pastes the

worksheets or readings into the Duxbury Program, which then translates them into Braille. She

then prints the Braille using the Braille Embosser, which imprints the Braille onto sheets for the

students to read. "I love technology but we also don't get rid of our paper and pencil, so I do

believe hard copies help my students as well. With these hard copies, I translate parts like

heading so the teacher can follow along with him." With T1 embossing the students' worksheets

into Braille, the students are able to follow along in class or complete their work without having

to input everything onto their Braille Note or laptop. It also assists the students in their reading

ability since Common Core not only tests listening abilities, but reading as well.

T1 also works with the students on life skills. She not only teaches students how to

effectively use a cane while walking, she also teaches them how to use a Mini-Guide and GPS

Navigator. A Mini-Guide has different levels of vibrations in accordance with the proximity to

the user. "The Mini-Guide would be used in conjunction with the cane or used by itself." She

teaches the students how to use a GPS navigator that speaks to them as they are walking. Just

like the GPS navigators we use, the students are able to program in an address and, as the student is walking, the GPS will tell them what streets are coming up, when they need to turn, and when they have arrived at their destinations. One unique characteristic about this piece of technology is that the student is able to record specific landmarks or obstacles they cross on the path that the GPS will remember. For example, if there is a hill ahead or if there is a crossing light they need to push a button in order to cross the street.

When asked if S1 implemented the different AT or if she individually implemented them, T1 stated:

These all belong to the school, but I attend a lot of conferences and I do a lot with technology, so I find out what's out there, I talk to vendors and companies and I ask certain venders if they would come in and give us a demonstration or something and then I made a recommendation. [S1] has been terrific and I want to say everything that I have recommended when it comes to technology, they have purchased for the kids. All this technology gives them an equal opportunity with their peers.

The last resource T1 explained was BookShare.org: "Bookshare.org is disability specific and is a free service to anyone with a disability, including a reading disability like dyslexia. We fill out the application for the students and they are able to download books to their laptop, iPad, Braille Note Apex, or Braille Note Touch. There are even textbooks on there. My students found their social studies and science textbooks on BookShare and they download them and now they can have them on their devices and they can read the textbook with the refreshable braille display or listen to it." Since books that are designed for students with visual impairments are few and far between and also costly, having BookShare.org as a resource helps these students connect more in the classroom.

Virtual Interview

As stated above, there was one virtual interview done with one of the special education teachers at S2. The virtual interview was with T2. The majority of the students in T2's classroom have been diagnosed with learning disabilities or multiple disabilities. He has one student who is diagnosed with Down Syndrome. In his special education classroom, the students use iPads, pencil grips, and seat cushions. The pencil grips are used to help a student who has fine motor difficulty, the seat cushions are used for students who have difficulty sitting in their seats for an extended period of time, and the iPad is used for a student who has difficulty using a regular computer. The pencil grips and seat cushions were given to T2 by the Occupational Therapy department of the school to assist the students with their motor skills.

From this interview, I realized that there wasn't as much AT implemented in the S2 classroom as there was at S1. T2 states: "I believe the assistive technology has a positive impact. I wish I had more resources to implement more than just a few simple things given to me by other departments but right now, our technology that's available to use is pretty limited." Only one student in his classroom is given an iPad for assistance during computer class and for down time in the classroom, but T2 wishes that all of his students could have iPads. He believes that out of all the AT that he uses, the iPad shows the most promise, but he, unfortunately, doesn't have the resources to give all of his students an iPad. "If I had a classroom set, I would incorporate and integrate it [assistive technology] much more into my curriculum." He has had past professional development on applications he could use in his classroom; however, without the access to the needed technology to use these applications, it's hard for him to really put that professional development to work. "I would do things very differently if technology like that was part of every day for kids in my room," T2 said. "I would like to see students all have an iPad or

Chrome Book or something like that. Not a classroom set to share but one for every student in the district, especially students in special education."

Unlike T1's interview, T2 had a piece of AT he believed didn't benefit his students at all. The one piece of AT he believes has no impact on his students are seat cushions. According to Therapy Shoppe (2017), these cushions "can be an effective seating option for kids who have a difficult time focusing or staying put in their seats." T2 stated that, although these seats are designed to help the students pay attention, they become more of a distraction.

From these interviews, I gathered that one common idea between the two teachers is that the AT has had a positive effect on their students. Although T1's students have more experience with technology, there are still positive effects coming from the small amount of AT used in T2's classroom. Both teachers also wished they had more AT. More specifically, T1 would like the use of an AT called the Transformer. T1 stated that, "It [the Transformer] is like a video magnifier. You can focus on anything in a room and it can enhance anything. It has Optical Character Recognition capabilities and it will read it out loud for you and it works in conjunction with the new iPad Air." This piece of technology would allow students who have visual impairments to focus in on writing on the whiteboard or information on the Interactive Whiteboard and be able to read along, or have the Transformer read it for him, and be able to follow along with the class. From T2's interview, he believes that the iPad has had the most success in terms of AT, which is what made him wish he had a class set. As stated above, only one of his students has been given an iPad and T2 has seen an improvement with his academic achievement. He believes that, if he were to have a class set of iPads, all of his students would benefit from the use of them in the classroom and would increase their academic achievement as well.

Conclusions

This section reviewed the results given from my interviews with the two special education teachers during the course of my investigation into the implementation of the accommodation of AT by teachers in Chautauqua County in order to impact the academic achievement of elementary students with disabilities (SWD). The interviews gave me insight into the AT that the teachers are using in their schools, the ways in which they implemented them into their classroom, and the effects of the AT on their students.

In the next section, I will analyze and discuss the significance of my results. During the interviews, I was able to see the different types of AT being used at both schools and to witness the effectiveness of their use in teaching SWD. I will also give disclaimers as to the limitations of my study and the factors that could have altered my results gained from the interviews.

Discussion

The present findings showed that some schools in Chautauqua County have more access to Assistive Technology (AT) for their students with disabilities than others. As stated in Chapter 4, School 1 (S1) has a high population of students with visual impairments, which allows them to have a specialist (T1) from an outside education source come into the school and provide services for the students. Some of those services are many different pieces of AT to assist the students with visual impairments in including them in the general education classroom activities and assignments. Some of these pieces of AT include the Braille Writer, elevated math worksheets, braille protractor, a cane, braille books, Braille Embosser, Duxbury Program, Key View, BookShare.org, JAWS Screen Reader, Mini-Guide, GPS Navigator, iPad, Braille Note Apex, and Braille Note Touch, all described in the previous chapter. T1 is able to suggest

necessary AT that the students would benefit from and, as learned from her interview, the majority of her suggestions are bought for the designated students.

Significance

From the data gathered from the interview with T2, S2 has much less AT available to its students. T2's classroom is made up of students who have been diagnosed with learning disabilities or multiple disabilities, and one student diagnosed with Down Syndrome. T2 uses much less AT in his classroom, which leads me to believe that the entire school is very limited when it comes to the implementation of AT. Some of the AT used in T2's classroom include iPads, pencil grips, and seat cushions. T2 wishes he had more access to assistive technology, especially iPads; however, the school has yet to implement enough iPads for a class set.

The only similar piece of AT between the two schools was the use of an iPad, which aligns with the common theme of the Apple Video, "Dillon's Path" (2016). Although neither of the two teachers I interviewed presently have a student with autism, they both have implemented iPads for their students. The Apps on the iPad help integrate the students into an inclusive classroom where they can be a part of all classroom activities and environment to show their individual intelligence. The use of iPads also correlates to the way that Jefferson County Public Schools in Kentucky uses them (Clark, 2016). This school district provides the iPads to "qualifying students with disabilities," which is how the two school districts in Chautauqua County do as well. T1 suggested the use of the iPad for one of her students with visual impairments, which S1 happily provided, while S2 provided one of T2's students with an iPad through the OT department.

Another aspect of the study that correlates with the found research in Chapter 2 is the way that T1 stated that she is able to go to AT fairs and Professional Development seminars and

speak with vendors about the available AT for students with visual impairments. The Utah

Center for Assistive Technology holds similar open houses to help community members and

service providers learn about the latest AT they can implement into their schools (Cortez, 2016).

As stated in Chapter 2, vendors from around the nation come to show and demonstrate their

products to people like T1, who then is able to make a recommendation to S1 on whether or not

the certain piece of AT would benefit her students with visual impairments needs.

Not only did Cortez (2016) talk about the open houses with the latest technology, but he

also talked about how these pieces of technology can also help influence the students' lives. "The

open house is intended to help community members and service providers learn about the latest

technology, devices and program offerings that can enhance the quality of lives of people with a

wide array of disabilities" (p. 1). T1 has incorporated two devices that assist the students in their

everyday life, rather than just specifically with school: a Mini-Guide and a GPS Navigator. As

stated in Chapter 4, the Mini-Guide is similar to the cane when detecting how close the student is

to things. It has different levels of vibrations in accordance with the proximity to the user. The

GPS navigator is very similar to GPS navigators we use, but there is no screen to look at; the

technology speaks to the student as they are walking. The student can input an address and it will

tell them what streets are coming up, when they need to turn, and when they have arrived at the

inputted address. T2 also uses a piece of AT that helps the student with both school and life.

Pencil grips were implemented by the OT department to help the students with their fine motor

skills. Assisting the students in developing their fine motor skills at a young age will help them

later in life when it comes to a simple task like tying their shoes or with a more difficult task like

using a manual screwdriver.

Both teachers stated they have had extensive experience with the AT used in their classrooms, however only T1 stated that she has gone to workshops and hands-on training with the AT she has implemented. According to Connor & Beard (2015), "to be comfortable with utilization of any technology, the teacher needs the opportunity for hands-on practice in the both the university and real work classroom" (p. 641). Since the AT used at S1 is more extensive because it specifically for students with visual impairments, T1 had to go through the necessary training in order to successfully implement the technology to assist in the students learning. Without her knowledge of how to use the high technology of the Braille Note Apex/Touch, the students wouldn't be able to appropriately use it in the classroom in order to assist in their academic achievement. According to Davis (2015), "Special education teachers are more likely to use [technology] with their students than general education teachers, but are not receiving enough formal training on the use of mobile technology for instructional purposes" (p. 1). With the training and experience teachers gain from workshops and professional development sessions, they are able to implement pieces of AT in order to assist their students in various subjects to help influence their academic achievement.

Limitations

There were a few limitations found throughout my study. First, since I was only able to interview two teachers, I was only able to gather a small amount of data from two of the schools. Although S1 has a high population of students with visual impairments, there are also students who have been diagnosed with other disabilities and receive special education services. I was not able to obtain the types of AT they use because T1 specializes in assisting students with only visual impairments. The second limitation is that there were two different types of interviews, which gave me different types of data. I feel like I was able to gather more data during T1's

interview because I was able to have a conversation with her and ask additional questions in order to clarify any confusion or gain additional data. Since T2's interview was virtual, the only data I was able to gather was what he typed up on the virtual interview question form. The third limitation is the amount of schools that were included in the study. According to New York State Education Department, there are 18 school districts in Chautauqua County, which means I was only able to collect about 1/9 (2/18 = 1/9) of the data that could have been collected if I was to interview someone from every school district present in the county.

The final limitation is that manner with which I was able to visit S1's school and experience the AT hands on, but wasn't able to visit S2 and experience their pieces of AT. Having hands on experience with S1's AT helped me better understand how the students use them in order to assist them with their learning throughout the year. Although I am pretty familiar with the AT used at S2, I still am unsure about the way that the one student uses the iPad to assist him throughout the day, which leads me to having additional questions such as, "what are the different kinds of Apps the student uses throughout the day?" or, "are there any time restrictions when it comes to using the iPad?" Also, additional questions arose when I read that some of his students have seat cushions, but he doesn't believe they are helpful since they become more of a distraction. The questions that arose were, "can the seat cushions be taken away, or are they in their IEPs?" "Are there other options the students have in order to help them focus throughout the day?" and "Does the OT department know these seats are becoming more of a distraction?"

Future Research

I feel that future researchers would be able to continue my research very easily. One of my limitations was how I was only able to visit 1/9 of the school districts in Chautauqua County.

A future researcher could continue exactly what I was doing and visit the remaining school districts and speak with their special educators on the types of AT they are presently using in their classroom. Technology is also always evolving, which means that some of the AT used in today's classrooms could change in a very short time. Future researchers could not only expand my research to other schools, but they could also follow up with S1 and S2 to see if any technology has evolved or been replaced.

Overall, this study provided a detailed introduction to a study that could be later expanded about the different types of AT used in Chautauqua County in order to assist the academic achievement of students with disabilities. From the data collected from the two schools, each school has a different amount of AT they are able to implement, however since technology is always evolving and it's been proven it assist students in the classroom, hopefully more will be introduced in order to positively affect the academic achievement of students with disabilities.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Apple Corporation. (2016, April 2). Dillon's path. Podcast retrieved from https://www.youtube.com/watch?v=UTx12y42Xv4.

Assistive Technology Act. (2004). *29 USC 3002, Section 3.* Retrieved from https://www.gpo. gov/fdsys/pkg/PLAW-108publ364/html/PLAW-108publ364.htm.

Ault, M.J., Bausch, M.E., McLaren, E.M. (2013). Assistive technology service delivery in rural school districts. *Rural Special Education Quarterly, 32*(2), 15-22. Retrieved from http://acres-sped.org/.

Baker, B. (1986). Using images to generate speech. *BYTE, 11*(3), 160-168. Retrieved from http://dl.acm.org/citation.cfm?id=5882.

Bouck, E.C., Bouck, M.K. (2008). Does it add up? Calculators as accommodations for sixth grade students with disabilities. *Journal of Special Education Technology, 23*(2), 17-32. doi: 10.1177/016264340802300202.

Chautauqua County, NY - Official Website. (n.d.). Retrieved January 19, 2017, from http://chautauqua.ny.us/509/History.

Clark, K. (2016). Closing gap for challenged kids can help others. Retrieved from http://www.kentuckynewera.com/news/ap/article_5554e730-208b-11e6-8350-3f89df4caa24.html.

Coleman, M. B. (2011). Successful implementation of assistive technology to promote access to curriculum and instruction for students with physical disabilities. *Physical Disabilities: Education and Related Services, 30*(2), 2-22. Retrieved from http://www.cec.sped.org.

Connor, C., & Beard, L. A. (2015). Increasing Meaningful Assistive Technology Use in the

    Classrooms. *Universal Journal of Educational Research*, *3*(9), 640-642. doi:

    10.13189/ujer.2015.030908.

Cortez, M. (2016). Assistive technologies helps people with disabilities 'be who they are'.

    Retrieved from http://www.deseretnews.com/article/865664771/Assistive-technologies-

    helps-people-with-disabilities-be-who-they-are.html.

Davis, M.R. (2015, August 23). Educators want more mobile technologies for classroom use,

    better PD. *EDWEEK.* Retrieved from https://marketbrief.edweek.org/marketplace-k-

    12/educators-want-mobile-technologies-classroom-use-better-pd/.

Duchenne Muscular Dystrophy (DMD). (2016, September 20). Retrieved January 19, 2017, from

    https://www.mda.org/disease/duchenne-muscular-dystrophy.

Gargiulo, R.M. (2015). *Special education in contemporary society* (5th ed.). Thousand Oaks, CA:

    SAGE Publications.

Gargiulo, R.M. (2015). Assistive technology. In T. Accomazzo & J. Miller (Eds.), *Special*

    education in contemporary society (p. 130-151). Thousand Oaks, CA: SAGE

    Publications.

Gonzalez-Ledo, M., Barbetta, P.M., & Unzueta, C.H. (2015). The effects of computer graphic

    organizers on the narrative writing of elementary school students with specific learning

    disabilities. *Journal of Special Education Technology, 30*(1), 29-42. doi:

    10.1177/016264341503000103.

Heller, K. W., Mezei, P. J., & Avant, M. J. T. (2008). Meeting the assistive technology needs of

    students with duchenne muscular dystrophy. *Journal of Special Education Technology,*

    23(4), 15-30. doi: 10.1177/016264340802300402.

Individuals with Disabilities Education Improvement Act. (2004). 20 U.S.C. Part A, Section 602.

Retrieved from http://idea.ed.gov/explore/view/p/,root,statute,I,A,602,1.

The IRIS Center. (2004). Accessing the general education curriculum: Inclusion considerations

for students with disabilities. Retrieved from http://iris.peabody.vanderbilt.edu/agc.

Lacava, P. G., Golan, O., Baron-Cohen, S., & Myles, B. S. (2007). Using assistive technology to

teach emotion recognition to students with Asperger Syndrome: A pilot study. *Remedial

& Special Education*, *28*(3), 174-181. doi: 10.1177/07419325070280030601.

McMillan, J. H. (2012). *Educational research: Fundamentals for the consumer* (6th ed.). Boston,

MA: Pearson Education.

National Assessment of Educational Progress. (2015). 2015 Mathematics & Reading

assessments. Retrieved from http://www.nationsreportcard.gov/reading_math

_2015/#?grade=4.

National Center for Education Statistics. (2016). Children and youth with disabilities. Retrieved

from https://nces.ed.gov/programs/coe/indicator_cgg.asp.

National Geographic Society (n.d.) Encyclopedic entry: Rural area. Retrieved from

http://www.nationalgeographic.org/encyclopedia/rural-area/.

New York State. (n.d.) The counties of New York State. Retrieved from

https://www.ny.gov/counties.

New York State Education Department. (2016). Chautauqua County at a glance. *Chautauqua

County Data 2015-2016.* Retrieved from https://data.nysed.gov/profile.php?county=06.

New York State Education Department. (2016). New York state education at a glance. *NY State

Data 2015-2016.* Retrieved from https://data.nysed.gov/.

New York State Education Department. (2016). NYS Districts. *2015-2016 Enrollment Data.*

Retrieved from https://data.nysed.gov/lists.php?type=district.

Poll, H. (2014). The Pearson Student Mobile Device Survey 2014. Retrieved from

http://www.pearsoned.com/wp-content/uploads/Pearson-K12-Student-Mobile-Device-

Survey-050914-PUBLIC-Report.pdf.

Qualitative Research Consultants Association. (2016). What is qualitative research? Retrieved

from http://www.qrca.org/?page=whatisqualresearch.

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). London: Sage.

Sze, S. (2009). The effects of assistive technology on students with disabilities. *Journal of*

Educational Technology Systems, 37(4), 419-429. doi: 10.2190/ET.37.4.f.

Therapy Shoppe. (2017). Seating Specialties. Retrieved April 11, 2017, from

https://www.therapyshoppe.com/category/3-seating-specialties-ball-chairs-sensory-

wiggle-seats-therapy-air-cushions.

Van Laarhoven, T., Munk, D. D., Zurita, L. M., Lynch, K., Zurita, B., Smith, T., & Chandler, L.

(2008). The effectiveness of video tutorials for teaching pre-service educators to use

assistive technologies. *Journal of Special Education Technology, 23*(4), 31-45.

doi:10.1177/016264340802300403.

Vesel, J., Robillard, T. (2013). Teaching mathematics vocabulary with an interactive signing

math dictionary. *Journal of Research on Technology in Education, 45*(4), 361-389. doi:

10.1080/15391523.2013.10782610.

Zirzow, N.K. (2015). Signing avatars: Using virtual reality to support students with hearing loss.

Rural Special Education Quarterly, 34(3), 33-36. Retrieved from http://acres-

sped.org/journal.

Appendices

Appendix A: Virtual Interview Question Form

Name:_____

Please read the definition of Assistive Technology and the different levels of Assistive Technology below. Answer the following questions with as much detail as possible. Thank you again for your willingness to participate in this study!

The term "Assistive Technology" (AT) is defined as both a device and a service. An AT device is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (Assistive Technology Act, 2004, Section 3, p. 118) but the device "does not include a medical device that is surgically implanted, or the replacement of such device" (p. 118). In order to qualify for an AT service or device, the student must be classified as a "child with a disability," meaning the child must be diagnosed within one of the 13 categories included by IDEA.

AT devices have evolved into no-tech (graphic organizers, mnemonics), low-tech (pencil grips, highlighters, braille), mid-tech (calculators, audio recorders), and high-tech (iPad, speech-to-text, word prediction) devices.

1. How long have you been working at your present school?

2. What types of Assistive Technology do you use with your students?

3. Did your school implement the Assistive Technology or did you individually implement it?

4. How did you implement the Assistive Technology into your classroom?

5. Since implementing the Assistive Technology, have you seen an impact in your students' academic achievement? Is the impact positive or negative?

6. Out of all the Assistive Technology you use, which one do you believe works best with your students? Why?

7. Out of all the Assistive Technology you have used in the past, which one do you believe did not work well or had no impact on your students?

8. In your undergraduate, graduate studies, and through Professional development offered by your school or local college, did you have opportunities to be trained on and use different types of technology that could later be implemented into your classrooms?

9. What types of Assistive Technology would you like to see your school or other teachers at your school implementing? Why?

Appendix B: Consent Form

Informed Consent

Protocol Title: How are teachers in Chautauqua County implementing the accommodation of
assistive technology to impact the academic achievement of elementary students with
disabilities?

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:

To research the kinds of Assistive Technology and the ways in which teachers in
Chautauqua County are implementing Assistive Technology in the field in order to
impact the academic achievement of students with disabilities.

What you will be asked to do in the study:

To participate in a small group, open-ended, semi-structured interview with other Special
Education teachers from your elementary school.

Time Required:

Time required including the answers to all of the set aside questions the investigator has
created and the open discussions and conversations that stem from the questions asked.
The interview should last no longer than an hour and a half.

Compensation:

There is no compensation for participating in the study.

Confidentiality:

Your school name and personal identity will be kept confidential to the extent provided
by the law.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not
participating.

Right to withdraw from the study:

You have the right to withdraw from the study at any time without consequence. You do
not have to answer any questions you do not want to answer.

Potential Benefits and Risks:

This investigation will add to the growing research of Assistive Technology. This
investigation also has the possibility to assist teachers in implementing useful technology

into the classroom in order to create an effective delivery of curriculum for their students with disabilities. Following the investigation, the participants and others will be allowed to reach the final research paper and discover what Assistive Technology other schools are using and how some Assistive technology is being implemented, which some may not agree on. Readers will also discover what Assistive Technology does or doesn't work and what Assistive Technology the participants would like to see implemented at their school. Only responses to the questions asked in the interviews will be use in the final research paper. The three elementary schools will be unnamed, as well as will the names of the participants.

Whom to contact if you have questions about the study:

Emily Palka

Curriculum and Instruction in Inclusive Education Graduate Student

emily.palka@fredonia.edu

Whom to contact about your rights as a research participant in the study:

Dr. Judith Horowitz

Associate Provost for Graduate Studies, Sponsored Research and Faculty Development

Maytum Hall 805

Judith.horowitz@fredonia.edu

(716) 673-4708

I have read the procedure outlined above. I voluntarily agree to participate in this study and have received a copy of this description.

_____   _____

Participant's signature   *Date*

_____   _____

Principal investigator's signatures   *Date*

Appendix C: IRB Human Subjects Approval

24 January 2017

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

Re: Emily Palka—How are Teachers in Chautauqua County Implementing the
Accommodation of Assistive Technology to Impact the Academic Achievement of
Elementary Students with Disabilities

Your research project using human subjects has been determined Category 1,
Exempt, under the United States Department of Health and Human Services Code of
Federal Regulations Title 45 Public Welfare, Part 46 Protection of Human Subjects,
46.101, Subpart A (b) (1) and/or (2). This document is your approval and your
study titled "How are Teachers in Chautauqua County Implementing the
Accommodation of Assistive Technology to Impact the Academic Achievement of
Elementary Students with Disabilities" may proceed as described, beginning on
March 1, 2017 and ending on April 30, 2017.

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

Sincerely,

Judith M. Horowitz, Ph.D.
Associate Provost, Graduate Studies, Sponsored Programs
  and Faculty Development
Human Subjects Administrator

Appendix D: Citi Human Subjects Training

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

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

- **Name:**   Emily Palka (ID: 5091515)
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Email:**   palk2367@fredonia.edy
- **Institution Unit:**   Curriculum and Instruction
- **Phone:**   7169123627

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

- **Record ID:**   17363060
- **Completion Date:**   18-Sep-2015
- **Expiration Date:**   17-Sep-2017
- **Minimum Passing:**   80
- **Reported Score*:**   90

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	18-Sep-2015	3/3 (100%)
History and Ethical Principles - SBE (ID: 490)	18-Sep-2015	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	18-Sep-2015	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	18-Sep-2015	5/5 (100%)
Assessing Risk - SBE (ID: 503)	18-Sep-2015	4/5 (80%)
Informed Consent - SBE (ID: 504)	18-Sep-2015	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	18-Sep-2015	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	18-Sep-2015	4/5 (80%)
Research with Children - SBE (ID: 507)	18-Sep-2015	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	18-Sep-2015	5/5 (100%)
International Research - SBE (ID: 509)	18-Sep-2015	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	18-Sep-2015	4/5 (80%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	18-Sep-2015	3/3 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	18-Sep-2015	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	18-Sep-2015	4/5 (80%)
SUNY Fredonia State College (ID: 587)	18-Sep-2015	No Quiz

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

Verify at: www.citiprogram.org/verify/?k5fb34b1a-e4cf-4d1b-8ff0-1b9b24a61698-17363060

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

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

- **Name:** Emily Palka (ID: 5091515)
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Email:** palk2367@fredonia.edy
- **Institution Unit:** Curriculum and Instruction
- **Phone:** 7169123627

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

- **Record ID:** 17363060
- **Report Date:** 27-Apr-2017
- **Current Score**:** 90

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
History and Ethical Principles - SBE (ID: 490)	18-Sep-2015	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	18-Sep-2015	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	18-Sep-2015	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	18-Sep-2015	5/5 (100%)
SUNY Fredonia State College (ID: 587)	18-Sep-2015	No Quiz
Assessing Risk - SBE (ID: 503)	18-Sep-2015	4/5 (80%)
Informed Consent - SBE (ID: 504)	18-Sep-2015	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	18-Sep-2015	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	18-Sep-2015	4/5 (80%)
Research with Children - SBE (ID: 507)	18-Sep-2015	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	18-Sep-2015	5/5 (100%)
International Research - SBE (ID: 509)	18-Sep-2015	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	18-Sep-2015	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	18-Sep-2015	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	18-Sep-2015	4/5 (80%)
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	18-Sep-2015	3/3 (100%)

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

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