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Assistive Technologies used by Students with Asperger's Syndrome to Improve Performance in the General Education Classroom

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The No Child Left Behind Act requires all students – regardless of poverty level, learning disability, limited English proficiency, or racial/ethnic origins – to be in general education classrooms meeting high standards of proficiency in reading/language arts and mathematics by 2013-14. Meeting high standards of proficiency in a general education classroom is particularly challenging for students diagnosed with pervasive developmental disorders, such as Asperger's syndrome. Limited interests, inflexible language, and social skills deficits without a history of cognitive or language delays before the age of three characterize the disorder. Other symptoms, such as clumsiness, unusual sensory reactions, and talk in unusual ways or with an odd tone of voice are present early in life, Asperger's syndrome is typically not diagnosed until school age and on average the age is 11 years old.

Various teaching strategies and assistive technologies encourage positive learning environments allowing for students with Asperger's to be productive in a general education classroom. A quantitative survey research design was the guiding methodology. Utilizing SurveyMonkey, two cross-sectional surveys were created and sent to Tennessee's 150 special education district supervisors with a request to forward to both special education and general education teachers. The surveys had three distinct components based on students with Asperger's syndrome – teaching strategies implemented, current assistive technologies being used, and how eReaders, tablets, and mobile applications are being utilized as assistive technologies.

The results were tallied and evaluated. A comprehensive set of teaching strategies and assistive technologies used in the general education classroom to improve reading/language arts for secondary students diagnosed with Asperger's Syndrome was compiled.

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Table of Contents

List of Tables

Tables

List of Figures

Figures

Chapter 1

Introduction

In January 2002, President George W. Bush signed the No Child Left Behind Act (NCLB; 2001) amending the federal education programs established under the Elementary and Secondary Education Act of 1965. The primary focus of NCLB is to close the achievement gap based on accountability, flexibility, and choice, so that no child is left behind. Using standardized tests, states are mandated to administer reading and mathematics tests annually to students in grades 10 through 12 and a science test one time. Students must achieve proficiency on these tests by the 2013-14 school year and that the school meet federally set adequate yearly progress (AYP) targets (Shelley, 2012) by testing 95% of each subgroup, which includes gender, race, ethnicity, English proficiency, migrant status, special education, and low socioeconomic status (Payne-Tsoupros, 2010).

Therefore, all students despite economics, disability, or race must meet a high standard of proficiency in reading/language arts and mathematics by 2013-14. In other words, NCLB places emphasis on facilitating achievement among all students by participating in general education curriculum and demonstrating academic progress, regardless of any existing developmental disability (Parette & Peterson-Karlan, 2007).

Once NCLB was enacted, then U.S. Secretary of Education, Rod Paige was adamant regarding deadlines set forth in the act indicating no appeals for waivers from the federal requirements would be permitted (Shelley, 2012). However, as the mathematics and English proficiency requirements were slowly approaching, President Barack Obama's administration team believed that more than 80% of public schools could face sanctions. Rather than teaching to the test and lowering standards in order to avoid sanctions, President Obama permitted various flexibility plans to be submitted based on college and career ready standards (Dervarics, 2011).

During the President's first term Obama presented a challenge to promote innovation, reform, and excellence in America's public schools because education is no longer a pathway to opportunity and success, but a prerequisite. The challenge titled, "Race to the Top" (RTTT), a $4.25 billion investment, provided states the opportunity to reform their educational system with innovative teaching and learning approaches so that graduates can be internationally competitive. RTTT emphasized designing and implementing rigorous standards and high-quality assessments, hiring of high-quality teachers, data systems designed to drive instruction, effective approaches for struggling schools, and effective collaborations to raise student achievement and close achievement gaps (www.whitehouse.gov). The phase 1 winners, announced in March 2010, were Delaware and Tennessee being awarded approximately $100 million and $500 million respectively to implement comprehensive school reform (www.ed.gov).

Prior to receiving the funds, Tennessee passed the First to the Top Act (2010; FTTT). The Act (2010) laid the foundation for broad-based education reform. The Act (2010):

(1) mandated a comprehensive evaluation system for teachers and principals based on multiple measures of effectiveness, including student achievement indicators and annual observations of educator practice;

(2) removed restrictions on the use of value-added data for promotion, retention, tenure and compensation decisions;

(3) enabled State intervention in the State's lowest-achieving schools;

(4) authorized local educational agencies to adopt alternative salary schedules;

(5) appropriated funds to Tennessee Department of Education to support its pre-kindergarten through higher education (P-20) longitudinal data system; and

(6) aligned funding and policies with a statewide plan for higher education established through the Complete College Act of 2010 (U.S. Department of Education, 2012).

Tennessee retained 50% of the funds at the state level to implement a variety of initiatives and the other 50% allocated to the school districts based on their Title 1 funding allocation (www.tn.gov). The state has 32 specific projects that are supported by the RTTT funds. The top three projects receive 43% of the total allocations: Integrating Data to Improve Instruction, Achievement School District, and State Longitudinal Data System (including Early Warning, P-20, and Evaluation Data Systems) (U.S. Department of Education, 2013). The three school districts receiving the most allocated funds were Memphis City (27.39%), Davidson County (12.10%), and Knox County (5.31%) (www.tn.gov).

Another attempt to reform education occurred in November 2011 when states began submitting to the U.S. Department of Education formal requests for waivers from key provisions of NCLB. Waivers such as locally-designed plans to implement college and career ready standards, developing rigorous accountability systems for achievement gaps, and creating better systems for developing, supporting, and evaluating principals and teachers. As of March 2013, 47 states, D.C., Puerto Rico, and the Bureau of Indian Education had requested waivers with 34 states and D.C. receiving approvals (www.ed.gov). Eleven states, including Tennessee, received the first round of waiver approvals in February 2012. Tennessee's waiver grants the adoption of a new accountability model and to raise the overall achievement by three to 5% each year and to cut achievement gaps in half over an eight-year period. The waiver also permits the state to set new ambitious but achievable annual measureable objectives for 2013-14 (www.tn.gov).

Problem Statement

Even though there have been changes, waivers, and proposals made to NCLB the requirement of students reaching appropriate achievement levels while participating in a general education classroom remains intact. General education classrooms can be a very challenging environment for students specifically those diagnosed with a Pervasive Developmental Disorder (PDD). In addition to the social and communication deficits associated with PDD, it is typical to have other behaviors that can make learning difficult in the general education classroom. Such behaviors include sensory issues, hyperactivity, short attention span, resistance to transitions, impulsivity, and aggressiveness all of which creates a barrier to inclusion and social integration in the general education classroom

(von der Embse, Brown, & Fortain, 2011). Although these students do not exhibit language delays and have average or above average IQs (www.cdc.gov) the severe and sustained impairment in social communication skills generate difficulties in the general education classroom, which can lead to poor attitude, grades, and depression. In some instances, poor communication skills contribute to high incidence of school maladjustment and school dropout, juvenile delinquency, and child psychopathology (Scharfstein, Beidel, Sims, & Finnell, 2011). Students with disabilities, whether physical, mental, or emotional, typically fall below an expected level of performance in academic and life skill curricular areas. Therefore, performance gaps exist between these students and their typical peers in both access to and participation in the curriculum (Parette et al., 2007).

Tennessee students diagnosed with Asperger syndrome (AS) were required to meet the reading/language arts and mathematics proficiency level by 2013-14 while participating in secondary general education classrooms. The NCLB Act (2001) requires all students – regardless of poverty level, learning disability, limited English proficiency, or racial/ethnic origins – be in general education classrooms. Since its enactment, there have been several proposals and changes. Tennessee, for instance, in 2005, proposed a projection model to test the efficacy of integrating longitudinal analysis of student achievement data. These data encourage schools to put individual students who have yet to reach proficiency on accelerated paths to meeting state achievement standards. Schools are encouraged to identify and provide appropriate interventions to students who are at-risk of falling below proficiency (www.tn.gov).

Dissertation Goal

The goal was to compile a comprehensive set of teaching strategies and assistive technologies (AT) used in the general education classroom to improve reading/language arts for secondary students diagnosed with AS. The Tennessee State Board of Education (http://www.state.tn.us/education/speced) identifies a developmental disability that significantly affects verbal and nonverbal communication and social interaction as autism. Autism includes students who have been diagnosed with an Autism Spectrum Disorder (ASD) such as Autism, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), or AS when the child's educational performance is adversely affected.

Research Questions

The study addressed the following research questions:

1. What is the consensus of the current literature on the best teaching practices for students diagnosed with AS?
2. What is the consensus of the current literature on appropriate AT for students diagnosed with AS?
3. What teaching strategies are used in the general education classroom to foster a positive learning environment for students diagnosed with AS?
4. What AT products are being used by secondary education AS students in Tennessee's general education classroom?
5. How are eReaders, tablets, or mobile applications currently used in the classroom to improve academic performance for students diagnosed with AS?

6. What teaching strategies and ATs are recommended for use in the general education classroom to improve reading/language arts for students diagnosed with AS?

Relevance and Significance

On February 7, 2013, U.S. Secretary of Education Arne Duncan testified before the U.S. Senate Committee on Health, Education, Labor, and Pensions regarding NCLB early lessons from state flexibility waivers.

> No Child Left Behind was a landmark Act. Eleven years ago, Congress, with strong bipartisan support in the Senate and the House, rightly said that our schools needed to focus on all students; that for America to continue to succeed, all of our children had to succeed. That is why NCLB sought to hold every state, district, and school accountable for 100% of students being proficient in reading and math by the end of the 2013-2014 school year.
>
> NCLB's goals were the right ones—holding all students to the same, challenging standards; closing achievement gaps; and providing transparency and accountability for the proficiency and graduation rates of all students. But, the closer we got the more NCLB has changed from an instrument of reform into a barrier to reform. And, the kids who have lost the most from that change are those who benefitted the most in the early years of NCLB—students with disabilities, low-income and minority students, and English learners (www.ed.gov).

The Tennessee school report card (2011) identified 11.2% ages 6 through 21 as students with disabilities with 4.98% of those students specifically diagnosed with autism. Of the 11.2% of students with disabilities, 63.39% spent at least 80% of the day

in the general education environment while 12.38% spent less than 40%. In comparison the report card for 2010 identified 11.4% students with disabilities with 4.51% diagnosed with autism. Of the 11.4% of students with disabilities, 62.33% spent at least 80% of the day in the general education environment while 12.64% spent less than 40%.

The Tennessee report card (2012) identified 11.8% ages 6 through 21 as students with disabilities with 5.39% being identified with autism. Of the 11.8% of students with disabilities, 63.40% spent 80% or more of their time in the general education classroom with 12.30% spending less than 40% of the day in the general education classroom. Tennessee met the 2012 target of 60% or more of the students spending more than 80% of their time in the general education while not meeting the 40% of the time in the general education classroom.

The graduation rate for students with disabilities has decreased from 67.9% to 67.40% while the dropout rate has increased from 4.25% in 2011 to 9.60% in 2012. The proficiency and advanced academic achievement in English I has decreased from 16.7% to 15.2% while English II has improved from 10.08% to 11.28%. The writing score has improved from 55.7% to 67.2% in the proficient and advanced academic achievement (www.tn.gov).

Secondary students across the country take the American College Testing (ACT) exam each year. Although the students with disabilities category was not separated data for the national and state scores comparisons, it is important to note the overall ranking for Tennessee. In 2011 Tennessee was one of eight states that mandated 100% of graduates test versus 49% nationally. In 2012 and 2013 nine states were mandated.

Students take the ACT test which can measure the state's progress towards its goal of greater number of students being both college and career readiness (www.tn.gov).

The ACT rankings include the 50 states and District of Columbia. Tennessee's 2011 highest ranking of T-43 was the average English score. For average composite and average reading Tennessee ranked 50. In 2012, Tennessee's ranking improved in all three categories: average composite was 48, average English was T-40, and average reading at 49. In 2013 the rankings were T-48, 42, and 47. Appendix A provides data from the ACT website (www.act.org) based on states with 100% tested students. For each state data the following data was gathered: number of students tested, average composite score, average English score, and average reading score with rankings for each. The national and top ranked states are also included.

Barriers and Issues

According to Tennessee Department of Education (www.state.tn.us/education) AS is under the umbrella of Autism/PDD. The diagnosis criteria are standard statewide using those from the *APA's Diagnostic and Statistical Manual (DSM-IV)* while each local school system develops an organized referral process to be eligible for special education. The diagnosis is based on various information were gathered, such as physical and neurological information from licensed physicians, experienced clinicians in the diagnosis and treatment of autism, parent interviews, behavioral observations, speech therapist, various assessment instruments, rating scales and checklists.

Economics may be a great barrier for classroom use of ATs and eReaders, tablets, and mobile applications. Tennessee has a total of 95 counties of which 27 are considered economically distressed and an 8.1% unemployment rate compared to 8.2% nationally

(www.tn.gov/ecd). The latest figure from the U.S. Census Bureau (2012) identifies Tennessee ranking 11th for persons below poverty level with a 15.5% of the state population (www.census.gov). In education, Tennessee ranks 45th based on expenditures per pupil in average daily attendance spending an average of $8,300 (www.nces.ed.gov).

Tennessee demographics may also be a major contributing factor in regard to AT product usage in the classroom. According to the U.S. Department of Commerce (2010), Tennessee ranked 43rd for presence and type of computer for individuals three years and older, by state. Computer home use includes desktops, laptops, netbooks, netbook computers, handheld computers, smart mobile phones, or other handheld wireless computers. Tennessee reported a 75.6% usage rate compared to the national average of 81.4%.

Limitation of the Study

The primary limitations of the surveys were the possibilities of low response rates. An ideal response rate is 30 – 50% but with increased responsibilities of special education supervisors and classroom teachers as well as the discouragement of districts allowing individuals to complete surveys the response rate may not reach 30%.

Definitions and Acronyms

ADHD: Attention Deficit Hyperactivity Disorder

APA: American Psychological Association

AS: Asperger Syndrome

ASD: Autism Spectrum Disorder

AT: Assistive Technology. According to the 29 U.S.C. § 2201 AT means technology designed to be utilized in an assistive technology device or assistive technology service.

ATA: Assistive Technology Act

ATD: Assistive Technology Device. Any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (29 U.S.C. § 2201).

AYP: Adequate Yearly Progress. Annual benchmark set by the state requiring a certain percentage of the school's subgroups to pass the exam (Payne-Tsoupros, 2010).

FAPE: Free Appropriate Public Education

GPS: Global Positioning System

HFA: High Functioning Autism

IDEA: Individuals with Disabilities Education Act

NCLB: No Child Left Behind

NINDS: The National Institute of Neurological Disorders and Stroke

PDA: Personal Digital Assistant

PDD: Pervasive Development Disorder

PDD-NOS: Pervasive Developmental Disorder Not Otherwise Specified

RTTT: Race to the Top

SRSD: Self-Regulated Strategy Development

Organization of the Study

The dissertation final report is divided into five chapters. Chapter 1 introduces NCLB and its impact on secondary students diagnosed with AS. The chapter provides an overview of the goal, what questions will be answered, and the relevance, significance, barriers, issues, limitations and delimitations associated with the study. Chapter 2 is a thorough literature review providing the foundation for the future work. The review synthesizes research in the areas of AS, AS teaching strategies, AS ATs, and eReaders, tablets, and the world of apps. Chapter 3 provides the research methodology used in the quantitative study. The research design, instrumentation, approach, and format for presenting results are included. Chapter 4 provides the results of the quantitative study using tables, charts, and narrative information. Chapter 5 has the conclusions, implications, recommendations, and summary of the report.

Chapter 2

Review of the Literature

NCLB mandates that all students achieve proficiency on state standardized tests by 2013-14 while meeting the federally set AYP targets. If schools fail to meet these targets then the federal government can impose increasingly strict sanctions over the next three years (Payne-Tsoupros, 2010). Reaching the proficiency level in reading/language arts for all subgroups can be major challenge specifically those students with disabilities (Linn, Baker, & Betebenner, 2002). Ennis and Jolivette (2012) state that the National Assessment of Education Progress writing assessment of 2007 released that only 6% of students with disabilities in grades 8 and 12 demonstrated proficiency on writing skills assessments. Add to those challenges the fact that all students must be in the general education classroom, students diagnosed with AS could have more difficulty meeting the proficient level.

Students diagnosed with AS have many of the same strengths and weaknesses in their learning; however, there is no single teaching strategy that works for all AS students. Since it is common for AS students to have one or more learning disability, or be gifted, or they may be both there is not a single program or strategy that should be followed.

Each student must be identified individually and receive individual strategies (Bashe & Kirby, 2005).

The following chapter provides a relevant review of literature pertaining to AS diagnosis and the appropriate teaching strategies and assistive technologies designed for AS students to promote success in the classroom.

Asperger Syndrome

The National Institute of Neurological Disorders and Stroke (NINDS; http://www.ninds.nih.gov) describe that in 1944, Hans Asperger, an Austrian pediatrician, observed four children who appeared normal, but had difficulty integrating socially and lacked nonverbal communication skills. Even though the children failed to demonstrate empathy with their peers they had above-average intellectual and language abilities. The condition, initially labeled Autistic Psychopathy by Asperger, did not come into use until 1981 when an English doctor, Lorna Wing, argued that autism included not only children who were aloof but also those who were socially active and odd in their behavior (Toth & King, 2008). Wing published a series of children case studies showing similar symptoms but emphasized that the disorder was different from classic autism, and called the separate disorder, Asperger syndrome. In 1992 AS became a distinct disease and diagnosis when it was included in the World Health Organization's diagnostic manual and in 1994 added to the *Diagnostic and Statistical Manual of Mental Disorders* (http://www.ninds.nih.gov).

The American Psychiatric Association (APA; http://dsm.psychiatryonline.org) classifies PDD as having severe and pervasive impairments in several areas of development such as reciprocal social interaction skills, communication skills, or the

presence of stereotyped behavior, interests, and activities. These impairments are distinctly relative to the individual's developmental level or mental age. There are five distinct pervasive developmental disorders: Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder (also known as AS), and PDD-NOS.

AS is a disorder with autistic-like symptoms such as severely impaired reciprocal social interaction and restricted patterns of behavior, interests, and activities while language impairment, delays, or acquisition typically do not appear (Dziegielewski, 2010). Again, the APA considers AS one of the five pervasive developmental disorders; however, the *Diagnostic and Statistical Manual of Mental Disorders* (2000) lists the language criteria differently from previous completed research. Because of the discrepancy in the AS language diagnostic criteria, many authors in more recent studies use their own definition of AS making it difficult to determine a usable definition and comparing various research data results (Whitby & Mancil, 2009). Overall, the language criteria discrepancy is extremely problematic with research results because it is difficult to distinguish between AS and high-functioning autism (Toth et al., 2008).

In May of 2013, APA released its fifth edition of *Diagnostic and Statistical Manual of Mental Disorders* twelve years since the fourth edition. AS is currently classified within the neurodevelopmental disorders and specifically as autism spectrum disorder without language or intellectual impairment.

> Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. Individuals who have

marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

NINDS reveals certain doctors consider AS a separate distinct disorder while others call AS a high-functioning autism (HFA) and view it on the mild end of the ASD. Even though AS symptoms differ, only in a degree, from classic autism some clinicians use the two diagnoses, AS and HFA, interchangeably. Therefore, population statistics for AS and ASD can only be estimated (http://www.ninds.nih.gov). Whitby et al., (2009) estimate 560,000 children between the ages of 0-21 having an ASD and the number is expected to increase, as approximately 1 in 150 children are being diagnosed due to better assessment and broadening of the diagnostic criteria. Autism Society (www.autism-society.org) states that ASD is the fastest-growing developmental disability with a 1,148% growth rate meaning 1% of the population of children in the U.S. ages 3-17 has an ASD, while Autism Speaks (www.autismspeaks.org) claim 1 in 110 children affected and boys being 4 times more likely than girls to be affected. Finally, more children will be diagnosed with autism in 2011 than with AIDS, diabetes, and cancer combined.

In March 2012, a consortium consisting of U. S. Centers for Disease Control and Prevention, NINDS, Autism Society, and Autism Speaks released new findings from a ten-year ASD research project. ASD affects 1 in 88 American children representing a ten-fold increase in prevalence in 40 years (www.cdc.gov). Autism remains the fastest growing serious development disability in the United States with boys five times more likely affected than girls (Baio, 2012). Although the incidence of AS is still not well

established, NINDS estimate that two to six out of every 1,000 children have the disorder. This is in comparison to previous findings of two out of every 10,000 children being affected (www.ninds.nih.gov).

A PDD, AS is characterized by limited interests, inflexible language, and social skills deficits without a history of cognitive or language delays before the age of three (Scharfstein et al., 2011). Other symptoms, such as clumsiness, unusual sensory reactions, and talk in unusual ways or with an odd tone of voice are present early in life, AS is typically not diagnosed until school age (www.cdc.gov). Toth and King (2008) state that the average age of diagnosis is 11 years old, compared to 5.5 years for autism. Children not being properly diagnosed can be problematic because of the missed opportunities of early, appropriate, structured education programs and interventions aimed at improving social competence.

Asperger Syndrome Teaching Strategies

According to APA (2013) ASD has three distinct criteria for diagnosis: (1) severe and sustained impairment in social interaction, (2) the development of restricted, repetitive patterns of behavior, interests, and activities, and (3) significant impairment in social, occupational, or other important areas of functioning. These traits and behaviors can be reduced in the general education classroom by using appropriate teaching methods as well as maintaining a well-managed classroom. Wong and Wong (2009) state that in a well-managed classroom students are deeply involved with their work, student expectations are understood, relatively little time is wasted, and the climate is work-oriented but relaxed and pleasant.

Winter and Lawrence (2011) suggest the most important factor for the overall classroom is consistency especially for AS students who need plenty of structure and typically react negatively to change. If possible, the teacher should prepare the student for potential change by explaining in full what will happen. Changes such as schedules, activities, and assemblies in their daily routine can lead to resistance and stress (Bashe et al., 2005). Also, when assigning any project, the teacher needs to be as explicit as possible with the requirements, expectations, grading, and due dates to help alleviate confusion (Egan, 2005).

Griffin, Griffin, Fitch, Albera, and Gingras (2006) describe three instructional strategies that are effective with AS students: priming, assignment modifications, and structural strategies. Priming is an advanced organization intervention strategy by familiarizing the student with the material prior to being taught establishing predictability, reducing stress, and increasing the chances of success. Teachers using assignment modifications can range from allowing extra time to complete assignments to creating alternative assignments. Finally, structural strategies such as visual supports, graphic organizers, outlines, and assignment notebooks can aid the student's academic success.

Social difficulties are a core condition for AS students and therefore must be a priority for the general education teacher. The misunderstanding of social cues, body language, and personal space as well as being unaware of nonverbal behaviors such as eye contact can cause a drastic change in the classroom dynamics (Gibbons & Goins, 2008). It is advised to assign seating for the AS student to encourage controlled interaction and cooperative learning. Using the 'think, pair, share' model provides

students time to think about a problem, explain their thoughts to a partner, and then join the class for discussion (Winter & Lawrence, 2011).

Children with AS often exhibit other indicators resulting in social impairment: poor nonverbal communications, failure to engage in spontaneous interactions, and an inability to form appropriate friendships. In fact, the Social Skills Rating System rate AS children as being less assertive and less cooperative because of their inability to identify emotions and nonverbal cues (Scharfstein et al., 2011). Specifically, the misunderstanding of what is being communicated, through the words or the flow of nonverbal information such as tone, rhythm, voice, and body language contributes to social impairment (Bashe et al., 2005).

One of the most distinguishing symptoms for AS individuals is their narrow, sometimes obsessive, interest. NINDS state that AS individual's unusual preoccupation with a particular interest leads to the exclusion of other activities. Interests range from vacuum cleaners and makes and models of cars to deep fat fryers and train schedules. No matter the single item of interest, the child becomes an expert with an enormous amount of factual information. With the obsessive interest, communication becomes overly formal, almost monotone, and typically becomes one sided (www.ninds.nih.gov). Therefore, general education teachers need to establish clear rules to limit perseverative discussions and questions based on the student's primary interest. Encouraging them to write, give presentations, and complete outside projects provides opportunities for the students to excel and accomplish an assignment while the subject matter remains their greatest interest (Bashe et al., 2005). On the other hand, AS students will also have to do assignments on topics that may not interest them so the teacher must again establish clear

rules. It must be made clear that the student is not in control and that specific rules must be followed such as the firm expectations set for completion of classwork (Williams, 1995).

Teachers who have a good understanding of AS and appropriate teaching strategies will foster a positive learning environment. Teachers who are more cognizant of their content delivery and are more aware of the AS student will not only assist the AS student and the entire class. Tips to keep in mind: avoid sarcasm and confusing figurative speech, keep teaching fairly concrete, use visual methods to teach abstract concepts, explain metaphors and words with double meaning, pause occasionally to check for understanding, use clear and literal language, and be explicit about what is being taught (Egan, 2005).

Asperger Syndrome Assistive Technologies

According to the 20 U.S.C. § 1401 (http://idea.ed.gov) AT is any item, piece of equipment or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities for individuals with disabilities. Emphasis is on the compensatory nature of the AT meaning it compensates for something a student cannot functionally do or perform.

In addition to meeting Individuals with Disabilities Education Act (IDEA; 2004) mandates, educators must adhere to the Assistive Technology Act (ATA; 1998). Also known as the Tech Act, funds are provided to states to support three types of programs: 1) establishment of AT demonstration centers, information centers, equipment loan facilitates, referral services, and other consumer oriented programs, 2) protection and advocacy services to help people with disabilities and their families, and 3) federal/state

programs to provide low interest loans and other alternative financing options to help people with disabilities and their families purchase needed AT. In regard to education, the ATA requires that any necessary AT device for a special education student must be provided to that student as part of a free appropriate public education (FAPE) (Simpson, McBride, Spencer, Lowdermilk, & Lynch, 2009).

AT is typically considered as products that focus on physical, sensory, and communication impairments that allow students to focus on their academic expectations and behaviors that may not be possible without the technology. Therefore, AT enhances, improves, or maintains the student's performance capabilities including: activities of daily living, communication, body support, environmental interaction, and sports. For educators, AT is a tool that allows a person to do a task that could not be done without the tool at the expected performance level (Parette et al., 2007). In order to reach the expected performance level, appropriate teacher recommendations must be considered. AT selection is based on careful assessment of the student's need, the overall course requirements, and the classroom context and dynamics (Cramer, Hirano, Tentori, Yeganyan, & Hayes, 2011).

Appropriate AT permits students to be more independent in achieving their own academic success as well as promoting their own independence, self-worth, and productivity. However, it is important to understand that there is definitely not a one size fits all. All students are different with their disability, level of the disability, and the individual needs so specific factors must be considered when choosing the appropriate AT. Factors to consider include training needed, technological features, functional

assistance to the student, individual performance, environmental use, and the student's knowledge of the device (Simpson et al., 2009).

Newman (2007) discusses secondary students with autism and their school experiences with AT. A technology aid is used by 57% of autistic students while 28% of the students use a calculator for activities not allowed for other students. Also, computer software designed for students with disabilities are used by 23% and 16% use a computer for activities not allowed for other students.

The inability to understand nonverbal behavior typically results in social relationship difficulties for students diagnosed with AS. Either lacking or misunderstanding of nonverbal behaviors such as eye contact, facial expression, and body gestures (Semrud-Clikeman, Walkowiak, Wilkinson, & Christopher, 2010) results in fewer social relationships leading to AS children experiencing frustration, outbursts, shut-downs, anxiety, and depression (Williams, 1995). Bianco, Carothers, and Smiley (2009) identify a variety of AT and software resources specifically for AS diagnosed students. Mind Reading (www.autismcoach.com) teaches social skills by helping students recognize facial expressions and emotions in others. According to the Autism Coach website (www.autismcoach.com) Mind Reading covers the entire spectrum of human emotions by exploring over 412 emotions. The software has six different people perform each emotion enabling the student to see the various facial expressions and hear the different tones the emotion can be expressed.

Other social skills training programs include REACT, a computer-based system built and tested so that individuals can experience social situations and choosing appropriate responses to unexpected events (Boujarwah, Riedl, Abowd, & Arriaga, 2011). Bashe et

al. (2005) encourage social skills training from answering a telephone to using computer and video technology. The Social Compass (www.lulu.com) is a behavioral and educational intervention that uses stories and paper-based visual cues to help guide the student in the right direction (Tentori & Hayes, 2010) while MOSOCO (www.monicatentori.com) is a mobile assistive application supporting The Social Compass curriculum that uses augmented reality to practice social skills in real-life situations (Escobedo, Nguyen, Boyd, Hirano, Rangel, García-Rosas, . . . Hayes, 2012).

To assist AS students, graphic organizers provide visual support when introducing new material. The relationships of key concepts shown in an organized framework allows time for processing as well as a concrete presentation for presenting abstract information. Examples of graphic organizers are semantic webs, timelines, and written visual supports (Griffin et al., 2006). Software such as Inspiration (www.inspiration.com) helps students to visualize, think, organize, and learn using their visual strengths. Both students and teachers can use the software's templates to create content specific graphic organizers (Bianco et al., 2009).

Originally designed as an electronic task organizer, personal digital assistants (PDA) enable AS students to be more organized and self-reliant. Calendar, tasks, and sticky notes along with alarm notifications increase the recording and completion of accurate homework assignments while reducing the reliance on others. The emergence of smartphones provides greater capabilities as well as not being an obvious AT device. Being so widely used and accepted, AS students prefer to actively and consistently use the device. Features such as wireless connectivity, Global Positioning System (GPS),

camera, video, messaging, and games provide both assistance and entertainment (Gentry, Wallace, Kvarfordt, & Lynch, 2010).

eReaders, Tablets, and the World of Apps

The ever-changing world of technology can be both hindering and progressing. The Consumer Electronics Association released information that smartphones are in more than half of U.S. homes, tablet computers are in one-third of homes, and annual consumer electronics sales to soar to $206.5 billion in 2012. Overall consumer electronic sales will see a 5.9% growth in 2012 and 30% revenue for smartphones and tablets (Snider, 2012). Apple (www.apple.com) announced their third quarter results highlighting the 17.0 million iPads sold during the quarter, representing an 84% unit increase over the year-ago quarter and the iPhone had a 28% unit growth over the year-ago quarter with sales reaching 26.0 million.

eReader market leaders Amazon and Barnes and Noble produce the most widely used eReaders. The various Kindle models and Nook family vary only on price and preference. The hardware is almost identical as well as are the screen and technology. Neither has a physical keyboard; both have a disappearing keyboard only visible when needed. The price difference is based on connectivity of 3G or Wi-Fi and whether to have advertisements or not (Griffey, 2012). Amazon has the greater market share of eReaders and eBooks, a computer file or electronic copy of a printed book. eBooks are small, condensed files permitting numerous novels to be loaded on the eReader (Ramaiah, 2012).

eBook sales for the first quarter of 2012 in the United States have for the first time overtaken sales of hardbacks. For example, Bloomsbury, the publisher of the Harry

Potter series, had a 70% increase year-on-year sales for the first quarter (Davoudi, 2012). Education has also seen a shift from print to electronic in textbook sales. Cost and ease of use are primary factors for the shift. Publishers can load the content and later modify to meet specific standards. Built-in modules such as interactive games and maps as well as online assessments including true and false questions, open-ended response, and fill-in-the-blank assists educators with various learning styles (Ramaiah, 2012).

Tablet computers were originally introduced in 2000 after Windows created a computer without a keyboard; however, not until 2010 did the tablet become the primary technology device for the everyday individual. Expanding and improving on the standard eReader, tablets provide the end user with software applications, web browser, media capabilities, gaming, and a world of mobile applications (apps) ranging from shopping and banking to gaming and movies. Currently, the apps for iOS and Android devices have the market share (Griffey, 2012).

The Apple app store receives on average 775 new apps per day and with over 30 billion downloads apps is certainly a world in itself. Therefore, it is overwhelming to view and determine appropriate apps for education. Areas such as books, reference tools, utilities, news, productivity, gaming, entertainment, and navigation all provide excellent apps for teachers and students. Walker (2011) provides several criteria when selecting educational apps: stability/reliability, consistency with the platform, fast loads, and usability. To further assist with selections Walker created an apps selection rubric based on important criteria from educators: curriculum connections, authenticity, feedback, differentiation, user friendliness, and student motivation. Murray and Olcese (2011) categorize apps by tutor, explore, communication, and tool by asking basic questions

regarding the app to provide insight whether the app is appropriate or not. For instance, can users add or create information? Can users collaborate with others? Does the app have multi-purposes?

Appendix B provides a snapshot of various apps for students, parents, and teachers to assist AS individuals. The list was compiled by searching iTunes, Google Play, Autism Speaks, and technology websites.

Reading/Language Arts Teaching Strategies Designed for AS and ASD Students

Over 70% of people who are diagnosed with an ASD have an additional mental health condition. Three conditions that can specifically make reading/language arts more challenging are Attention Deficit Hyperactivity Disorder (ADHD), Dyslexia, and Dysgraphia. ADHD is the inability to maintain concentration even though the child is trying his very best. Dyslexia is a condition where the student has difficulty decoding single words, which in turns makes reading, writing, and spelling more confusing. Dysgraphia is the difficulty of putting thoughts into writing, especially while either trying to read the board or listen to someone talk at the same time (Winter & Lawrence, 2011).

Academically AS students have an average or above average academic achievement with an uneven pattern of performance indicating distinct strengths and weaknesses. They characteristically have well developed formal language skills, such as phonology, syntax, and semantics, but exhibit difficulties with the social or pragmatic uses of language (Sciutto, Richwine, Mentrikoski, & Niedzwiecki, 2012). Also, children with AS often have excellent reading recognition skills, but their language comprehension is weak. This is especially evident when the child writes on a subject that does not provide interest therefore producing poor work (Williams, 1995).

Although AS individuals do not have problems with language or intellectual disabilities (www.cdc.gov) they do, however, have challenges with the development of composition skills. This is due primarily because of their lack of communication skills. Writing is considered a social communication between the writer and the audience and requires cognitive, linguistic, and motor processes simultaneously while the student is planning, writing, organizing, and revising (Pennington & Delano, 2012).

Pennington et al. (2012) provide teaching recommendations for effective writing instruction: teach students strategies for planning, revising, and editing; use instructional collaboration in planning, drafting, revising, and editing compositions; and teach students how to combine sentences to make more complex sentences. Whalon and Hart (2011) suggest using two strategies: question-generation and retelling. Question-generation teaches students how to generate and respond to questions about text, such as identifying the main idea or the ability to make connections. Retelling, on the other hand, asks students to retell what was read so that the teacher identifies whether or not comprehension has been mastered.

The major areas of writing weakness include organization skills, attention, and complex processing across domains including listening and reading comprehension (Whitby et al., 2009). To assist with the writing process of planning, composition, editing, revising, and publishing is a program called Self-Regulated Strategy Development (SRSD) that was developed in 1982 to address the needs of students with poor writing skills. The program is designed to address difficulties with the student's writing as well as their attitudes and motivation related to the overall writing process. SRSD has 8 to 12 lessons lasting 30 to 40 minutes each and being administered 3 times

per week either individually, in small groups, or whole class formats (Ennis et al., 2012). Evidence was shown that using SRSD improved the student's work both in quantity and quality (Delano, 2007) as well as writing fluency and story quality (Schneider, Codding, & Georgiana, 2013).

Schneider et al. (2013) also suggest using either a word processing program, such as WordPad, or the Dragon NaturallySpeaking software to assist AS students with their writing. Using WordPad rather than a full version of a word processor software allows AS students to easily write their story without all the distractions of automatic correction and other editing tools. The Dragon software enables the student to orally tell the story and be converted to text rather than handwriting or using the keyboard.

Relationship of the Literature to the Study

Teachers having students diagnosed with AS may find their classroom having a different dynamic. The assumed additional requirements needed may seem overwhelming at first; however, once the teacher understands AS diagnosis, identify the various teaching strategies, and be familiar with the available assistive technologies, teachers will soon discover there is no difference. The comprehensive list created will enable teachers with the appropriate tools for a successful environment for all students.

Chapter 3

Methodology

Overview

Tennessee students diagnosed with AS must meet the reading/language arts and mathematics proficiency level by 2013-14 while participating in secondary general education classrooms. The NCLB Act (2001) requires all students – regardless of poverty level, learning disability, limited English proficiency, or racial/ethnic origins – be in general education classrooms. The goal of the investigation was to compile a comprehensive set of teaching strategies and assistive technologies used in the general education classroom designed to improve reading/language arts for secondary students diagnosed with AS.

Research Design

A quantitative study based on Gay, Mills, and Airasian's (2009) survey research design was the guiding methodology. Two separate cross-sectional surveys provided specific answers based on the respondent's beliefs, attitudes, and demographic composition. Specifically, a cross-sectional survey gathers data rather quickly since it is a single, stand-alone study and because technology changes so quickly these surveys allow for the most up-to-date recommendations.

According to Gay, et al. (2009) the most commonly used type of survey questions are structured items that require the respondent to choose between provided response options. To allow the respondent to elaborate further or provide greater depth of a response, unstructured items are also commonly used. However, the use of unstructured items should be limited because many respondents will not take the time to respond or will give unclear or useless responses.

Instrumentation

There were two separate surveys delivered, one for the special education supervisor (Appendix C) and the other for the special and/or general education teachers (Appendix D), both having structured and unstructured items. The special education supervisor's version included the following sections:

- respondent demographics,
- system demographics,
- AS and other diagnoses, and
- AS and AT.

These sections focused on the overall school district demographics, student enrollment, and district purchases. The special and/or general education teacher's survey featured:

- respondent demographics,
- school demographics,
- AS,
- positive learning environment designed for students with an ASD,

- ATs and AS,
- eReaders, tablets, mobile applications to improve academic performance, and
- teaching strategies and AT.

SurveyMonkey (www.surveymonkey.com), a provider of web-based survey solutions, enabled the researcher to create surveys with custom templates and then to e-mail to the participants (Creswell, 2014). Using SurveyMonkey, the two cross-sectional surveys were designed, validated, and distributed through Tennessee's 150 special education district supervisors (www.tn.gov/education/speced). The e-mail's cover letter (Appendix E) introduced the investigator, the purpose and goal of the dissertation, and requested their participation. The e-mail also included two survey links, one designed for the supervisor and the other for special education and general education teachers, requesting the supervisor complete the survey and then forward the e-mail to educators encouraging participation. Tennessee has 400 active 9-12 secondary institutions and gathering input from both district supervisors and educators provided a greater number of teaching strategies and appropriate AT for AS students (www.k-12.state.tn.us).

The following table identifies experts employed by Williamson County Schools in Franklin, Tennessee, who evaluated the survey instruments for validity and reliability. The experts confirmed its reliability by verifying the scales were appropriate for each question as well as being consistent throughout the surveys.

Table 1

Expert's Contributions to Survey Development

Position	Expert Contributions
District Wide Autism Specialist	Autism terminology, identified that AS is not listed as a specific disorder in TN – it is listed as Autism
District Special Education Supervisor	Special education terminology, question clarity and understanding
High School Principal	Question validity and reliability
High School Assistant Principal	Question validity and reliability
High School Student Support Services Department Chair	Special education questions clarity and understanding
High School English Teacher	General education clarity and understanding

Following discussions with the autism specialist, both surveys were edited for terminology. The state of Tennessee does not identify AS specifically, rather AS falls under the umbrella of Autism/Pervasive Development Disorder. Therefore, questions specific to students being diagnosed with AS have to be more opinion based rather than actual data. The supervisor can typically identify AS students based on knowing the individual and which diploma the student receives.

Once the surveys were determined to be reliable and valid, application for human subject research for the Nova Southeastern University Institutional Review Board. Upon approval (Appendix F), an application for conducting research projects at Williamson County Schools was submitted to the Research and Program Development department.

Following the district's approval (Appendix G) and prior to formal distribution, the surveys were pilot tested by a small population of general education and special education teachers within the Williamson County Schools district. Gay et al. (2009) encourage pilot testing with a small group that can help identify problems and be representative of the 150 special education supervisors and the special education and general education population. Feedback, questions, and concerns enabled an accurate survey for distribution. Once the surveys received final approval, the e-mail was distributed through SurveyMonkey allowing for participants' anonymity and the gathering of analysis data for final results. Data collection then occurred in two phases over a seven-week period.

Approach

Research Question 1: What is the consensus of the current literature on the best teaching practices for students diagnosed with AS?

The literature review provided the best teaching practices for students diagnosed with AS. Using the guidelines in conducting a literature review provided by Gay et al. (2009) a list of keywords was identified to guide the literature review. Keywords essential to the best teaching practices included: teaching practices, AS teaching practices, AS and classroom, AS behaviors, and classroom management.

Once the keywords were established, primary and secondary sources were located. Primary sources contained first-hand information from articles published in current peer-reviewed journals, peer-reviewed conference proceedings, and books. Secondary sources, second-hand information found in handbooks, encyclopedias, and reviews, were then searched and reviewed. Nova Southeastern University's Alvin Sherman Library's

electronic resources provided the sources needed by searching its database on subjects. Searched databases included: Computer and Information Sciences, Education, and Psychology and Behavioral Sciences.

Once the resources were located, all were then evaluated on its appropriateness with teaching practices. Evaluation included relationship to current research question, who was studied, where was the source published, when was the research conduction, and how was the study conducted. The sources were then abstracted and later organized and reported in the literature review.

Research Question 2: What is the consensus of the current literature on appropriate AT for students diagnosed with AS?

The literature review provided appropriate AT for students diagnosed with AS. The process of conducting a literature review by Gay et al. (2009) in research question 1 was also done for research question 2 with the following exceptions.

- Keywords researched: ATs, AS, AT and classroom, AS and AT
- Locate resources: websites included. Government and software company websites were searched regarding legislative laws and software developed for AS.

Research Question 3: What teaching strategies are used in the general education classroom to foster a positive learning environment for students diagnosed with AS?

The educator survey addressed two specific areas of teaching strategies: classroom management style and respondent's teaching strategies. Identifying 10 management style techniques and five teaching strategies along with a Likert scale of never, rarely,

sometimes, often, and always required the respondent to evaluate their own classroom management style and their various teaching strategies. Items such as assigned seating, work-oriented environment, expectations, and consistencies identified the respondent's classroom management style. Whereas, "think, pair, share," figurative speech, checking for understanding, and literal language identified the respondent's teaching strategies. Following both items was a comment/essay box requesting the educator to explain their own styles and strategies they have found to be successful.

Research Question 4: What AT products are being used by secondary education AS students in Tennessee's general education classroom?

The special education supervisor survey was designed specifically for AT products being used. Survey items related to school system demographics included system type, community, region, enrollment, and the percentage of all students being identified as students with disabilities, economically disadvantaged, and Title 1. Other survey items included the amount of federal funds being spent on AT, approximate number of AS students enrolled, district's referral system, and other disabilities identified. There were two likert scale questions related to the purchase of AT: satisfaction of various technologies and the quality of social skills software designed specifically for AS students. Each question had a comment/essay box regarding the specific purchases by the district and whether or not they recommend the technologies.

The educator survey also addressed the research question in one Likert scale question followed by a comment/essay box. The satisfaction question used in the supervisor's survey was also included in the educator's version. Rather than asking if purchases have been made the question asked if these technologies are being used in the classroom.

Research Question 5: How are eReaders, tablets, or mobile applications currently used in the classroom to improve academic performance for students diagnosed with AS?

The educator's survey was designed to answer this question. The first two questions were based on utilization of eReaders and tablets in the classroom. Specifically, how the students were using eReaders and tablets, whether as textbooks, magazines, web browsers, or entertainment followed by an other option box.

The literature review provided a list of available mobile applications through iTunes and Google Play as well as internet search engines for students diagnosed with AS. The applications were developed to assist AS students therefore, using a likert scale based on utilization all the listed applications were identified with the following utilization scale: student only, teacher only, both student and teacher, or neither.

Research Question 6: What teaching strategies and ATs are recommended for use in the general education classroom to improve reading/language arts for students diagnosed with AS?

In order for educators to understand AS better, the educator survey addressed the percentage of AS students diagnosed with ADHD, Dyslexia, or Dysgraphia followed by the AS traits exhibited in the classroom. Specific teaching strategies to improve reading/language arts included question-generation and retelling and appropriate ATs included Self-Regulated Strategy Development, WordPad, and Dragon NaturallySpeaking.

Resources

To compile a comprehensive set three resources were required: most up-to-date contact information for Tennessee's special education supervisors; SurveyMonkey for

creation, collection of results, and data analysis; and Nova Southeastern University's e-mail system.

Summary

A quantitative study was the guiding methodology to complete two cross-sectional surveys designed for Tennessee's special education supervisor and special education and/or general education teachers. The surveys were created and distributed through SurveyMonkey following IRB approvals. The surveys were designed to expand on information gathered in the literature review in order reach the dissertation goal.

Chapter 4

Results

This chapter reports the results of the quantitative study that was described in Chapter 3. As previously summarized, Tennessee students diagnosed with AS must meet the reading/language arts and mathematics proficiency level by 2013-14 while participating in secondary general education classrooms. Therefore, the goal was to compile a comprehensive set of teaching strategies and ATs used in the general education classroom to improve reading/language arts for secondary students diagnosed with AS.

Using the contact information from the Tennessee Department of Education, there were 150 special education supervisors identified; however, a duplicate e-mail was identified and removed having a final number of 149 supervisors. The initial contact yielded a response total of 15 special education supervisors, six educators, and eight returned e-mails. Four district special education supervisors replied to the original e-mail three of which their district requires IRB approval and the fourth stating there were no AS students enrolled in the district. After confirming e-mail addresses for the original eight returned, the e-mail was resent and still received three bounced backs.

After four weeks of receiving feedback and purging the bounced backs and the returned responses, a reminder e-mail was resent to the original 137 district supervisors.

At the end of the collection date a total number of 31 completed the supervisor survey and 23 had completed the educator survey, a 21% return rate.

Respondent Demographics

The supervisor survey yielded 28 of the 31 respondents as special education supervisors, two special education teachers, and one part-time supervisor/part-time teacher with an average of three years in their current position compared to 30 years as an educator. The 27 females and four males had a minimum of a master's degree with five having a doctorate. Eleven of the respondents had 32 or more years experience as an educator.

The educator survey had a breakdown of 16 as special education teachers, one special education supervisor, four general education teachers, a school psychologist, and a speech/language pathologist. The average years of experience in their current position was four compared to 11 years as an educator with only three individuals having more than 30 years of experience as an educator. Of the 19 females and four males only four individuals had an Ed.S., eight a bachelor's and 10 a master's.

System Demographics

Figure 1 is a graphical representation of Tennessee demographics gathered from the 29 of 31 supervisor responses. Tennessee is geographically divided into three regions with eight core districts, three community types, and three types of school systems. The three regions in Tennessee are West, Middle, and East. The three community types are rural (typically considered country or farmland where there are fewer people who live further apart), suburban (communities are usually close to, but not, in cities and they have fewer people than urban communities, but many more than in rural communities), and

urban (cities where lots of people live close together in a small amount of space). The three types of school systems in Tennessee are city, county, and special school.

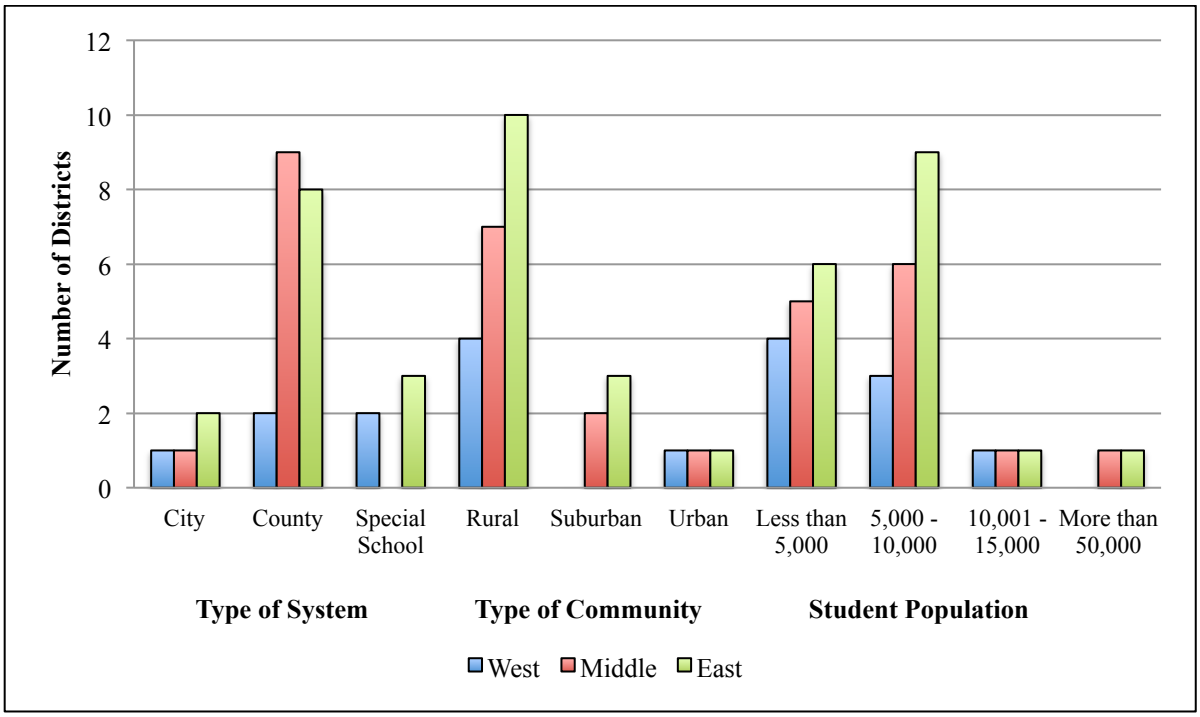

Figure 1. System demographics based on supervisor responses. Three demographic categories separated by region: type of system, type of community, and student population.

The supervisor survey also requested the number of schools and student population in their district. The results were: West had 48 schools in five systems, Middle had 243 in ten systems, and East Tennessee had 128 in 14 systems.

The educator survey did not include the geographical location of the region because the survey was designed more for the individual school rather than the district. Of the 22 responses there were three city systems, 17 county schools, and two special school districts. The schools (77%) were located primarily in rural communities. Twelve educators responded to the type of school where they worked: three for K-8, two for 6-

12, four for 7-12, and three grades 9-12. Finally, 22 responded to the NCLB status of their school: nine educators chose proficient, four chose needs improvement, and nine educators responded unknown.

Student Demographics

Tennessee has three classified student categories: Students with Disabilities, Economically Disadvantaged, and Title 1. Students with disabilities can have mental, physical, or learning disabilities whereas, economically disadvantaged students are those who receive free or reduced-price lunch. Tennessee Department of Education (2014) describe Title 1 as a program under the NCLB Act (2001) with the purpose of supporting local school districts to improve teaching and learning in high-poverty schools so that students may meet the state's challenging content and performance standards.

Table 2 identifies the supervisor response to the percentage of all students being classified in the three categories. The responses were then separated by region.

Table 2

Student Classification Percentage of All Students

	Students with Disabilities			Economically Disadvantaged			Title 1		
	West	Middle	East	West	Middle	East	West	Middle	East
0-10%						1			
11-20%	4	6	13					2	
21-30%	1	3	1						
31-40%						1	1		2
41-50%					3	3		2	3
51-60%					2	2		1	1
61-70%				3	1	3	1	1	2
71-80%				1	3	3	1	2	3
81-90%						1		1	
More than 90%							2		2
Total Number of Responses	5	9	14	4	9	14	5	9	13

Asperger's Syndrome in the School

The supervisors' had an open-ended inquiry based on their professional opinion the approximate number of enrolled Autistic students were diagnosed with AS. Twenty-two supervisors responded with the following data: West region had 91 in three systems, Middle had 191 students in six systems, and the East region had 283 in 12 systems. Of these responses, there were five districts with a total of 89 students that do not have an organized referral process for Asperger diagnosis. One hundred percent of the respondents use parent interviews, behavioral observations, and various assessment instruments in their organized referral process, 94% include licensed physicians and

rating scales, 88% use speech therapists, 82% use checklists, and 64% include experienced clinicians. Three respondents specified other items on their referral that included SLP's, OT evaluation, and observations.

Educators were asked how familiar they were to AS prior to the survey. Thirteen percent responded slightly familiar and somewhat familiar, whereas 45% responded moderately familiar, and 27% were extremely familiar. Therefore, the 22 respondents did know something about AS prior to the survey. They were also asked how many AS students they have had in their classroom over the past 5 years. Seventeen educators have had 0-9, 3 educators with 10-19, and 2 with 20-29.

Positive Learning Environment

Figure 2 is a visual representation of classroom management styles to foster a positive learning environment. Educators responded always at 80.95% that students know what is expected of them and 76.19% that the teacher established clear rules to limit perseverative discussions. Educators also responded 71.43% of always being consistent with classroom rules.

Educators indicated often as their primary choice for the following characteristics: students are deeply involved with their work (60%), work-oriented environment (55%), and little time being wasted (47.62%).

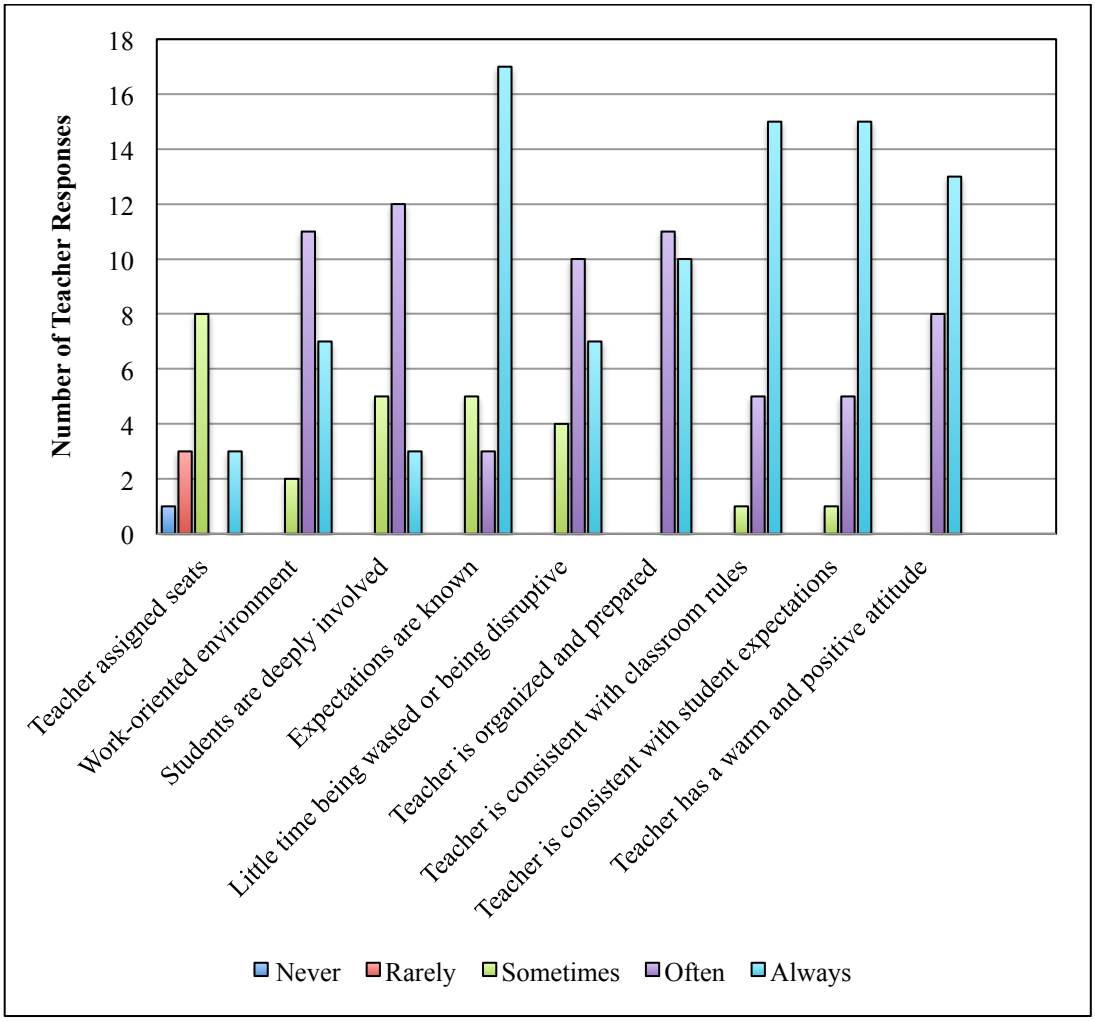

Figure 2. Classroom management styles based on educator responses. Educators ranked their personal classroom management style using the rating scale.

There was an open-ended question requesting additional management strategies that have been used specifically for students with an autism spectrum disorder. Responses included: picture exchange system, picture schedules, and daily schedule chart to help with anxiety. Class rules should be posted and explained and be very consistent. Being prepared and making expectations clearly known is very important. Prompting the student prior to abnormal routines, using I-messages, allowing extra time to complete activities, creating a structured environment, and having a quiet area for the student to

cool down or take a break. Role-play. Catch the student being good and praise that behavior and if a problem occurs discuss actions and consequences and then give the student time to make the right decision. Finally, clearly defined guidelines and goals that are specific to the student.

Teaching Strategies

Figure 3 represents teacher responses to the five teaching strategies used in the classroom that were identified in the literature review. Fifty-five percent sometimes use cooperative learning, whereas 57.14% often use both avoiding sarcasm and confusing figurative speech and pausing to check for understanding. Eight teachers always pause for understanding, use visual methods to teach abstract concepts and uses clear and literal language.

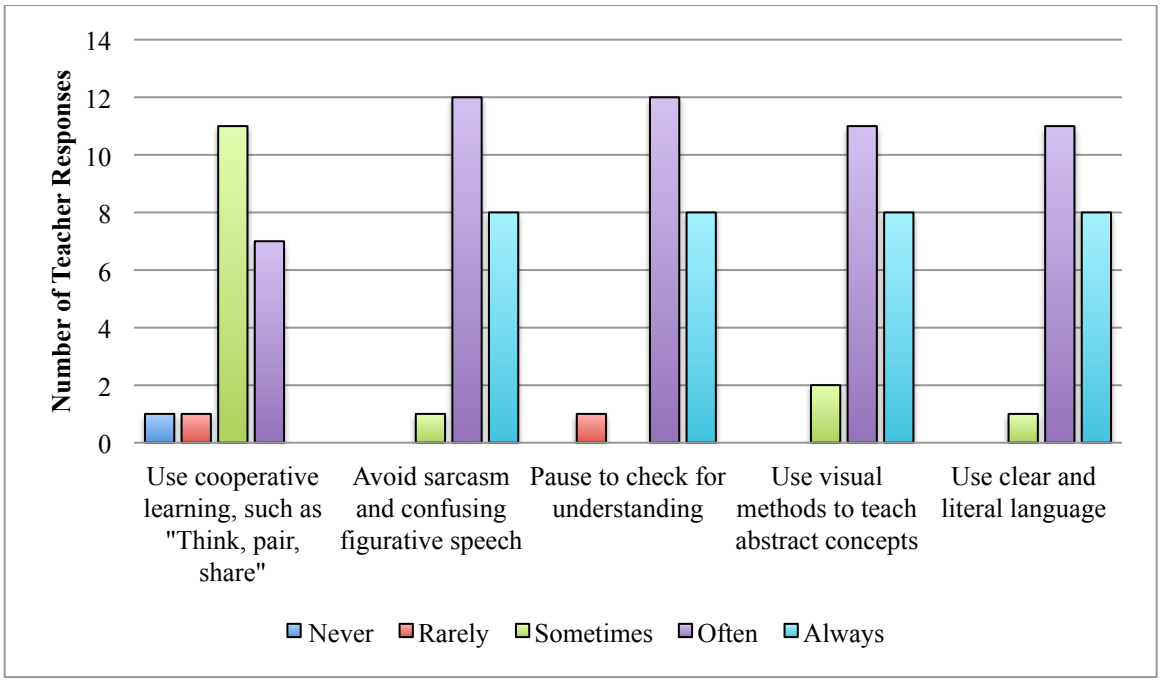

Figure 3. Teaching strategies used in the classroom. Educators ranked their personal classroom management style using the rating scale.

The educators had an open-ended question requesting to list other teaching strategies that have been successful for AS students. Responses included visuals such as photographs, charts, and visual cues as well as picture schedules using words, pictures, or both attached to Velcro allowing to replace and remove items. Also included were hands on activities and the use of communication devices.

Assistive Technologies

Figure 4 is a visual representation of the supervisor's survey responses regarding amount of federal funds received each year was spent on AT for autistic students compared to its district population. The average of the 21 responses was $501 - $1,000 being spent and two districts spending more than $10,000.

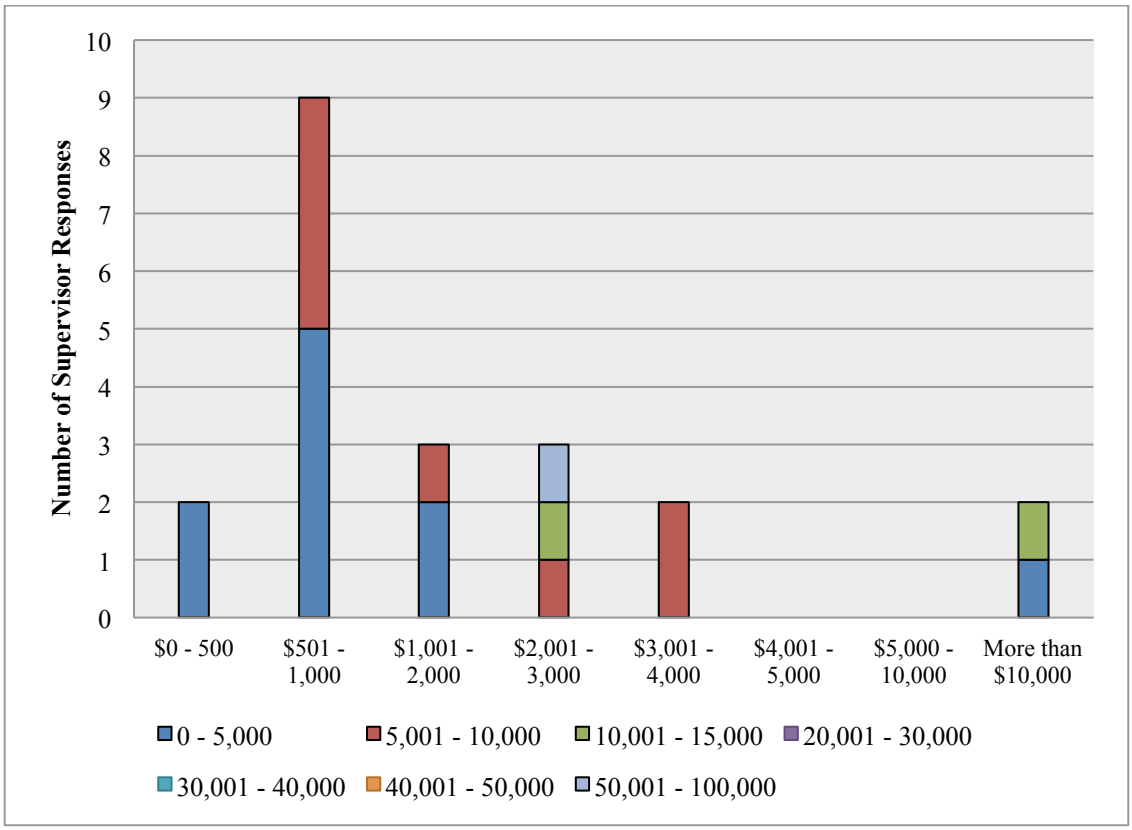

Figure 4. Amount of federal funds spent on AT for autistic students.

Based on available funds, supervisors purchase certain AT for autistic students. Figure 5 identifies AT items that supervisors have purchased and the average satisfaction ranking for each. Desktop computers, laptop computers, iPads, and mobile applications all received very satisfied rankings. The iPad was purchased the most with 76% of the supervisors providing them for their students. Both PDAs and eReaders were purchased only by five supervisors and on average not at all satisfied with the purchase. Four supervisors purchased the tablet and each had a different satisfaction rank: not at all, moderately, very satisfied, and extremely satisfied. As an open-ended response, the supervisors identified other ATs that they personally recommended: iPod, communication devices, and large key keyboards.

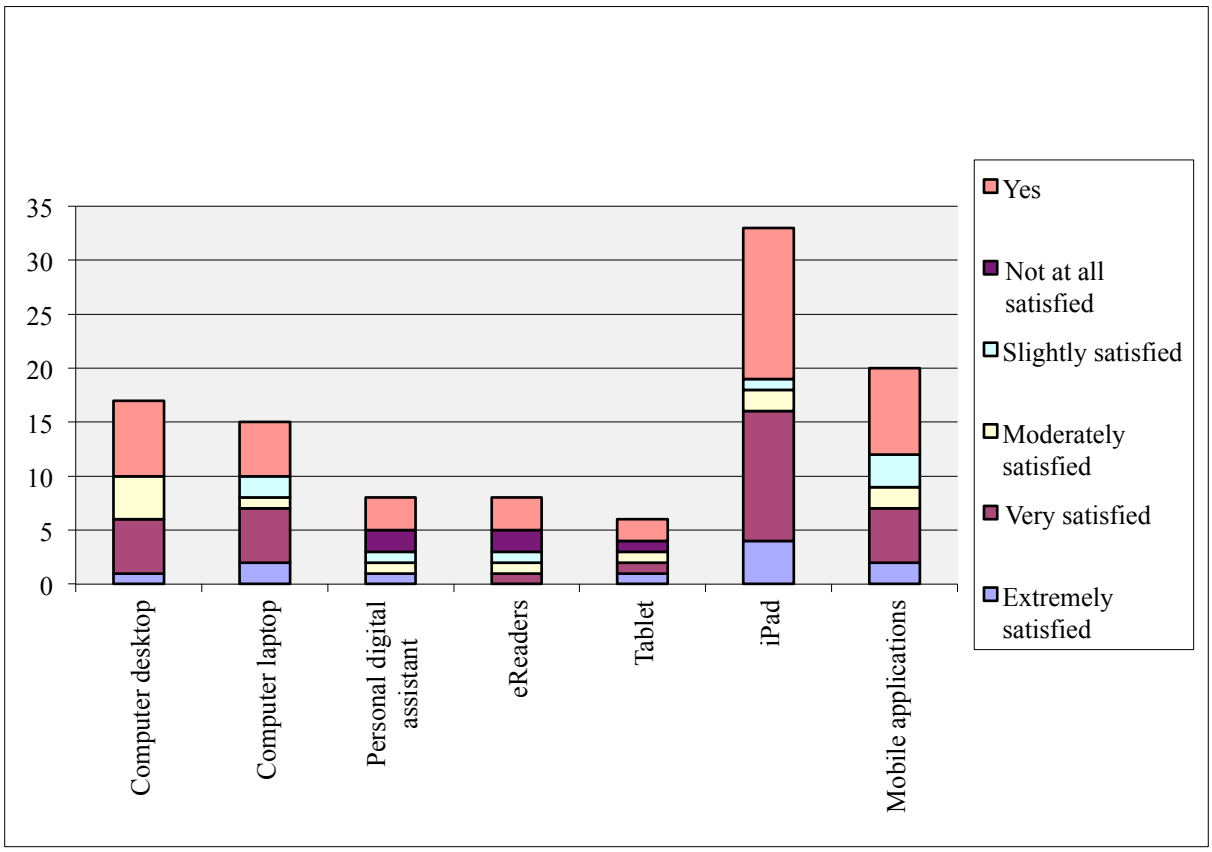

Figure 5. District level ATs purchased for students diagnosed with autism. Supervisors indicated if ATs were purchased and then ranked level of satisfaction using the rating scale.

The educators used the following ATs the most in their classroom and provided their satisfaction ranking. Desktop computers were used the most and had an average of extremely satisfied ranking. Laptops and iPads were the second most used receiving a very satisfied franking. The educators also suggested graphic organizers and agendas with moderately satisfied ranking. The following ATs were used by less than five educators and ranked them accordingly: eReaders – extremely satisfied, personal digital assistants and tablets – very satisfied, and mobile applications and smartphones neither had an average ranking. The educators also had an open-ended response requesting other

ATs being used in their classroom and they included iPods and Lady Bug document camera.

Specific software of Mind Reading, REACT, The Social Compass, and Inspiration are recommended for AS students. However, no supervisor had purchased any of the software for their district.

eReaders, Tablets, and Mobile Applications

eReaders, such as the Kindle or Nook can be utilized in the classroom for students with an autism spectrum disorder. Seven educators use them for textbooks, library books, and entertainment. Autistic students in the classroom are also utilizing the tablet, such as the Windows tablet for software applications, web browser, and entertainment.

The educator survey identified 17 mobile applications that have been developed specifically for AS students. Of those 17 applications the student or teacher is not utilizing nine of them, including Asperger 101, Asperger's Syndrome, or Aspergers Answers Revealed. The app utilized the most by teachers and students is Reading Trainer followed by English Reading Comprehension and ABA Flash Cards and Games – Emotions. One educator responded both student and teacher utilized for The Social Express, Imagine, and DropBox. Only one student used Dragon Dictation application.

ATs Recommended to Improve Reading/Language Arts

Table 3 indicates the responses from supervisors and educators regarding the percentage of students identified with an ASD and another condition over the past five years.

Table 3

Students Diagnosed with ASD and Another Mental Health Condition

	Attention Deficit Hyperactivity Disorder		Dyslexia		Dysgraphia	
	Supervisor	Educator	Supervisor	Educator	Supervisor	Educator
Never	0%	19%	14%	36%	9%	7%
Rarely, in less than 10%	18%	6%	57%	27%	52%	33%
Occasionally, in about 30%	18%	25%	10%	27%	10%	20%
Sometimes, in about 50%	46%	19%	19%	10%	24%	13%
Frequently, in about 70%	18%	12%	0%	0%	5%	13%
Usually, in about 90%	0%	19%	0%	0%	0%	7%
Always	0%	0%	0%	0%	0%	7%

Academically AS students have an average or above average academic achievement and characteristically have well developed formal language skills. Table 4 is a visual representation of the eight traits that are typically exhibited by AS students and the percentage of students that the teacher has had over the past five years.

Table 4

AS Exhibited Traits

	Never	Rarely, in less than 10%	Occasionally, in about 30%	Sometimes, in about 50%	Frequently, in about 70%	Usually, in about 90%	Always
Average Academic Achievement	7%	13%	7%	33%	33%	7%	0%
Above Average Academic Achievement	27%	13%	13%	7%	20%	20%	0%
Distinct Strengths & Weaknesses in Language Skills	6%	6%	13%	25%	19%	25%	6%
Well Developed Formal Language Skills	8%	21%	8%	21%	21%	21%	0%
Difficulties with the Social or Pragmatic Uses of Language	0%	6%	6%	19%	19%	31%	19%
Challenges with the Development of Composition Skills	0%	7%	7%	40%	20%	20%	6%
Weakness of Organization Skills	0%	6%	6%	25%	38%	25%	0%
Average Reading Comprehension	0%	13%	20%	33%	14%	20%	0%

The literature review suggested various teaching strategies and ATs for AS students to improve reading/language arts. Two specific teaching strategies included question-generation and retelling strategies and the teacher response usage stated 55% and 82%

respectively. Two computer programs, Self-Regulated Strategy Development (SRSD) and Dragon NaturallySpeaking, are designed to assist students with poor writing skills, however, none of the teachers used SRSD but 67% used Dragon NaturallySpeaking. Also suggested was using a very simple word processing program and 67% of the surveyed teachers used WordPad.

Summary

Using the methodology discussed in Chapter 3, this chapter provided the results. Following seven weeks of receiving feedback, a total of 31 completed the supervisor survey and 23 completed the educator survey reflecting an overall 21% return rate. The data was analyzed and synthesized in order to provide conclusions, implications, and recommendations in Chapter 5.

Chapter 5

Conclusions, Implications, Recommendations, and Summary

This chapter will provide answers to the research questions first presented in Chapter 1. The results in Chapter 4 and synthesis of the literature in Chapter 2 provided answers to the research questions followed by the implications and recommendations.

Conclusions

1. *What is the consensus of the current literature on the best teaching practices for students diagnosed with AS?*

The following are best teaching practices found within the current literature.

- Positive learning environment: well-managed, work-oriented, relaxed, and pleasant atmosphere. Students are involved and not wasting time.
- Consistency: established clear rules, expectations, and limiting disruptions.
- Social misunderstandings: social cues, body language, personal space, as well as nonverbal behaviors such as eye contact. Avoid sarcasm and confusing figurative speech. Keep teaching fairly concrete and explain metaphors and words with double meanings.

- Instructional strategies: priming, assignment modifications, and structural strategies. Think, pair, share. Pause to check for understanding. Use visual methods to teach abstract concepts. Use clear and literal language.

2. *What is the consensus of the current literature on appropriate AT for students diagnosed with AS?*

A variety of classroom ATs are recommended for AS students.

- Technology: calculators, desktop and laptop computers
- Graphic organizers: semantic webs, timelines, and written visual supports
- PDA: calendar, tasks, sticky notes, alarm notifications
- Smartphones: wireless connectivity, GPS, camera, video, messaging, and games

Four software programs have been specifically developed to improve social and organizational skills in AS individuals.

- Mind Reading helps students recognize facial expressions and emotions in others.
- REACT is a program where individuals experience social situations and then requires appropriate responses to unexpected events.
- The Social Compass is a behavioral and educational intervention program.
- Inspiration encourages students to visualize, think, organize, and learn using their visual strengths.

3. *What teaching strategies are used in the general education classroom to foster a positive learning environment for students diagnosed with AS?*

The following classroom management styles have been effective in the general education classroom:

- Environment: teacher assigned seats, work-oriented environment, students deeply involved, expectations are known, little time is wasted or being disruptive, class rules posted, structured environment
- Classroom teacher: organized and prepared, consistent with classroom rules, consistent with student expectations, and a warm and positive attitude
- Reducing anxiety: picture exchange system, picture schedules, daily schedule chart, prompting the student prior to abnormal routines, praise good behavior
- Student assistance: using I-messages, allowing extra time to complete activities, quiet area for the student to cool down or take a break, role-play, if a problem occurs discuss actions and consequences and then give the student time to make the right decision, clearly defined guidelines and goals that are specific to the student.

4. *What AT products are being used by secondary education AS students in Tennessee's general education classroom?*

AS students use a variety of AT products in Tennessee's general education classroom. Most widely used items are desktop computers, laptop computers, iPads, graphic organizers, and agendas. Additional recommendations included iPods, large key keyboards, and Lady Bug document camera.

5. *How are eReaders, tablets, or mobile applications currently used in the classroom to improve academic performance for students diagnosed with AS?*

eReaders, tablets, and mobile applications can improve academic performance for students diagnosed with AS. eReaders, such as the Kindle and Nook, are currently

utilized for textbooks, library books, and entertainment. Textbooks as eBooks have built-in modules such as interactive games and online assessments. Publishers have the ability to upload modified or new information to meet specific standards.

Tablets are expanding and improving on the standard eReader incorporating software applications, web browsers, media, and gaming. Both eReaders and tablets have calendar, note taking abilities, listening to music, and communication. Tennessee students use tablets primarily for the software, Internet, and entertainment.

The world of mobile applications continue to explode in all areas such as books, reference tools, utilities, news, productivity, gaming, and entertainment. Mobile applications currently being utilized are Reading Trainer, English Reading Comprehension, and ABA Flash Cards and Games – Emotions. Other apps recommended were The Social Express, Imagine, and DropBox.

6. *What teaching strategies and ATs are recommended for use in the general education classroom to improve reading/language arts for students diagnosed with AS?*

Two specific teaching strategies recommended for use in the general education classroom to improve reading/language arts for AS students included question-generation and retelling. Other strategies include teaching students for planning, revising, and editing; use instructional collaboration in planning, drafting, revising, and editing compositions; and teach students how to combine sentences to make more complex sentences. Additional suggestions included visuals such as photographs, charts, and visual cues as well as picture schedules using words, pictures, or both attached to Velcro allowing to replace and remove items.

There are two computer programs designed to assist with poor writing skills, SRSD and Dragon NaturallySpeaking. Also suggested was a simple word processing program such as WordPad.

Implications

The answers to the survey questions coupled with the fact that the response rate was barely above 20% tell a great deal about assistive technology in Tennessee high schools. It is reasonable to assume that schools and personnel who had something valuable to share stepped forward to take part in the surveys. Those who did not most likely refrained because they were not active participants in the process. The lack of responsiveness/participation is difficult to accept particularly since government funding is readily available for students with identified disabilities.

Through publication of the dissertation and articles distilled from it, multiple suggestions will be put into the public domain. The ease of use coupled with the very minor needs for teacher training should encourage schools to join the efforts to provide learning assistance as needed by the students.

Though wide-spread efforts, the state of Tennessee will meet Section 504 regulation of the federal government: FAPE, which requires school districts to provide a free, appropriate public education to qualified individuals with disabilities within the jurisdiction of a school district. Services include education in the general education classroom, education in general education classroom with supplementary aids, or special education and related services outside the general education setting. Instruction and services must be individually designed to meet the needs of students with disabilities as adequately as the needs of students without disabilities (www.mnps.org).

Recommendations

Based on the data received from the special education supervisors and general education teachers the following recommendations emerged from the investigation.

Recommendation 1: Professional Development for Educators

The opportunities provided by eReaders, tablets and mobile applications have a great impact for AS students. Educators had not utilized AS developed apps so the professional development would encourage the educator to explore the various apps available. Educators suggested graphic organizers so the eReader and tablet would allow for the organization needed by AS students.

Recommendation 2: Supervisors Purchase Appropriate ATs

No supervisor had purchased any of the social skills software recommended for AS students. Although one educator had used the Social Compass software supervisors had not purchased any of the software packages. In fact, the money spent on AT across the state was fairly low considering the number of students in the districts. The average for districts with 0 – 5,000 students was $501-$1,000. However, there was one district that spends more than $10,000 on the autistic students. For districts with 5,001 – 10,000 the average spending was $501 - $1,000 and for one district with more than 50,000 students their spending was $2,001 - $3,000.

Summary

The NCLB Act (2001) amended the federal education programs established under the Elementary and Secondary Education Act of 1965. The focus was to close the achievement gap based on accountability, flexibility, and choice, so that no child will be left behind. By the 2013-14 school year students must achieve proficiency on

standardized tests while the school meets federally set adequate yearly progress targets (Shelley, 2012) by testing 95% of each subgroup, which includes gender, race, ethnicity, English proficiency, migrant status, special education, and low socioeconomic status (Payne-Tsoupros, 2010). Therefore, NCLB placed emphasis on facilitating achievement among all students by participating in general education curriculum and demonstrating academic progress, regardless of any existing developmental disability (Parette, et al, 2007).

The problem statement was based on that Tennessee students diagnosed with AS must meet the reading/language arts and mathematics proficiency level by 2013-14 while participating in secondary general education classrooms. General education classrooms can be challenging environments for students diagnosed with a PDD. In addition to the social and communication deficits associated with PDD, it is typical to have other behaviors such as sensory issues, hyperactivity, short attention span, resistance to transitions, impulsivity, and aggressiveness all of which creates a barrier to inclusion and social integration in the general education classroom (von der Embse et al., 2011). Although these students do not exhibit language delays and have average or above average IQs (www.cdc.gov) the severe and sustained impairment in social communication skills generate difficulties in the general education classroom, which can lead to poor attitude, grades, and depression. In some instances, poor communication skills contribute to high incidence of school maladjustment and school dropout, juvenile delinquency, and child psychopathology (Scharfstein et al., 2011). Students with disabilities, whether physical, mental, or emotional, typically fall below an expected level of performance in academic and life skill curricular areas. Therefore, performance gaps

exist between these students and their typical peers in both access to and participation in the curriculum (Parette et al., 2007).

Tennessee's annual report cards identified an average of 63.39% of students with disabilities spending at least 80% of the day in the general education environment while an average of 12.47% spent less than 40%. The average graduation rate for this subgroup was 67.65% and the average proficiency and advanced academic achievement in English I was 15.95% while English II was 10.68% (www.tn.gov). Although ACT (www.act.org) does not separate data for students with disabilities subgroup, Tennessee's average composite, English, and reading scores over a three year period were 19.57, 19.43, and 19.8 respectively compared to national averages of 21.03, 20.43, and 22.27. Tennessee's average rankings were composite at 49, English at 42, and reading at 49.

To assist AS students with reaching the proficiency level in reading/language arts, specific teaching strategies and ATs are recommended. Primarily, the general education classroom must foster a positive learning environment with teachers being more cognizant of their content delivery. Egan (2005) suggested to avoid sarcasm and confusing figurative speech, keep teaching fairly concrete, use visual methods to teach abstract concepts, explain metaphors and words with double meaning, pause occasionally to check for understanding, use clear and literal language, and be explicit about what is being taught. Along with teaching strategies, ATs are used to permit students to be more independent in achieving their own academic success as well as promoting their own independence, self-worth, and productivity (Simpson et al., 2009). There are a variety of ATs recommended: computers, tablets, iPads, software, PDAs, eReaders, and apps.

The goal was to compile a comprehensive set of teaching strategies and ATs used in the general education classroom to improve reading/language arts for secondary students diagnosed with AS. A quantitative study was the guiding methodology. Two separate cross-sectional surveys were created in SurveyMonkey for Tennessee's 150 special education supervisors and general education teachers. An e-mail was sent to the supervisors with two survey links requesting the supervisor complete the appropriate survey and then forward the e-mail to general education teachers encouraging their participation.

The rate of return on the surveys were lower than desired. Several districts required their own IRB process to be completed while others were not allowed to participate. However, the responses that were received reaffirmed the literature and provided for the comprehensive sets. Educators used the recommended teaching practices and provided an appropriate learning environment which in turn should improve AS students reading and language arts proficiency levels.

Appendix A

ACT National and State Scores								
Average Scores by Years								
Graduating Classes of 2011, 2012, and 2013								
	% Tested	Number of Students Tested	Average Composite Score	Overall Ranking	Average English Score	Overall Ranking	Average Reading Score	Overall Ranking
2011								
National	49	1,623,112	21.1		20.6		21.3	
MA	22	9,685	24.2	1	24.1	1	24.4	1
CO	100	52,930	20.7	T-34	20.1	T-37	20.9	34
IL	100	144,469	20.9	32	20.6	T-29	20.8	T-35
KY	100	46,428	19.6	T-48	19.2	47	20	48
LA	100	35,870	20.2	41	20.4	T-34	20.3	T-42
MI	100	116,823	20	T-43	19.3	46	20.1	47
MS	100	28,167	18.7	51	18.6	51	18.8	51
TN	100	68,524	19.5	50	19.4	T-43	19.7	50
WY	100	5,533	20.3	40	19.4	T-43	20.8	T-35
2012								
National	52	1,666,017	21.1		20.5		21.3	
MA	23	9,840	24.1	1			24.2	1
CT	27	9,089			23.9	1		
CO	100	52,071	20.6	37	19.9	39	20.7	T-36
IL	100	146,822	20.9	31	20.5	T-29	20.7	T-36
KY	100	46,289	19.8	46	19.5	T-43	20.2	46
LA	100	36,736	20.3	T-39	20.4	T-32	20.4	T-43
MI	100	114,727	20.1	44	19.3	45	20	T-47
MS	100	28,288	18.7	51	18.6	51	18.9	51
ND	100	6,896	20.7	T-33	19.6	T-40	20.7	T-36
TN	100	68,095	19.7	48	19.6	T-40	19.9	49
WY	100	5,527	20.3	T-39	19.2	46	20.5	T-41

2013								
National	54	1,799,243	20.9		20.2		21.1	
MA	22	9,979	24.1	1			24.4	T-1
CT	27	9,293	24.0	2	24.0	1	24.4	T-1
CO	100	53,071	20.4	T-36	19.9	T-34	20.5	T-37
IL	100	160,066	20.6	T-33	20.2	T-30	20.4	T-40
KY	100	49,551	19.6	45	19.2	43	19.9	46
LA	100	45,305	19.5	T-48	19.4	41	19.7	48
MI	100	120,451	19.9	43	19.1	44	20	T-44
NC	100	95,782	18.7	51	17.1	51	18.8	51
TN	100	69,641	19.5	T-48	19.3	42	19.8	47
UT	100	34,514	20.7	T-31	19.9	T-34	21.3	T-30
WY	100	5,896	19.8	44	18.6	49	20.2	43

Appendix B

App Store or Website	App Name	App Description
iTunes	i-Lexis PRO	New, innovative, application designed expressly to provide a simple and immediate tool to help children with speech and language disorders.
	The Social Express	Engaging, educational software for children and young adults with social learning challenges.
	Calm Counter – Social Story and Anger Management Tool for Autism, Down Syndrome, and Special Needs	Calm Counter is a visual and audio tool to help people calm down when they are angry or anxious.
	The Zones of Regulation	A framework for thinking as well as a curriculum geared toward help students gain skills in consciously regulating their behaviors, including the management of their emotions and level of alertness.
	AceReader Pro – Speed Reading	Known as the most popular Speed Reading Software on the market.
	Imagine	Simple, clean, readable layout and you'd ever expect from a simple text editor, but so much more.
	Compositions	Multi-platform Dropbox enabled writer's app designed for OS X and iOS, with a focus on content creation.
Google Play	Asperger 101	Information on recognizing the signs of Asperger's Syndrome.
	Asperger's Syndrome	Get answers to your questions and learn to live a fulfilling life with Asperger's.
	Aspergers Answers Revealed	Do you have questions about Aspergers Syndrome and high functioning autism?
	English Reading Comprehension	Let's test your English Reading Comprehension Skills through this simple 5-minute tests.
App Store or Website	App Name	App Description
	English Reading Comprehension	Measures reading comprehension at a basic skill level.

	Reading Trainer	Improves your reading speed and retention rate with 12 challenging and fun exercises.
Appcrawlr.com	ABA Flash Cards & Games – Emotions	A fun, simple, and easy way to learn to recognize emotions.
	Social Navigator	Revolutionary social skills app developed to assist children with social and behavioral challenges in adapting their behavior and developing life-long social skills.
Autismspeaks.org	Dragon Dictation	Easy to use voice recognition app that allows you to speak and instantly see your text or e-mail message before you send it.
	DropBox	Cloud based, real time file sharing between your computer and all your iDevice's.
	Idea Organizer	Record your ideas, reminders and notes in either text, photo or voice memo form or a combination of any.
	reQall	Save your ideas, to-do lists and things to remember by voice, text, e-mail, or IM. Recognizes dates, times, locations and keywords.
	Say it & Mail it Pro Recorder for iPad	E-mail a voice memo from your iPad to yourself or someone else and optionally include a photo, movie, and Google map location.
	School Skills	Addresses social skills that are geared towards situations that arise during the school day.
	Speak it!	Text-to-speech app.
	Time Timer Apps	Lets you set a timer with a visual reminder with a finger swipe, use multiple timers, and save timers for future use.
	Touch Mouse	Turns your iDevice into a wireless trackpad and keyboard for your computer.
TechLearning.com	Idea Sketch	Lets you easily draw a diagram – mind map, concept map, or flow chart – and convert it to a text outline and vice versa.
	AppWriter	First text editor for the iPad to offer users of all ages with reading and writing disabilities the necessary tools for unlocking a world of information.
	SimpleMind	Easy-to-use Mind Mapping tool that turns your Mac into a brainstorming, idea collection and thought structuring device.

Appendix C

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

You are invited to participate in a research study. The goal of this study is to compile a comprehensive set of teaching strategies and assistive technologies used in the general education classroom to improve reading/language arts for secondary students diagnosed with Asperger syndrome. Your participation is strictly voluntary; therefore, no benefits nor costs or payments are made for participating in the study. By completing the survey it does indicate your voluntary participation in the study.

You have the right to leave this study at any time or refuse to participate. If you decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

Respondent Demographics

The following are demographic questions specifically on the respondent.

1. Are you male or female?

- Male
- Female

2. What is the highest degree you have received?

- Bachelor degree
- Masters degree
- Educational Specialist
- Doctorate

Other (please specify)

3. Which of the following best describes your current employment position?

- Special Education Supervisor
- Special Education Teacher
- General Education Teacher

Other (please specify)

4. About how long have you been in your current position?

Years

Months

5. How many total years of experience do you have as an educator?

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

System Demographics

The following are school system demographics specifically on the respondent.

6. Which of the following best describes your school system?

- City
- County
- Special School District

7. Which of the following best describes the school system's community type?

- Rural - Typically considered country or farmland where there are fewer people who live further apart.
- Suburban - Communities are usually close to, but not in, cities. There are fewer people than urban communities, but many more than in rural communities.
- Urban - Cities where lots of people live close together in a small amount of space.

8. In what region in Tennessee is your school district?

- West Tennessee
- Middle Tennessee
- East Tennessee

9. How many schools are in the school system?

10. About how many students are enrolled in your district?

- Less than 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000
- 30,001 - 35,000
- 35,001 - 40,000
- 40,001 - 45,000
- 45,001 - 50,000
- More than 50,000

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

11. What percentage of all students are identified as

	Percentage of Total Students
Students with Disabilities	6
Economically Disadvantaged	6
Title 1	6

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

Asperger's Syndrome and Other Diagnoses

According to Tennessee Department of Education (www.state.tn.us/education) Asperger's Syndrome is under the umbrella of Autism/PDD. The diagnosis criteria are standard statewide using those from the APA's Diagnostic and Statistical Manual (DSM-IV) while each local school system develops an organized referral process to be eligible for special education.

12. Based on your professional opinion, about how many currently enrolled Autistic students are diagnosed with Asperger Syndrome?

13. Does your school system have a developed organized referral process for Asperger diagnosis?

- Yes
- No

14. If you answered yes to question #12, please answer the following question.

Which of the following items are included in your school district's referral program? Check all that apply.

- Licensed physicians
- Experienced clinicians in the diagnosis and treatment of autism
- Parent interviews
- Behavioral observations
- Speech therapist
- Various assessment instruments
- Rating Scales
- Checklists

Other (please specify)

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

15. Over 70% of people who are diagnosed with an Autism Spectrum Disorder have an additional mental health condition. Over the past five years, what percentage of students diagnosed with an Autism Spectrum Disorder have also been diagnosed with the following conditions? Answer all that apply.

	Never	Rarely, in less than 10%	Occasionally, in about 30%	Sometimes, in about 50%	Frequently, in about 70%	Usually, in about 90%	Always
Attention Deficit Hyperactivity Disorder							
Dyslexia							
Dysgraphia							

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

Assistive Technologies and Autism/Pervasive Development Disorder

16. Does your school district provide assistive technologies to students diagnosed with autism?

- Yes
- No

17. Approximately how much of federal funds received each year are spent on assistive technologies for autistic students?

- $0 - $500
- $501 - $1,000
- $1,001 - $2,000
- $2,001 - $3,000
- $3,001 - $4,000
- $4,001 - $5,000
- $5,001 - $10,000
- More than $10,000

18. Has your district purchased any of the following assistive technologies for students diagnosed with autism? If yes, rank the level of satisfaction with the product.

	Yes	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied
Computer desktop						
Computer laptop						
Personal digital assistant						
eReaders						
Tablet						
iPad						
Mobile applications						

19. Has your district purchased other assistive technologies for students diagnosed with autism? If so, do you recommend the product for other districts?

Assistive Technology Product

Recommend

Assistive Technologies & Asperger's Syndrome - Supervisor Survey

20. The following programs are specifically designed for Asperger syndrome students.

Has your school district purchased any of the following social skills programs? If yes, indicate the quality of the product for students diagnosed with Asperger syndrome. Check all that apply.

	Yes	Poor	Fair	Good	Very Good	Excellent
Mind Reading						
REACT						
The Social Compass						
MOSOCO						

21. Has your district purchased other social skills programs designed for Asperger syndrome students?

Program

Recommend

22. Has your district purchased software designed for Autistic students to improve their reading/language arts skills?

Program

Recommend

Appendix D

Assistive Technologies & Asperger's Syndrome - Educator

You are invited to participate in a research study. The goal of this study is to compile a comprehensive set of teaching strategies and assistive technologies used in the general education classroom to improve reading/language arts for secondary students diagnosed with Asperger syndrome. Your participation is strictly voluntary; therefore, no benefits nor costs or payments are made for participating in the study. By completing the survey it does indicate your voluntary participation in the study.

You have the right to leave this study at any time or refuse to participate. If you decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Assistive Technologies & Asperger's Syndrome - Educator

Respondent Demographics

The following are demographic questions specifically on the respondent.

1. Are you male or female?

- Male
- Female

2. What is the highest degree you have received?

- Bachelor degree
- Masters degree
- Educational Specialist
- Doctorate

Other (please specify)

3. Which of the following best describes your current employment position?

- Special Education Supervisor
- Special Education Teacher
- General Education Teacher
- Other (please specify)

4. About how long have you been in your current position?

Years

Months

5. How many total years of experience do you have as an educator?

Assistive Technologies & Asperger's Syndrome - Educator

School Demographics

The following are school demographics specifically on the respondent.

6. Which of the following best describes your school system?

- City
- County
- Special School District

7. Which of the following best describes your school district?

- Rural - Typically considered country or farmland where there are fewer people who live further apart.
- Suburban - Communities are usually close to, but not in, cities. There are fewer people than urban communities, but many more than in rural communities.
- Urban - Cities where lots of people live close together in a small amount of space.

8. Which of the following best describes the school in which you work?

- Grades K-8
- Grades K-12
- Grades 6 - 12
- Grades 7 - 12
- Grades 9 - 12

Other (please specify)

9. What is the No Child Left Behind status of your school?

- Proficient
- Needs Improvement
- Unknown

Assistive Technologies & Asperger's Syndrome - Educator

Asperger Syndrome

According to the American Psychology Association there are three distinct criteria for an Asperger Syndrome diagnosis: 1) severe and sustained impairment in social interaction, (2) the development of restricted, repetitive patterns of behavior, interests, and activities, and (3) significant impairment in social, occupational, or other important areas of functioning.

The Tennessee Department of Education classifies Asperger syndrome under the umbrella of Autism/Pervasive Developmental Disorder. Therefore, all questions regarding Asperger's will be classified as an Autism Spectrum Disorder.

The following questions relate to the respondent's knowledge of Asperger's Syndrome.

10. Prior to this survey and the information provided, how familiar are you with Asperger's Syndrome?

- Not at all familiar
- Slightly familiar
- Somewhat familiar
- Moderately familiar
- Extremely familiar

11. Based on the APA's description of Asperger Syndrome, approximately how many students over the past 5 years have you had in your classroom with Asperger's Syndrome diagnosis?

- 0-9
- 10-19
- 20-29
- 30-39
- More than 50

Assistive Technologies & Asperger's Syndrome - Educator

Positive Learning Environment Designed for Students with an Autism Spectrum...

12. Rank your classroom management style based on the following characteristics.

	Never	Rarely	Sometimes	Often	Always
The seats are teacher assigned.					
The classroom has a work-oriented environment.					
Students are deeply involved with their work.					
Students know what is expected of them.					
There is little time being wasted or being disruptive.					
Teacher is organized and prepared prior to beginning of class.					
Teacher is consistent with classroom rules.					
Teacher is consistent with student expectations.					
Teacher has a warm and positive attitude.					
Teacher establishes clear rules to limit perseverative discussions.					

13. Are there other classroom management strategies that you have used specifically for students with an autism spectrum disorder? Please explain.

Assistive Technologies & Asperger's Syndrome - Educator

14. Rank the following characteristics based on the respondent's teaching strategies.

	Never	Rarely	Sometimes	Often	Always
Teacher uses cooperative learning, such as "Think, pair, share."					
Teacher avoids sarcasm and confusing figurative speech.					
Teacher pauses to check for understanding.					
Teacher uses visual methods to teach abstract concepts.					
Teacher uses clear and literal language.					

15. Are there other teaching strategies that you have used specifically for students with an autism spectrum disorder? Please explain.

Assistive Technologies & Asperger's Syndrome - Educator

Assistive Technologies and Asperger's Syndrome

According to the 20 U.S.C. § 1401 an assistive technology is any item, piece of equipment or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities for individuals with disabilities.

16. Have any of your students diagnosed with an autism spectrum disorder used any of the following assistive technologies in your classroom? If yes, rank the level of satisfaction with the product.

	Yes	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied
Computer desktop						
Computer laptop						
Personal digital assistant						
eReaders						
Tablet						
iPad						
Mobile applications						
Graphic organizer						
Smartphone						
Agenda						

17. Are there other assistive technologies that you have used specifically for students with an autism spectrum disorder? Please explain.

Assistive Technologies & Asperger's Syndrome - Educator

eReaders, Tablets, Mobile Applications to Improve Academic Performance

18. Are eReaders, such as the Kindle or Nook, being utilized in the classroom for students with an autism spectrum disorder? If so, how are they being utilized?

- Textbook
- Library book
- Magazine
- Entertainment

Other (please specify)

19. Are tablets, such as the Windows tablet, being utilized in the classroom for students with an autism spectrum disorder? If so, how are they being utilized?

- Software applications
- Web browser
- Entertainment

Other (please specify)

Assistive Technologies & Asperger's Syndrome - Educator

20. The following mobile applications have been developed to assist Asperger syndrome individuals. As an educator, are any of these apps being utilized in the classroom by the teacher and/or for Asperger syndrome students?

	Student Only	Teacher Only	Both Student and Teacher	Neither
i-Lexis PRO				
The Social Express				
Calm Counter				
The Zones of Regulation				
AceReader Pro-Speed Reading				
Imagine				
Compositions				
Asperger 101				
Asperger's Syndrome				
Aspergers Answers Revealed				
English Reading Comprehension				
Reading Trainer				
ABA Flash Cards and Games - Emotions				
Dragon Dictation				
DropBox				
Idea Organizer				
reQall				
Say it & Mail it Pro Recorder for iPad				
Time Timer Apps				
Touch Mouse				
Idea Sketch				
AppWriter				
SimpleMind				

Other (please specify)

Assistive Technologies & Asperger's Syndrome - Educator

Teaching Strategies and Assistive Technologies

21. Over the past five years, what percentage of students diagnosed with Asperger's also been diagnosed with the following conditions?

	Never	Rarely, in less than 10%	Occasionally, in about 30%	Sometimes, in about 50%	Frequently, in about 70%	Usually, in about 90%	Always
Attention Deficit Hyperactivity Disorder - the inability to maintain concentration even though the child is trying their very best							
Dyslexia - the student has difficulty decoding single words							
Dysgraphia - the difficulty of putting thoughts into writing, especially while trying to read the board or listening to others							

22. Over the past five years, what percentage of your students diagnosed with Asperger's have exhibited the following traits?

	Never	Rarely, in less than 10%	Occassionally, in about 30%	Sometimes, in about 50%	Frequently, in about 70%	Usually, in about 90%	Always
Average academic achievement							
Above average academic achievement							
Distinct strengths and weaknesses in language skills							
Well developed formal language skills							
Difficulties with the social or pragmatic uses of language							
Challenges with the development of composition skills							
Weakness of organization skills							
Average reading comprehension							

Assistive Technologies & Asperger's Syndrome - Educator

23. Do you use either of the the following strategies to improve writing? Check all that apply.

- Question-generation
- Retelling

24. Have you used or recommended any of the following software programs to students with Asperger's to improve their reading/language arts skills?

- Self-Regulated Strategy Development
- WordPad
- Dragon NaturallySpeaking

Appendix E

Dear _____,

I am a graduate student in the Graduate School of Computer and Information Sciences at Nova Southeastern University fulfilling the requirements for a degree of Doctor of Philosophy in Computing Technology in Education. I am also the drafting teacher at Page High School, Williamson County Schools, in Franklin, Tennessee.

I am conducting a study titled, "Assistive Technologies used by Students with Asperger's Syndrome to Improve Performance in the General Education Classroom." The goal is to compile a comprehensive set of teaching strategies and assistive technologies used in the general education classroom to improve reading/language arts for secondary students diagnosed with Asperger Syndrome.

The No Child Left Behind Act has the primary focus of closing the achievement gap based on accountability, flexibility, and choice, so that no child is left behind. Using state standardized tests students much achieve proficiency by 2013-14 and the school meet federally set adequate yearly progress targets by testing 95% of each subgroup, one of which is special education. In other words, NCLB places emphasis on facilitating achievement among all students by participating in general education curriculum and demonstrating academic progress, regardless of any existing developmental disability.

The surveys are being sent to Tennessee's 150 special education supervisors because of your knowledge of Asperger Syndrome and the assistive technologies being used in your district. I request that not only you complete the survey but that you also forward the educator survey link to your special education and general education teachers that have students diagnosed with Asperger Syndrome in their classrooms.

The following link will direct you to the survey developed through SurveyMonkey. The survey will require approximately 15-20 minutes to complete with a response due date of _____. There is no compensation for responding nor is there any known risk. Participation is completely anonymous and your responses will remain confidential. If you choose to participate, please answer all questions honestly. Once the data is collected you will receive a copy of the findings.

If you have any questions or concerns about completing the survey or about participating in this study, you may contact me at (615) 944-3419 or at sarafore@nova.edu. Thank you in advance for your participation.

Sincerely,

Sara C. Foreman

Appendix F

NOVA SOUTHEASTERN UNIVERSITY
Office of Grants and Contracts
Institutional Review Board

MEMORANDUM

To: Sara Foreman

From: Ling Wang, Ph.D.
Institutional Review Board

Date: Dec. 9, 2013

Re: *Assistive Technologies used by Students with Asperger's Syndrome to Improve Academic Performance in the General Education Classroom*

IRB Approval Number: wang11151303

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE REACTIONS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and 954-262-2020 respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Protocol File

Appendix G

Approved Research

Latarchal Morton <latarchal.morton@wcs.edu>

Mon 1/6/2014 12:43 PM

To: Sara Foreman <saraf@wcs.edu>;

Cc: Andrea Anthony <andreaa@wcs.edu>; Carol Hendlmyer <carolh@wcs.edu>; Donna Wright <donna.wright@wcs.edu>;

Importance: High

Dear Ms. Foreman,

Your research project "Assistive Technologies used by Students with Asperger's Syndrome to Improve Academic Performance in the General Education Classroom" has been approved. Please be sure that Principal Anthony approves and is in full knowledge of the details of this study.

Best Regards,

Latarchal Morton, PhD.
Research and Program Development Analyst
Williamson County Schools
Central Office
1320 West Main St. Suite 202
Franklin, TN 37064
615- 472-4007
615-472-5755 (fax)
latarchal.morton@wcs.edu

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