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Educator Perceptions of Visual Support Systems and Social Skills for Young Adults with Autism Spectrum Disorders

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MAS, Embry-Riddle Aeronautical University, 2008

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Young adults with Autism Spectrum Disorder (ASD) face unique social skills challenges as they transition into independent living environments and seek fulfilling relationships within their communities. Research has focused on social education and interventions for children with autism, while transitioning young adults with ASD have received insufficient attention. The purpose of this multisite case study was to explore perceptions of school personnel related to the use of visual support system (VSS) technology and enhancement of social skillsets for young adults with ASD. Information processing theory and social learning theory provided the research framework. Research questions addressed perceptions related to the utility of VSS technology and social skills teaching strategies. Interviews were conducted with 11 special education administrators, teachers, and intervention specialists from 3 different programs in the United States. Data from interviews and field notes were analyzed using open, axial, and selective coding; themes such as *social skills, video-modeling, learning strategies, use of visual technology*, and *cognition* emerged. Participants indicated that exploring cognitive learning strategies underpinned with VSS technology provided alternative methods to teach social skills in classroom settings. They identified the need for more funding for VSS technologies for all learners. Implications for social change include that social skills and critical thinking skills can be enhanced by learning through the use of VSS technology. Empowering young adults with ASD to participate with greater confidence in learning situations and in social situations will support their efforts to be more comfortable and to interact more appropriately in work and community interactions.

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Dedication

This research study is dedicated to my son and all people diagnosed with ASD. There is hope through scientific research and advocacy for social change by creating and improving innovative learning strategies for this population. People with ASD deserve inclusion into conventional communities, relationships and personal triumphs that are inhibited due to social skill challenges. Compassionate and educational contributions to these cognitively-challenged people's lives are the intrinsic responsibility of those willing to exhibit altruism in lieu of tribute.

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I would like to extend my appreciation to the public and private special education schools that offered their time and support to this study. Cooperation and support from the administrators and staff from the various sites were essential to the data collection phase of this study. Walden University faculty members that were instrumental to the completion of this dissertation were Dr. Jennifer Smolka (Committee Chair) and Dr. Christina Dawson (Methodologist). Thank you for your commitment to fostering my academic voice to stakeholders across communities that may contribute to proactive measures to improve the lives of people with ASD. I also would like to acknowledge the unwavering support of my colleague and friend, Annette Coletta. I offer you analogous convictions as you pursue with passion and tenacity your quest to discern empathy through the lens of an artist.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Young adults with autism spectrum disorder (ASD) face unique social-skill challenges as this population transitions into independent living environments and seek fulfilling relationships within their communities. Agriani (2014) reported that visual support systems (VSS), such as icons, images, visual schedules, and social stories, when used as an assistive technology for young adults with ASD, provided an opportunity to adjust to social setting expectations (p. 5). Allen, Vatland, Bowen, and Burke (2015) suggested that research that examines innovative methods to provide video modeling across wider domains such as shareware, the Internet, and e-learning websites should be explored. Assistive technology for young adults with ASD may provide an opportunity to adjust to social setting expectations through the use of VSS and can be a strategy-based learning resource to increase the social skills of young adults with ASD. Research to enhance the social skill-sets of a young adult with an ASD warrants consideration.

People with ASD are subject to impairments that include social interaction difficulties, communication (verbal and nonverbal) complications, and cognitive learning-challenges. An increasing isolation from social activities also exists as this population transitions into adulthood. The *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, as reported by the American Psychiatric Association (APA ; 2015), identifies ASD as a "disorder characterized by persistent deficits in social communication and social interaction across multiple contexts and typically appears in the first three years of life affecting the brain's normal development of social and communication skills" (p. 31). Special education administrators, educators, and policy makers hold

strategic positions to consider how individuals with ASD benefit from VSS intervention strategies. Meaningful connections that highlight emerging practices and interventions related to social skill-sets for young adults with ASD are essential to foster human social development. Young adults with ASD experience challenges at attempts to display neuro-typical acceptable behavior and engage in activities with others during conversations.

VSS and Interventions

The absence or delay of substantial social skills is a concern when people with ASD mature. Neurotypical populations seek social skills that foster a sense of belonging, self-worth, and emotional growth. Initializing and maintaining socially structured relationships becomes formidable obstacles for young adults with ASD (Dalrymple and Duchaine, 2013). Delays in cognitive growth may inhibit the expression of typical emotions commonly witnessed in social settings. Social skill strategies and interventions taught to neurotypical populations may not be cognitively processed the same way by young adults with ASD (Sperry, Neitzel, & Engelhardt-Wells, 2010). The manner in which cognitive information is collected and the resultant decisions by people diagnosed with ASD may be due to their unique aspect of movement and emotions, and consequently, processed differently.

Typical VSS programs used to combat visual sensory issues in many special educational environments include iPod, iPad, vSked (an interactive and collaborative visual scheduling system), and Video Modeling (Gentry, Kriner, Sima, McDonough, & Wehman, 2015). These authors quantified the role of technology, iPads and personal digital assistants (PDAs), for young adults with ASD as “very versatile task organizers

that hold promise as assistive technologies for people with cognitive-behavioral challenges" (p.670). Strategy-based interventions that incorporate VSS for young adults with ASD should consider the process of sensemaking as it is perceived by this population. Appropriate learning strategies and the on-going sustainability of social skills are instrumental in becoming part of a sustained social structure.

VSS used in teaching strategies for children and adolescents with ASD have established proven outcomes and interventions for this target population. Ludlow et al. (2014) revealed data from research where children with ASD completed the Adult and Adolescent Sensory Profile. Results from these authors' study indicated that appropriate auditory sensory behaviors increased more when VSS controls were used. With the introduction and use of innovative technologies, some classrooms have been transformed into interactive facilities that offer alternative VSS learning strategies. This study focuses on visual enhancements.

Problem Statement

The problem addressed in this study was the challenges that young adults with ASD encounter when engaging in appropriate communication and behavior with other people in social scenarios. Practical teaching strategies that use VSS may provide pathways to integrate typical social activities into their daily routines. Investigative studies have primarily focused on social education and interventions for children with autism. An insufficient amount of attention has been directed to social skill intervention strategies as young adults with ASD transition into adulthood. Harmon (2011) reported, "With some 200,000 autistic teenagers set to come of age in the United States over the

next five years alone, little is known about their ability to participate fully in public life, or what it would take to accommodate them" (pg.1). Young adults with ASD seek inclusiveness in social settings, and skill-sets learned through the use of VSS may empower them to participate with greater confidence.

Advances in medical and psychological diagnostic criteria have contributed to the number of people diagnosed with ASD. According to the APA (2013), matters resultant from studies that address typical aging and ensuing social and health problems are of greater concern to people with ASD as they age (p.7). Rich data pertinent to VSS interventions and that augment social change for young adults with ASD are insufficient. Data collected that are germane to the aging adult population with ASD may be collectively beneficial where VSS intervention strategies are part of the research.

Singh, Illes, Lazzeroni, and Hallmayer (2011) noted that "Currently, the top five treatments being used in public schools included sensory integration (93%), gentle teaching (49 %), music therapy (45%), cognitive behavior modification (33%), and art therapy (29%)" (p. 789). Conducting more research on VSS with a particular focus on obtaining information from a variety of sources, including administrators, teachers, and intervention specialists, is necessary. Walton and Ingersoll (2013) reported "significant disparities in research design and methodologies existed across interventions and studies that addressed social skills for adults with autism" (pg. 594). Liptak et al. (2011) reported that, over a 30-year period, a small percentage of published works pertinent to adults with ASD and potential interventions have been conducted (p. 152). Litptak et al. (2011) found only five studies that focused on social skill-set interventions and cited a lack of

follow-up and the fact that most studies were small with the quality of research in them deemed as poor. Evaluated investigations that examined VSS interventions for young adults with ASD have not produced sufficient evidence-based data. Consideration of these results suggests that the gap in research is due to the primary focus being on social education and interventions for children with autism. An insufficient amount of attention has been directed to young adults with ASD.

Purpose of the Study

The purpose of this study was to explore perceptions of school personnel related to the use of VSS technology and enhancement of social skill-sets for young adults with ASD. I interviewed 11 special education administrators, teachers, and intervention specialists as to the perceived utility of VSS and any VSS social skill-set teaching strategies that the participants deemed beneficial for young adults with ASD. Data from this study provided insights into how the use of VSS may affect the social skill-sets of youth with ASD during their transition years. In order to enhance and perpetuate a young adult with ASD's ability to learn and apply social skill-sets, the application of visual assistive technology devices and software promoted a reduction of the barriers towards community integration and independent living conditions. Visual technology that uses language resources for young adults with ASD bolstered social skill-sets when considering the visual user, interfaces, and technology appropriate to the teaching strategy. Exploring cognitive strategies underpinned with VSS produced a parallelization of efforts while promoting future discussion on this topic.

Research Questions

1. How do special education administrators, teachers, and intervention specialists perceive the use of VSS meets the social-skill training needs of a young adult with ASD?
2. What VSS learning strategies are being used effectively by special education administrators, teachers, and intervention specialists towards enhancing social skills-sets for young adults with ASD?

Conceptual Framework

The conceptual framework for this study used the information processing theory (Broadbent, 1958) and social learning theory (Bandura, 1977). Young adults with ASD process information differently than those without ASD (Bandura, 1977). Information processing theory informs understanding of how the human brain limits the processing of sensory inputs and how overload can occur (Bowler, Limoges, & Mottron, 2009). Cognitive limitations in people with ASD exist in areas of abstract thinking, communication, and social cognition (Jones et al., 2011). Strengths for this target population, reported by Sigman, Dissanayake, Arbelle, and Ruskin (2012), mentioned rote memory, cued recall, associative learning, and a stronger memory for nonverbal information compared to memory from verbal information (p. 290). Similar to computers, information processing in the human brain thrives on input/output functions. However, according to Jones et al. (2011), cognitive challenges faced by people with ASD appear to originate from conflicting external sensory stimuli and the developmental delays in processing a theoretical premise of information.

Social learning theory (Bandura, 1977) posits that people learn from one another via observation, imitation, and modeling. Pring (2010) emphasized that "young adults with ASD process visual information better than auditory information due to the amount of time they had to encode and organize the information" (p.213). Intelligence tests conducted by Banda, Grimmett, and Hart (2009) supported the premise that people with ASD are visual learners. Moreover, Quill (1995) suggested "visual support system strategies should target the strengths of how students with autism process information" (p. 15). The conceptual theories of information processing and social learning used in this research study provided a disciplined foundation towards a better understanding of VSS as a multimedia teaching resource.

Nature of the Study

This research study was a qualitative multicase study that followed a systematic methodology. A function of multiple case studies explored the speculative depth of the phenomenon during actual events. Baxter and Jack (2010) reported that, according to Yin (2003), a case study design should be considered when the study seeks to answer how and why questions and boundaries are not clear between the phenomenon and context. Using multiple data sources improves the credibility of the data. For this study, each case was a school where VSS tools were being used in classrooms with students with ASD. Examples of materials and technologies being used in the multiple sites included video modeling, Picture Exchange Communication System (PECS), Boardmaker, Dynavox, and iPads. Semistructured interviews of special education administrators, teachers, and intervention specialists from multiple sources were used to explore the phenomenon

under investigation by examining how relationships between VSS and social skills development for young adults with ASD were perceived. Teaching strategies used by the participants that addressed the strengths and weaknesses of developing social skill-sets were also examined during the interviews. Resultant data obtained from written notes, audio recordings, and memos were transcribed and analyzed using NVivo 11 qualitative research software. Open, axial, and selective coding were used to support emerging themes and relationships to bring a greater order, relevance, and understanding of the data to produce a narrative analysis.

Definitions

Autism: A developmental disability that typically appears during the first 3 years of life, autism involves impairments in social interaction — such as being aware of other people's feelings — and verbal and nonverbal communication (APA, 2013).

Autism spectrum disorder (ASD): A range of complex developmental disorders that can cause problems with thinking, feeling, language, and the ability to relate to others. They are neurological disorders, which mean they affect the functioning of the brain (APA, 2013).

Enhanced visual functioning: The theory and documented examples specific to perceptual and cognitive tasks exhibited by autistics noting increased physiological engagement of the visual system when compared to non-autistics (Samson, Mottron, Soulières, & Zeffiro, 2012).

Psychological diagnostic resources: Standards established by and used by experts for the diagnosis of recognized mental illness in the United States. *The*

Diagnostic and Statistical Manual of Mental Disorder (DSM-5) is compiled by the APA (APA, 2013).

Visual support systems: Learning aids used while teaching to improve academic performance, behavior, interaction with others, and self-help skills. Resources that are used to combat the deficits typical of autism. These deficits may include language, memory, temporal sequential skills, attention, motivation, and social skills (Hayes, Hirano, Marcu, Monibi, Nguyen, & Yeganyan, 2010)

Assumptions

Participants in this study were assumed to offer genuine views and responses stemming from individual experiences with VSS and young adults with ASD. These assumptions were necessary to consider for data collection to sustain flexibility and allow for open interpretations. Participants were selected based on specific criteria established and published in the recruitment process.

Scope and Delimitations

The focus of the study on VSS and teaching strategies germane to social skills for young adults with ASD was selected to promote a deeper awareness of the challenges that this population faces when attempting to participate in ordinary activities. The research was conducted at three separate sites. Administrators, intervention specialists, and special education coordinators were selected as participants over others with the consideration that these professionals had current expertise and experience using teaching strategies for young adults with ASD. The criteria for participation in the study were as follows:

- Participant's program had students between the ages of 16-23 and classified as ASD in accordance with APA *DSM-5* criteria.
- Participant had evidence of 3 years of experience in either administrative, educational, coordination, or intervention roles of young adults with ASD.
- Participant had existing or past use of VSS in the participant's educational environment.

Other conceptual frameworks not investigated but pertinent to this study may include a practice perspective or practice theory. Shaefor and Horejsi (2007) noted practice perspectives for case study research as "as a conceptual lens through which one views human behavior and social structures and which, simultaneously, guide the selection of intervention strategies" (para. 11). Practice theory seeks to explain specific behaviors using expansive guidelines and considers methods to change the nature of the outcome (CITE). The use of information processing theory and the social learning theory were reasonable in scope and provided structure for reporting the results of the study. The issue of the potential transferability for this study was enhanced by following comprehensive measures to account for assumptions and a thorough description of central context.

Limitations

Only the perceptions of educators and not the perceptions of young adults with ASD were included due to the difficulty in receiving consistent responses from young adults with ASD. The participants lived in one area of the United States and met the criteria chosen for the study. Based on the participants' experience in special education

and the site resources, the results of the study can inform personnel at other sites and settings, yet are not generalizable.

As suggested by Kvale (2007), peer reviews were conducted using nonparticipants familiar with the topic of interest to determine weaknesses in the interview questions (p. 757). I made revisions to the questions, if warranted. During the interviews, the level of expertise with VSS used by the participants was queried subjectively. I addressed bias in this area using open-ended questions to extract data that examined the participant's level of familiarity with VSS resources.

Significance of the Study

Research that focuses on social skill-set interventions for young adults with ASD lacks in-depth investigation. When this population transitions out of special-education programs from U.S. high schools to seek social acceptance in adult communities, a vast number of this group will be inadequately prepared to understand and practice sociable habits. In March 2014, the Centers for Disease Control and Prevention (CDC) reported that "the rate of ASD in children at eight years of age was 14.7 per 1.000, or one in sixty-eight" (CDC, 2014, p. 1). To date, medical and psychological professionals have not ascertained the cause of ASD. The likelihood of an increase in the rate of children diagnosed with ASD over the next decade is imminent (CDC, 2014, p. 2). The aging population of young adults with ASD is at a cognitive disadvantage due to neurological impairments that inhibit social skills.

With the knowledge that there is no known cure for ASD, research that targets early interventions for social skill-sets is paramount to social change in our communities.

Research that explores VSS teaching strategies towards social skill-set education provides opportunities for this population to contribute and achieve normalcy in their workplace, homes, and relationships. Successful intervention models for children with ASD (Hayes et al., 2010) recognized VSS as cognitive resources that empower language and learning skills (p. 663). The capacity for social interaction among young adults with ASD bounds interventions that stem from an insufficient number of credible research studies that consider VSS as a viable learning strategy for young adults with ASD.

Summary

VSS offer opportunities in learning environments conducive to increasing the social skills of young adults with ASD. Despite the importance of this technology and teaching strategy, at the time of this study a gap exists in the literature and inherent social change benefits of VSS for young adults with ASD. In this chapter, I included an introduction to the study, identified the research problem, and introduced the conceptual framework that underpinned the study. In Chapter 2, I present a review of related literature. In Chapter 3, I discuss the methodology and procedures that were used to develop the qualitative multiple-case study method, interview process, data collection, and data analysis procedures.

Chapter 2: Literature Review

Kanner (1943) produced a revolutionary report, *Autistic Disturbance of Affective Contact*, characterizing obsessive and repetitive behaviors in children. This author's early work highlighted noticeable differences in the manner in which these children avoided relationships with others and their obsession with particular objects. Russell and Norwich (2012) further elaborated on the topic of autism when these authors described the levels or variations in autism as a spectrum. ASD, as suggested by Russell and Norwich, "is characterized by the triad of impairments: impaired social interaction, problems with verbal and non-verbal communication and limited imagination and rigid thought processes" (p.229).

In this chapter, I investigated and expanded upon literature related to the interest in visual assistive technology that encourages social skills for young adults with ASD. This review contained numerous studies on ASD, VSS, social skill-set strategies, and interventions that used assistive technologies to increase knowledge on ASD research. Delimiting the research problem through innovative inquiries and fresh insight revealed suggestions for prospective theories. The historical and societal perspectives of ASD were reviewed initially to produce a liberal amount of background germane to ASD, VSS, and teaching strategies. The emphasis of the literature review then moved to an examination of learning theories for adults, information processing, VSS, and assistive technology prototypes. The evaluation of emerging practices related to social skill-sets for young adults with ASD completed the literature review.

Literature Search Strategy

The literature review used a keyword search strategy and several electronic databases such as EBSCO host, ERIC, Proquest, Education Research Complete, IEEE Explore Digital Library, and PsycArticles. The article search strategy focused on accessing the most appropriate and current literature germane to my research study. Search terms used for this literature review included: *autism, visual support systems, social skill-set strategies, autism spectrum disorder (ASD), developmental disorders, cognition, interventions, psychological diagnostic resources, neurotypical aging, accommodation, aging adults, social and employment outlook, intellectual disability, vocational interventions, assistive technologies, professional skill-sets, cognitively challenged, independent living, visual technology, visual user interfaces, visual languages, single-user focus, perceptual processes, parallelization of effort, collaboration, conceptual framework,* and *human visual systems.*

Historical Perspectives of Autism Spectrum Disorder

Autism, as a syndrome, likely existed prior to being scientifically discovered. Bleuler, a Swiss psychiatrist, was credited for documenting the term, *autistic,* in 1912 as a disorder of social withdrawal observed in schizophrenic adults who were especially withdrawn or self-absorbed (Jones et al., 2011). Kanner's (1943) work adopted similar concepts towards the understanding of autism for the more than forty years. The seminal work of this author described young children that were observed to display unusual behaviors of aloneness and a strong urge for repetitiveness in daily routines. In 1944, Asperger was credited for identifying social dysfunction and delays as a slighter form of

autism in males only (Jones et al., (2011). Twenty years later, Bettelheim offered the concept that, parents that did not display enough affection for their children (refrigerator mothers), caused autism (Severson, Aune, & Jodlowski, 2008). Research conducted on autism from 1970 to 1991 advanced theory, diagnosis, and treatment efforts to raise public awareness and garner federal support to classify autism in a special education category.

Subsequently, Lord and Bishop (2010) grouped the developmental brain disorders, collectively called ASD, into a range of mannerisms congruent with abnormal cognitive functions and varying levels of social dysfunction. Lord and Bishop noted, "ASD is currently diagnosed according to guidelines listed in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*" (p. 1). The *DSM-5* manual, as explained by the APA (2013), is the global governing body that determines diagnoses for psychiatric health issues. Recommendations for treatments and health care institution's payment plans are based on *DSM* classifications. People with autism may be affected in some manner due to the *DSM-5* classifications; however, individuals will present differently. The scope of ASD ranges from mild impairment to severe disability and is identified by the APA as a pervasive developmental disorder (PDD). Volkmar and Reichow (2014) asserted that PDDs consist of groups of conditions that hinder the growth of fundamental skills. Areas of concern attached to PDDs subsume deficiencies in socialization, communication, and creativity. The comprehension of everyday life events for people with PDDs creates challenges for critical-thinking tasks. PDDs may include

other diagnoses such as Asperger Syndrome (AS), Rett Syndrome (RS), and Childhood Disintegrative Disorder (CDD; Volkmar & Reichow, 2014).

The Etiology of Autism

A textbook published in 1809 by Dr. John Haslam, *Observations on Madness and Melancholy,* preceded Kanner's work on autism. Kanner (1943) described the symptoms more closely related to the existing traits of ASD at that time. Deisinger (2011) reported Dr. Haslam's account of a young male patient diagnosed with the measles. During treatment, the patient exhibited signs of unruly behavior, delayed speech and mobility development, and extreme hyperactivity (Deisinger, 2011). This patient exhibited signs of hyperactivity, a prevalent trait in children with autism. Beyond this historical observation, there is little known about the etiology of ASD. Efforts to thoroughly examine the foundational basis of ASD evolved over time when the alarming rate of ASD escalated due to advances in diagnostic methods by the APA and *DSM* criteria. A possible genetic link to ASD was reported by Matson and Kozlowski (2011). Attwood, Garnett, Peterson, and Kelly (2013) added substance to the basis of ASD from a study that identified variances in the brain structure of individuals with ASD through the use of diagnostic brain imaging machines. These researchers indicated, "A significant percentage of children with ASD have first-degree relatives with a similar profile of abilities and behavior" (Attwood, Garnett, Peterson, and Kelly, 2013, pg. 7). Currently, the overall consensus exists among scientific researchers that ASD originated from neuro-genetic disorders. Brain variations or dysfunction were the primary causes of ASD (Goldstein & Ozonoff, 2009), and Kanner speculated that the conditions of ASD

originated from genetic or neurological influences. The psychoanalytic theory in the 1940s era purported that parental methods of raising children caused autism (Goldstein and Ozonoff, 2009); the root of developmental delays was linked to parental influence.

More recent research by Wallace, Dankner, Kenworthy, and Martin (2010) considered the effects of "age-related temporal and parietal cortical thinning differences between high-functioning adolescent and young adult males with autism spectrum disorders (n = 41) and matched typically developing males (n = 40)" (p. 3747). Findings from the study compared neuro-typical controls to individuals with ASD. It was inferred from this study that the brain of people with ASD may have a thinner cortex in the frontal, parietal and temporal regions. Overall, literature reviews of the etiology of ASD revealed indefinite and debatable connections towards a compelling root-cause of this cognitive developmental delay.

Prevalence Perspective

Following Kanner's (1943) original work, ASD was identified in terms of complexity and by the level of cognitive and developmental impairment. The prevalence of ASD has escalated since Kanner's explanation of this once rare disorder. The CDC (2014) reported an estimated increase in ASD from four in 10,000 (.004%) to one in 68 (1.4%) of children in the United States. (para. 1). Evaluation of the chronology of the increasing prevalence of ASD in the United States revealed in the literature originated from the CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network. According to the CDC (2012), "all variants of diseases related to ASD increased by 78 percent between 2002 to 2008" (p. 61). The upsurge of ASD in the United States,

unfortunately, continued to grow from 2008 to 2012; the rate of ASD had risen to one in 88 children being identified with an ASD (CDC, 2012). Support for the data that confirms the increasing rate of ASD was endorsed by Leonarda et al. (2010). These authors contended that substantial research and literature has developed to evidence higher rates of ASD as compared to previous years. In consideration of the current perspectives and prevalence of ASD, prioritizing attention to combating subsequent health care for this population may become a pressing public crisis.

Diagnosis of ASD

A critical proactive measure for caregivers of children who display symptoms of ASD is early identification by medical or psychological professionals. Using the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*, four individual PDD-related disorders were used to determine a diagnosis of ASD. According to the APA (2012), these conditions included (a) autistic disorder, (b) Asperger's disorder, (c) childhood disintegrative disorder, and (d) the catch-all diagnosis of pervasive developmental disorder not otherwise specified (PDD-NOS; para. 3). The APA *DSM-IV* was used to classify ASD between 1994 and 2013. Subsequently, the APA *DSM-5* was used to identify the symptoms of ASD in children. The primary difference between *DSM-IV* and *DSM-5* is that people diagnosed with ASD must have prior documented evidence of symptoms evidenced in early childhood, regardless if the symptoms remain unnoticed until later in life (APA, 2012). Mcpartland, Reichow, and Volkman (2012) discovered that inconsistencies occurred when using separate diagnoses or other medical organizations (p.383). These authors contended that, "Anyone diagnosed with one of the

four pervasive developmental disorders (PDD) from DSM-IV should still meet the criteria for ASD in DSM-5 or another, more accurate DSM-5 diagnosis" (Mcpartland, Reichow and Volkman, 2012, p. 384). The use of the *DSM-5* criteria implores caregivers of children to consider earlier examinations if symptoms of ASD exist in their children. It is likely that developmental delays in social behavior for people with ASD may not be thoroughly recognized at an early age.

Findings that evaluated the impact of the revised *DSM* criteria for ASD revealed that the *DSM-5* could "substantially alter the composition of the autism spectrum" (Goldstein & Ozonoff, 2009, p. 1). These authors advised that the determination of ASDs lacks a unified and complete set of optimum processes bounded by a trusted system of assessment. Goldstein and Ozonoff (2009) additionally stated, "The revised criteria improve specificity but exclude a substantial portion of cognitively able individuals and those with ASDs other than autistic disorder" (p.16). The use of supplemental criteria to identify ASD in young children with special health care requirements was a topic of interest in a study by Pringle, Colpe, Blumberg, Avila, and Kogan (2012). These authors, documented by the National Center for Health Statistics (NCHS), recommended criteria for this population that was endorsed by the CDC (2012). According to the CDC, the diagnostic criterial should include (a) when the ASD was identified, (b) who identified the ASD, and (c) services and medication used for care (p. 5). Results reported by these authors noted that various professionals working in health care roles were the primary source for the identification of ASD in young children with special health care needs (Pringle, Colpe, Blumberg, Avila, & Kogan, 2012). Conclusions from this study

suggested that future in-depth examinations that consider the potential medical ramifications for individuals seeking available services be conducted.

Social Perspectives on Autism Spectrum Disorder

Asperger's (1944) description of ASDs emphasized issues of social withdrawal and obsessive behavior in young children. The depiction of ASD in this broad context constituted further examination. A subset of literature to explore ASD in terms of social perspectives highlighted communication and acceptable social constructs as known challenges for many with ASD. Martin (2012) asserted that "there exist additional personal challenges for people with ASD such as difficulty initiating and maintaining communication, issues building relationships, and combating the preconceived notions of peers" (p. 3). Further assessments on developmental delays in individuals with ASD described communication as a daily fundamental need; an assumed and proficient skill-set found in neurotypical individuals (Warren et al., 2011). Difficultly initiating conversation is one of the most frustrating aspects of communication for people with ASD. The struggle to start conversations and the lack of self-confidence to contribute to discussions originate from the lack of understanding of how to verbally engage with others. Müller, Schuler, and Yates (2009) suggested that neurotypical conversations often include the use of subtle gestures (hands, facial, and tone) that people with ASD do not understand, thereby creating outlines conducive to complications in cognitive information processing.

Social Evolution, Variation, and Stigmatization of ASD

People with ASD face several challenges adapting to the norms in social settings. In the scientific community, ASD is deemed as an incurable disorder that is identified by particular social traits. There are common threads better to understand the current dilemma faced by this population. Lord (2011) suggested that the fundamental social impairments of ASD contained (a) communication difficulties, (b) facial and intonation abnormalities and, (c) obsessive and repetitious fixations (p. 167). Martin (2012) noted a dramatic change in the perception of social needs expanded from historical archives of autism in the United States. A critical aspect of the complexity of ASD is the marked variation in how the disorder is expressed. An insufficient understanding of how the public perceives ASD (Sarrett, 2011, p. 143) accounted for much of the social stigma evidenced in society. Sarrett (2011), additionally suggested, "Social stigma stemming from this lack of knowledge has been reported in varying degrees from the original formation of the diagnosis" (p. 141). Shtayermann (2009) considered a person, when perceived by others, is stigmatized if the individual possesses qualities that are unacceptable due to adverse attributes (p. 299). This author also contended that people with developmental disabilities have historically been judged if deemed noticeably different and the amount of stigmatization increases with the severity of the disability (Shtayermann, 2009, p. 300). The evolution of ASDs has paralleled the simultaneous growth in how people with ASD are perceived and stigmatized.

Noticeable insight regarding stigmatizations experienced by people with ASD was evidenced by examining the transition of people with ASD from childhood to

adulthood. Begeer, Bouk, Boussaid, Terwogt, and Koot (2009) reported severe emotions and isolation for young adults with ASD due to the stigmas created by the perceptions of neurotypical peers. Further investigation from a similar study noted that the level of stigmatization condoned by neurotypical people in regards to individuals with ASD created feeling of isolation (Müller, Schuler, & Yates, 2009). Shtayermman (2009) indicated that the level of stigmatization experienced by an individual with ASD directly correlates to self-esteem. Martin (2012) hypothesized that people with ASD may internalize external stigmas from peers. Emotions attached to isolation and stigmatizations experienced by persons with ASD are typically compounded by extraneous impairments. Müller, Schuler, and Yates suggested that enjoyable relationships for people with ASD may be strained due to physical and emotional disconnects. Individuals diagnosed with ASD, and their families' experienced stereotypical attention since this spectrum of disabilities was defined. Solomon and Chung (2012) reported, "The numerous reasons for this associated stigma include the individualized nature of the syndrome, the associated different speech and actions, and the lack of understanding in its physical basis" (p.255). Many people with ASD innocently contribute to stigmas and pre-conceptions of ASD in the eyes of neurotypicals due to their inability to express individual ideas or emotions.

Aging Adults with ASD

Literature reviewed in previous sections of this study created a credible perception of the historical increasing rate of ASD in children in the United States and the current *DSM* revisions that classify this disability. Information garnered from these

reviews suggested that the incidence of ASD will continue to escalate without an expected decline in the near future. A critical concern will be educational, health care and general living arrangements for aging adults with ASD. Harmon (2011), explained, "With some 200,000 autistic teenagers set to come of age in the United States over the next five years alone, little is known about their ability to participate fully in public life, or what it would take to accommodate them" (pg.1). Research by Rosenthal et al. (2013) concluded that increased executive function problems are evidenced in older people with ASD more often than people with ASD that are younger. A widening divergence specific to metacognitive executive skills is evidenced by the aging population diagnosed with ASD. Information that endorses the impending challenges for people with ASD implies that the combination of inflexible impairments and increasing age may present additional obstacle for mainstreaming into the social community.

Disparities in the quality of life for people with ASD are not limited to aging. Other factors, for example, race, economic status, gender, and accesses to health care are typical issues of concern for people with disabilities. Perkins and Moran (2010) reported, "Within the population of those with disabilities, people with intellectual disabilities (ID) are further disadvantaged" (p.91). Increased risk of health concerns is affected by a combination of increasing age and the vulnerability associated with disabilities. The relevance of research (Happe & Charlton, 2012) when people with ASD mature as compared to neurotypical aging remains necessary to ascertain the level of services needed. These authors encouraged future research for the aging ASD population that surveys necessary services and provides insight on neuropathology and etiology (Happe

& Charlton, 2012, p 77). Optimistic outcomes for the aging population with ASD may challenge the general description of negative core attributes with overarching impairment in social skills and stereotyped behaviors. However, as noted by Martin (2012), there are positive aspects of ASD; people with ASD exhibit consistent interest in attention to details, higher-order memory, and creativeness.

Adult Learning Theories and Strategies

One of the conceptual frameworks that assist researchers to investigate strategies for education is adult learning theory. Knowles (1980) theoretical approach of andragogy (the art and science of helping adults learn) founded this conceptual framework. Sopher and Hehschke (2011) reported that andragogy is founded on concepts under the premise that adults prefer self-direction, have experiences that contribute to the learning process, and are oriented to task-centered problem solving challenges.

The Basis of Andragogy

The function of engaging adults to learn through teaching strategies developed for this population is the purpose of andragogical approaches. Kenner and Weinerman (2011) construed andragogy as "a process of engaging adult learners with the structure of learning experience" (p. 87). The three common interpretations of andragogical learning strategies (Sopher & Hehschke, 2011) included (a) the science of theory and practice, b) literature endorsed by Malcolm Knowles germane to autonomous teaching and learning and (c) outcomes not related to pedagogical methods (p.2). Hock and Mellard (2011) explained all scholars did not accept andragogy due to issues of variance and degrees of

demonstration by adults. Using an andragogical theoretical framework is frequently prevalent in research that queries adult learning strategies.

Self-Directed Learning

A primary assumption of andragogy as an adult educational theory involves self-directed learning (SDL). Educational objectives using creative methods of SDL seek to increase the locus of control in collaboration with the educators. Kenner and Weinerman (2011) discussed metacognitive frameworks for assessing methods to structure SDL theories. A challenge to SDL, reported by Kucukaydin and Cranton (2012), was adult educators in traditional classrooms compelled to adhere to standard practices as an obligation to the educational institution and associated programs. Kucukaydin and Cranton advocated for a SDL theory based on historical foundations of adult education theory and practice. The literature reviewed pertinent to SDL suggested that additional theories of SDL were situational and exhibited in various environments among non-specific age groups.

Transformative Learning

Transformative Learning: Theory to Practice, a controversial model expanded from adult learning theory, was introduced in this book by Mezirow in 2000. In a study by Kaufman and Mann (2010), these authors suggested that Mezirow's premise was for others to accept transformational learning as an essential conversion of an adult's primary frame of reference to perplexing situations. Transformative learning theory encouraged adults to apply critical thinking in lieu of traditional assumptions. The majority of relevant research about transformative learning focused on knowledge obtained in

advanced educational setting and life experiences. However, Cranton (2010) proposed that teaching methods underpinned with critical reflection supports transformative learning (p.18). Findings from the author's work expanded transformative learning to endorse the empowerment of adult learner's self-reflection skill-sets.

Verbal Learning Strategies

Verbal learners are more likely to understand when concepts are expressed orally. Reinforcing and strengthening the ideas being taught is accomplished through engaging questions. Solomon, Smith, Frank, Stanford and Carter (2011) contended that "each time an idea is verbalized, it is more likely to be remembered" (p. 110). Bowler, Limoges, and Mottron (2009) assessed relational verbal cues to encode and retrieve information during a multitrial, multilist free study. Using the Rey Auditory Verbal Learning Test, the recall ability in adults with high-functioning ASD provided credence towards verbal learning strategies. The implication was that the knowledge memory of individuals with ASD will increase with additional research. Reading, listening, participation in discussions, and explaining details to others (Bowler, Limoges, & Mottron, 2009) advanced verbal learners' cognitive levels. Kulkarni et al. (2010) noted that the neurobiological models for ASD evidence consistency when compared to verbal learning and planning function deficit models. Future studies to evaluate verbal learning strategies should seek to identify collaborative outcomes of imaging and information retrieval.

Learning Strategies and Technology

Technological devices are often used to present educational and learning strategies for many adult learners. Tamin, Lowerison, Schmidt, Bernard, and Abrami

(2011) evaluated the relationship between age and approach in a study that considered technology as a primary resource. Findings from these authors' work indicated that errors and attitudes of the diverse age groups varied based on the method of content delivery. Variables that predict the perception of efficient technology integrated in higher education should include pedagogical theory, the use of computers, and how students assess course effectiveness (Meislewitz & Chakraborty, 2011). When determining the value of learning strategies and technology, a consistent predictor is the structure of the course. Noted by Meislewitz and Chakraborty, "Pedagogy seemed to be of the highest importance to students and, the relationship between computer use and perceived course effectiveness, is changing over time" (p.61). Andragogical frameworks underpin the innovation and diffusion of technology in traditional classroom settings and asynchronous delivery methods. The persistent evolution of course curriculum for the adult learner requires dynamic and task-related expectations.

Social Learning Theories and Strategies

Identified as a disorder of social learning, experimental studies regarding ASD seldom adhere to this perspective. Social learning theory (Bandura, 1977) posits that people learn by watching others, mimicking behaviors, and modeling others. Syriopoulou-Deli (2010) advised that many advocates of social learning theories agree that optimal learning occurs when students actively engage in communication and construction. Strategies endorse social learning theory by typifying cooperative methods of instruction. During cooperative learning, the student's ability to communicate efficiently and produce decisions within the group is predicated on agreement. Sperry,

Neitzel, and Engelhardt-Wells (2010) stated, “Empirically-based methods of applying peer-mediated strategies are based on principles of behaviorism and social learning theory” (p. 257). Intervention techniques that assist in the development of peer groups increase opportunities for people with ASD to acquire social skills in ordinary environments. Conclusions from these authors offered strategies that encouraged the cautious selection of peers as intervention agents and the requirement for organized instruction to promote social learning.

In early education, the strategy of coaching recognized a social learning approach to mitigating cognitive impairments. Merely participating in workshops or singular training sessions, however, was not a practical approach to affect the issues of social cognitive delays. Wilson et al. (2012) conducted a trial study entitled, *Advancing social-communication and play (ASAP),* outlining a coaching model for children with ASD that addressed supplemental interventions. Data amassed from these authors’ research revealed a notable impact on collaborative practices for peer groups and the participants’ ability to follow directions through the coaching model. A common practice to teach children with ASD is the use of a paraprofessional; however, useful outcome data was scarce. A multiple-baseline design (Hall, Grundon, Pope, & Romero, 2010) considered strategies to assess behavioral issues of children with ASD. These authors’ findings indicated that the transfer-of-training to environments beyond the test site did not occur; behavioral skill-sets declined even with the use of proficient paraprofessionals.

Social Intervention Strategies

The impact of ASD on individuals and families over the last quarter century created a significant amount of literature in regards to diagnoses, intervention strategies, and treatments. Research interest's during this period reviewed ASD through a broad scientific lens and used central themes of social motivation to understand the deficits congruent to ASD. Research on children with ASD (Strain, Schwartz, & Barton, 2011) investigated the historical element of public education as a free service. Resultant from this study were themes that considered the role of policy and practices towards the social context of inclusion for people with ASD. Research traditions that mainly addressed cognitive impairments, i.e., theory-of-mind and executive function, reduced the attention to issues of motivation.

Martin (2012) suggested that research that ascertains if students with ASD require more VSS than individuals without ASD becomes a precursor towards progressive future educational interventions (p. 2). Hayes et al. (2010) reported that technology that assists in the interpretation of naturally occurring events created foundations for successful VSS. Three prototype systems studied by Hayes et al endorsed innovative learning strategies for students with ASD that were flexible and targeted individual requirements. Information collected from these authors' work was utilized to better understand the perception of other people's actions in social scenarios (social information) while considering human movement indicators to assess intentions and emotional behaviors. Results from this research suggested that the innovation and diffusion of VSS created connections for young adults with ASD to overcome social

barriers. An additional outcome indicated that one precursor to better understand future educational VSS social skill interventions for people with ASD was to compare this population to individuals without ASD. Variations of results (Hayes et al. 2010) stemmed from inherent restrictions on the design of the VSS programs and the cooperation of the participants. Chevallier, Kohls, Troiani, Brodkin, and Schultz (2012a) outlined social motivation in terms of social, organic, and evolutionary stages. Results of this study suggested "ASD can be construed as an extreme case of diminished social motivation and, as such, provides a powerful model to understand the human's intrinsic drive to seek acceptance and avoid rejection" (pg. 237). Research on early interventions for individuals with ASD (Stock, Mirenda, & Smith, 2013) assessed data from a community-based program, Pivotal Response Treatment (PRT). The primary objectives of a PRT program seek to develop communication, acceptable language and social skills, and the reduction of self-stimulatory mannerisms. Stock, Mirenda, and Smith (2013) reported notable successes in the areas of cognition, age-appropriate use of language, and behavioral issues. Additional research was suggested by these authors to consider other long-term and efficient early intervention methodologies. Targeted strategies to diagnose and provide responses to problems for people with ASD may produce precursors to valid biomarkers towards the cause of ASD (Walsh, Elsabbagh, Bolton, & Singh, 2011). Current improvements in the future research on social intervention strategies may create an overall awareness in the scientific community for clinical evaluation.

Information Processing as a Conceptual Framework

The current understanding of how the brain in people with ASD processes information is unclear. Successful outcomes of learning tasks that are technology-based may be contingent upon a person with ASD's approach to understanding technology (Meiselwitz & Chakraborty, 2011). Previous literature (Rosenthal et al., 2013) suggested that the aging population diagnosed with ASD experiences a divergence of metacognitive executive skills (p.17). Research that considered the relationship between the age of older people with ASD and the methods to utilize new educational technology (Levy Mandell, & Schultz, 2009) contended that minimal information is available on this issue. Tamin et al. (2011) suggested that, optimally, learning theories underpinned with information processing and adult learning strategies increased success rates in social skill settings for young adults with ASD. These authors proposed that a technology that embraces social-skill set strategies fosters ideas that benefit the individual and cultural growth. Structured VSS technologies for young adults with ASD promoted social skills (Tamin et al. 2011). Stock, Davies, Wehmeyer, and Lachapelle (2011) reported, "the lack of social relationships that carry over from childhood in this target group may lead to decreased employability, decreased independent living opportunities, a reduced life expectancy and possibly severe mental health problems such as depression, suicidal ideation and anxiety" (p. 262).

Bowler, Limoges and Mottron (2009) suggested that cognition in the human brain encompasses cerebral and emotional conditioning. People with ASD may have difficulty with some components of information processing due to sensory overload. Kim (2011)

suggested that people with ASD may have difficulty with visual and auditory components of information processing due to sensory overload. An in-depth research study pertinent to information processing for people with ASD evaluated this population's performance on visual processing skills. Jones et al. (2011) held the premise that "atypicalities in low-level visual processing may contribute to the expression and development of the unusual cognitive and behavioral profile seen in autism spectrum disorders" (p. 349). The population tested for this study (ASD, n = 89; non-ASD, n = 52) and IQ (range 52–133) was evaluated across issues of (a) unity of motion, (b) form from motion, and (c) biological motion. These authors reported that visual processing differences did not exist between the ASD and non-ASD groups. Thus, people with ASD did not exhibit symptoms of deficits in this area. However, the correlation between low IQ levels and poor biological motion for some of the participants was evidenced (Jones et al., 2011). A contributing factor to the results of this study considered the possibility of impaired visual processing in the brain of some of the participants. Visual processing typically occurs in the superior temporal sulcus (STS) of the human brain. Jones et al. (2013) indicated that psychiatrists and medical professionals have identified an association of the STS (eye gaze) with the perception of socially relevant information. Zilbovicius et al. (2013) supported the connection that unusual visual impairments in eye gaze associated with STS abnormalities in people with ASD.

The process of sensemaking (Heer & Agrawala, 2010) entails the use of cognitive functions to amass information and make informed decisions. Evaluating the speed and accuracy of information processing functions for people with ASD in social and

emotional settings presents unique opportunities for intervention strategies. Selectpersons with high-functioning autism spectrum disorder (HF-ASD) may display efficient performance during routine visual tasks. However, according to Lerner, McPartland, & Morris (2012), many people with ASD exhibit difficulties when perceiving the socially significant facial expression of others (p. 12). Maekawa et al. (2011) assessed HF-ASD subjects in research that tested the evidence for correlations between information processing activity and the bottom-up and top-down theory of visual information processing. Data from these authors' work indicated that HF-ASD people performed with more rapid target detection as opposed to the control group. Literature amassed from these select reviews posited that young adults with ASD may process visual information at rates different than those without ASD. The IQ of people with ASD correlated to visual information processing as a variable in the outcomes.

Kim (2011) additionally asserted that it was relevant to consider alternative *visual learning* strategies for children with ASD due to challenges with this population's auditory component of information processing. Gentry, Lau, Molinelli, Kriner, and Fallen (2012) suggested that VSS enhances teaching strategies for children and adolescents with ASD, have established proven outcomes, and provides richer outcomes (p. 84). The human visual system component of information processing (Heer and Agrawala, 2010) contributes to the process of sensemaking; the collection, organization and analysis of information generated to informed actions. Existing elementary school learning strategies for children with ASD often consider sensory issues that may constrain student cognitive retention. Results of an observational study (Tentori & Hayes, 2012) offered insight

towards the development and use of social skill-sets in mobile situations that promoted VSS dynamic interactions among the participants. Strategies resultant from these authors' research produced encouraging assessments in terms of "the quantity and quality of the human-initiated prompts required to help a student complete an activity" (Tentori & Hayes, 2012, p. 4).

Visual Support Systems

Educational settings have evolved to mainstream students with ASD into neurotypical classrooms. Advanced strategies to examine the effectiveness of education for this population is gaining interest in the scientific community. Banda, Grimmett and Hart (2009) recommended tangible visual teaching strategies to support educational programs for students with ASD. These authors contended that the use of VSS enhanced the language, structure, and environmental assumptions of program expectations for individuals with ASD. Multiple settings, i.e., work, school, home and community, are conducive to the use of VSS. Herr and Agrawala (2010) suggested, "VSS are practical resources that enhance successful learning outcomes based on the premise that they (a) are components of communication systems for everyone, (b) hold and attract a student's attention, (c) enable the student to focus and reduce anxiety, and (d) make abstract concepts more concrete for the student" (p. 55). The timely implementation of VSS into life activities for people with ASD promoted autonomy. Roa and Gagie (2009) identified VSS as a strategy-based learning resource that is conducive to increasing the social skills of young adults with ASD.

Children with ASD learn skill-sets for daily functions through the use of VSS. Transitions through literacy and behavioral training use visual signals from computer and video applications to enhance life skills. Roa and Gagie (2009) suggested that daily routines for children with ASD are strengthened using VSS (p.27). In addition to communication issues, people with ASD (Dalrymple & Duchaine, 2013) struggle to understand cues such as physical gestures and intonation in another's voice, affecting social inclusion. These authors' attested that, in order for people with ASD to respond more appropriately, visual cues should be provided. An opportunity for persons with ASD to successfully manage various life skills may employ VSS as a resource to facilitate this transition.

Examples of Visual Supports

Emerging challenges from deficits in communication, language, and social skills in people with ASD require environmental and strategically aligned support systems. Understanding the distinctive nature of the requirements for this population is critical to educators and families. The use of VSS such as icons, images, visual schedules and social stories (Roa & Gagie, 2009) enhance learning for people with ASD. These authors' suggested that the design of VSS models should consider amassing information by collaborative teams and include parents of children with ASD. The Treatment and Education of Autistic and Related –Communication- Handicapped Children (TEACCH) program, developed by Schopler (1970), focused on teaching strategies that targeted the interests and skills of children with ASD. Banda, Grimmet, and Hart (2009) described the TEACCH program as VSS for children with ASD that encouraged a better understanding

of this population's learning characteristics. The TEACCH program is not limited to interventions for adolescents; active structures that support vocational and life-skill training are available for adults with ASD. The Picture Exchange Communication System (PECS), as a VSS, assists individuals in the acquisition of "functional means of communication" (Banda, Grimmet and Hart, 2009, p. 20). Individuals with speech impairments (a deficiency commonly found in ASD) may benefit from PECS. Information processing delays and social skill challenges appear to decline in people with ASD through the use of programs exemplified by TEACCH and PECS.

Visual Schedules

Students with ASD receiving educational instruction in typical environments face difficulties related to transitions in activities and timetables. The use of visual schedules assists this population towards completion of tasks. Banda, Grimmett and Hart reported that decreasing incidents of disruptive behaviors can be mitigated through the use of activity schedules (p. 17). These authors suggested "students with ASD, who have problems making these transitions, can be left out of social circles and have problems associated with the amount of activities they complete on a given day" (Banda, Grimmet and Hart, 2009, pg. 20). Exploring methods that assisted students with ASD to anticipate change in perceived expectations, findings from Banda, Grimmett, and Hart supported positive outcomes aligned with impacts on improved behavior and progress in classroom situations. Visual schedules, when contrasted to a published agenda, provide alternative methods for people with ASD to organize their intentions and activities.

Cramer et al., (2011) tested vSked in a classroom setting during an empirical study of adolescents with ASD. As an interactive and collaborative assistive technology for students with autism, the use of vSked in these authors' research combined visual schedules, choice boards, and a token-based reward system into an integrated classroom system (Cramer et al., 2011, p. 2). Results from these authors demonstrated that vSked promoted student independence, reduced the quantity of educator-initiated prompts, encouraged consistency and predictability, and reduced the time required to transition from one activity to another. These types of findings provided insight towards the benefits of VSS for young adults with ASD and highlighted important considerations for both the design and the evaluation of assistive technologies in the future, especially those destined for classroom use. Results from Cramer et al. (2011) revealed that new VSS learning strategies may produce a greater dependence on the technology, yet offer alternatives to traditional means of social interaction. The use of assistive technology evidenced from Cramer et al., warranted design considerations in respect to balancing the requirements of individual participants as well as VSS for neurotypical students. The use of VSS for innovative community practices emerged from this type of research.

Reducing anxious and inappropriate behavior in students with ASD poses challenges to educators and caregivers. Research produced by Rao and Gagie (2009) indicated that a significant reduction in inappropriate behavior occurred in students with ASD when this population used visual schedules for assignments and activities. Latency time and independent function improved as a result of the use of visual scheduling aids. Visual models for individuals with ASD that stimulated play (Goodman and Williams,

2009) increased the execution of creative ideas. The use of images to assemble models from building blocks enhanced the information process by means of visual assimilation. Hirano et al. (2010) explained that VSked, an interactive and cooperative VSS created to assist teachers with classroom schedules, reduced the user's effort required for typical visual supports. These authors indicated that social interactions and the quality of communication improved as a result of the use of vSked during the study. Conceptual frameworks and applications relevant to visual schedules for adult populations warrant future investigation.

Challenges for Visual Support Systems

People with ASD have varied needs with respect to levels of visual supports. Designing VSS appropriate to individual challenges may use technological resources to elicit optimal performance standards. Prototypes of VSS (Hayes et al., 2010) evaluated across groups using technology as a strategy for educational and behavioral instruction. These authors' suggested "just as autism is a disability that varies in degree from student to student, the program that best meets the needs of students with autism should vary from student to student" (Hayes et al, pg. 670). Findings from this study supported the general premise in education that learning strategies for students must be flexible and target individual requirements. The perception of other people's actions in social scenarios (social information) considers human movement indicators to assess intentions and emotional behaviors. Body movement of people (Heer & Agrawala, 2010) articulated personal emotions and purposes. Kim (2010) specified that, because auditory

information, when coupled with VSS created multisensory complications in people with ASD, the singular use of VSS enhances learning more efficiently.

Research and the application of VSS learning strategies for people with ASD require a more extensive investigation. Interpersonal and social skill activities in life settings (Arthur-Kelly, Sigafoos, Green, & Mathisen, 2009, p. 397) were examined to ascertain if behavioral flexibility was sustained during the use of VSS for individuals with ASD. These authors concluded that urgent future methods are imminent to develop innovative and efficient VSS strategies for this population. This urgency is predicated on the suppositions that ASD learning impairments vary in range and (APA, 2010) and, according to Chakrabarti and Fombonne (2010), there is an increase in people diagnosed with ASD.

The Human Visual System that Supports the Process of Sensemaking

The human visual system is a critical component of sensemaking; how people connect experiences to a meaning. Using visualization leverages the human visual system to support the process of sensemaking. Heer and Agrawala (2010) reported that the *human visual system* of individuals with ASD contributed to the process of sensemaking; the collection, organization and analysis of information generated informed actions (p. 53). Research by these authors assumed a single-user focus and considered sensemaking as a social process. The parallelization of effort (Heer & Agrawala, 2010), when considering the perceptual and cognitive processes, equates to social development (p. 54). The authors reported, “To fully support sensemaking, interactive visualization should also support social interaction; however, the most appropriate collaboration mechanisms

for supporting this interaction are not immediately clear" (p. 55). Sense-making (De Jaegher, 2013) allows each other to coordinate the embodiment of activities in social scenarios.

Research that used the Enhanced Perceptual Functioning Model (EPFM) on people with ASD considered visual processing areas common to neurotypical populations (Samson, Mottron, Soulières, & Zeffiro, 2012). Evidence from this study indicated that, within the tested ASD population, atypical visual processing during perceptual tasks has greater capacities to search and detect embedded figures and increased levels of physiological engagement occur. Interventions using VSS developed to target preferred learning styles for people with ASD should consider that this population struggles with issues of recall and verbal communication. According to Grandin (2009), an adult with ASD, many of this population "think in pictures" (p. 1439) using visuals (e.g., photographs and videos) to help them retain information. Adjusting teaching strategies assists communication for people with ASD. Data from research (Arthur-Kelly et al., 2009) indicated that teachers using VSS during interventions for individuals with ASD reduces difficulties in behavioral and transitions. Creative VSS develops social skills appropriate to individual needs and expands the concept of sensemaking for people with ASD.

Interventions Associated with Prototypes of Visual Support Systems

Dynamic learning in classrooms, at work, and home environments frequently requires transitions between activities. Unobtrusive resources that consist of natural VSS, such as maps, organizers, or written directions, augment transitions for individuals with

ASD. An objective of the use of VSS for this population is to mitigate stressors due to anxious behavior and to encourage expressive thoughts. Research generated by Gentry, Lau, Molinelli, Kriner, and Fallen (2012) suggested that the use of PDAs enhance the management of assignments and organizational practices. These authors' research also determined that implementing the use video and software programs during interventions for people with ASD provided richer outcomes. Using the touch screen mobile computer (TSMC), Rasche and Qian (2012) evaluated technology of a facilitator to a child's learning experience and reinforcement of skills. Findings from this study revealed that the use of technology as a form of VSS therapy improved early interventions. These authors further wrote, "At an affordable price range, the simple touch screen of a TSMC has an immediate cause and effect response that enables these students to be more independent during the learning process" (Rasche and Qian, pg. 1). Conclusions from this study suggested that the identification of an accurate starting point for VSS strategy is crucial. Familiarity with current literature, evaluation of TSMC designs, and prototype designs are optimal starting points. Prototypes of video modeling and audio cueing (Allen et al., 2012) were evaluated to assess the advantages of using VSS to train individuals with ASD for employment. Results from this study indicated a statistically significant improvement in participant performance using audio cuing; however video modeling was not effective. No evidence of credible research studies involving prototype studies on innovative VSS software platforms, such as AutiPlan Pictoplanner, Snapwords, and Choiceworks, existed for this literature review.

Emerging Practices and Interventions

Applicable communication skills for young adults with ASD diminish due to cognitive impairments. According to Stock, Davies, Wehmeyer and Lachapelle (2011), without support, young adults with ASD struggle to start conversations, join peer in activities, or understand socially acceptable behavior. Without social relationships established during childhood, this population may struggle with employability, independent living, and experience mental health issues. Stable and familiar relationships are not frequently experienced (Branson, 2013) by individuals with ASD (p. 121). Without the relationships commonly established by neurotypical persons, self-worth, and a sense of belonging are difficult to obtain.

Social Skills Training

Early identification and interventions for children with ASD may lead to improved outcomes. The knowledge and performance of appropriate social skills for people with high-functioning autism (HFA) or ASD is challenging. According to Stichter et al., (2010), "deficits of social cognition, theory of mind, emotion recognition and executive functioning contribute to ASD" (p. 1067). These authors conducted research that used a social competence intervention (SCI) model to assess deficits of cognition and behavior of an ASD population. Results from the population ($N = 27$, ages 11-14) indicated marked progress when parents of this population reported improved social skills and executive functioning. Problem-solving skills and the measurement of how the participants recognized facial expressions increased. Future research for this type of study suggested increased sample sizes conducted in naturalistic environments. The social

behavior of an ASD population during training focused on social training (McMahon Vismara, & Solomon, 2013) using participant vocalizations to code dyadic (relationships to pairs) interactions. Analysis of this work suggested that people with ASD, when using vocal responses, versus inquiries, increased interaction among peer groups learn about social settings beyond the family environment.

School-based Strategies

Impairments in adaptive, psychiatric, and social function for adolescents with ASD have the potential to continue into adulthood. Due to these deficiencies (Jennes-Coussens, Magill-Evans, & Koning, 2009), this population frequently relies on families or community services into adulthood (p. 404). Sustained relationships outside of immediate family are difficult, if obtainable. Employment for people with ASD presents challenges, even if this population has a high school or college education. Howlin (2010) proposed school-based intervention objectives that "focus on social behaviors that allow individuals with ASD to improve the depth and quality of their social relationships, in order to achieve satisfying, supportive, and meaningful relationships"(p. 208). Increasing school-based social relationship (Schmidt, Stichter, Lierheimer, McGhee, & O'Connor, 2011b) perpetuates long-term confidence (p. 10). Teacher-directed social structure benefits peer groups.

Social Competence Intervention-Adolescent (SCI-A) curriculum measures the degree of generalization delivered in classrooms. Evidence-based studies addressing social interventions in schools warrant more research (Elder, Caterino, Janet, Shacknai, & De Simone, 2009). Findings resultant from Schmidt et al. (2011b) suggested that teachers

working with students with ASD need to improve reporting methods on social and executive functioning skills. Direct measures relative to facial expressions in people with ASD during interventions are central to assessing social skills. The intellectual functioning of individuals with ASD may fall into neurotypical ranges and are academically adept. However, Schmidt et al (2011b) suggested that social deficits inhibit the achievement of complete independence as this population ages. Progress incurred through school-based social strategies must be maintained after withdrawal of the intervention.

Challenges to Social Skill-Set Interventions

The validation of interventions for social and behavioral impairments affecting young adults with ASD requires attention. The National Autism Center (NAC; 2012) published statistics in the *National Standards Report* highlighting the evaluation of evidence-based social skill strategies for individuals with ASD (para. 2). Findings from this report indicated "a total of 11 treatments were identified as established treatments and 22 as emerging. Of the established treatments, only two reported evidence for individuals with ASD and for the emerging treatments only four treatments reported evidence for ASD" (NAC, 2010, para. 4). The ASD scientific field persists to investigate one undertaking (Gresham, Sugai, & Horner, 2011); the development and validation of strategies to generalize and maintain social skills for the ASD population. Recent literatures (Schmidt et al., 2011b) failed to report data supported by general and flexible social skills studied in natural settings. Weaknesses in methodologies during previous studies existed. Limitations, to fully understand the competence and efficacy of social

interventions for people with ASD, must generalize to innovative environments and investigate unique people (Bellini, Peters, Benner, & Hopf, 2009). An emerging strategy for people with ASD (NAC, 2010) uses cognitive behavioral intervention (CBI) to categorize social competence. Information on this type of social and behavioral intervention reported encouraging results. Interventions relevant to social skill deficits of people with ASD remain one of the most challenging areas to meet this population's needs.

Summary

Evidence-based reviews from the literature on VSS exploring educational settings and an examination of the social structure of people with ASD projected a broad perspective of this population's needs. This literature review arrived at similar, yet contrasting views that evolved from recent scientific investigation. Consistent themes from research studies emphasized the need to examine behavioral and social skill-set interventions for individuals with ASD. The majority of findings pertinent to VSS for ASD interventions provided data for children and adolescents. Scarcity of data existed that addressed the efficacy of interventions for adults with ASD. The premise, that social skills training lacks progressive direction and support for adults with ASD, presents future challenges for society and communities. Learning strategies that encompass VSS for young adults with ASD should address how the efficacy of studies may drive adequate data and translate findings into much- needed services for this population.

Discrete methods discussed in this literature review focused on the analysis of cognitive abilities and social deficiencies of children and adolescents with ASD.

Consideration of these results are significant, however, the educational and social wellness of young adults with ASD justified future research. The evaluated investigations did not produce evidence-based data that examined VSS interventions to validate social, physiological, and psychological impedance for young adults with ASD. Findings from the review purported that the requirements and related interventions for children with ASD do not equate with the appropriate education and services. When people with ASD age, the inequality perpetuates. Deliberation of the social skill-sets for young adults with ASD to use innovative engagement approaches and enhance appropriate behavior in community settings are essential to social change. In this chapter, I reviewed literature that related to VSS and social skills for the ASD population. In Chapter 3, I present the methods of data collection and analysis.

Chapter 3: Research Method

The purpose of this study was to explore perceptions of school personnel related to the use of VSS technology and enhancement of social skill-sets for young adults with ASD. The problem addressed in this study included the challenges that young adults with ASD encounter when engaging in appropriate communication and behavior with other people in social scenarios. Even though the use of technology is attractive to this population, a gap in the research literature for VSS existed. According to Miller (2013), "Much attention has focused on education and interventions for children with autism. Little attention is paid to what happens as they transition into adulthood" (para. 1). In order to enhance and perpetuate the learning and application of social skills for a young adult with ASD, VSS devices and software assists to mitigate the barriers that inhibit integration into the community and independent living.

In this chapter, I included the research design, the role of the researcher, criteria for selection of participants, methods of data collection, and data analysis used in the study. I discussed ethical issues of trustworthiness and how I addressed these in this study. A qualitative multiple-case study was used to guide the data collection and analysis of this research using semistructured interviews with administrators, teachers, and intervention specialists from three separate special education program locations.

Research Design and Rationale

Research Questions

This study focused on two research questions:

1. How do special education administrators, teachers, and intervention specialists perceive the use of VSS meets the social skills training needs of a young adult with ASD?
2. What VSS learning strategies are being used efficiently by special education administrators, teachers, and intervention specialists towards enhancing social skills-sets for young adults with ASD?

Central Concepts of the Study

The central concepts of this study were VSS and young adults with ASD. VSS are visual learning aids used while teaching to improve academic performance, behavior, interaction with others, and self-help skills. Young adults with ASD are people diagnosed with ASD between the ages of 16 and 23. The phenomenon of inquiry for this study was how administrators, teachers, and intervention specialists from special education programs perceived the use of VSS by young adults with ASD. The perception under investigation was the VSS learning strategies and alignment with the enhancement of social skills for young adults with ASD.

Research Tradition

This study used a qualitative approach and the multiple-case study research method. Each case was a school where VSS tools were being used in classrooms with students with ASD. Participants from three separate school systems where VSS was used in classroom settings were interviewed. A hallmark of case study research is the use of multiple lines of evidence, a strategy that also enhances data credibility (Patton, 1990; Yin, 2003). Yin (2003) refined his original interpretation of a case study, “an empirical

inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 18) into a "twofold, technical definition" (p. 18). Data were collected from an in-depth exploration of the phenomenon through semistructured interviews with administrators, teachers, and intervention specialists that use VSS with young adults with ASD. Interviews conducted at three separate special education programs were addressed within the boundaries of real-life context and sought multiple information sources. Findings from the interviews were coded and analyzed using NVivo 11, a qualitative research software program.

Rationale

The rationale for using a multiple-case study methodological approach considered that each context and the environment are different. Case study design was used for this study's methodology because the focus of the study was to answer how and why questions. The case study as a research method (Yin, 1984) is a situated approach to many paradigms. Case studies can be conducted and written with many different motives, including the simple presentation of individual cases or the desire to arrive at broad generalizations based on case study evidence. Yin (2003) reported "It was the most appropriate research approach for appreciating the complexity of organizational phenomena" (p. 15). According to this author, applicable outcomes from case studies produce unique assessments (Yin, 2003, p. 19). A multiple-case study design for this study was used to encourage changes in educational strategies for young adults with ASD. Analysis of the data led to the development of a professional and educational

model for key stakeholders to understand how to use VSS to support social skills for young adults with ASD. Stake (2008) suggested that case studies investigate human affairs in natural settings (p. 19). A multiple-case study approach to this research was reasonable for the participants (administrators, teachers and intervention specialists) and sites (schools) as it addressed how VSS provided perceptions through personal experiences.

The research design in this study was consistent in all school settings where the research was conducted. Using multiple sites within the research assisted in the understanding of group perceptions of phenomena (Stake, 2010, p. 7). The same units of analysis or events were studied in the light of the same fundamental research questions. In addition, identical data collection, analysis, and reporting approaches were employed across the cases. The multiple-case study approach was designed to contrast different cases that may share some feature or characteristic problem and investigate the variation of carefully matched units of analysis. In my study, the puzzlement or issue of concern was that the use of instructional VSS as an assistive technology to enhance social skill-sets for young adults with ASD has historically received limited attention. The bounded multiple-case study was each school where VSS tools were being used in classrooms with students with ASD.

The Role of the Researcher

In this qualitative multiple-case study, I was the sole researcher, transcriptionist, and manager of the primary instruments for data collection and analysis. I transcribed the amassed data obtained through a series of interviews with administrators, teachers, and

intervention specialists from three separate special education programs. Recording of data was accomplished by note taking, memos, and audio recording. This process assured that all responses were accurately recorded and transcribed. Data analysis for this study was accomplished using the three step coding process from the case study methodology approach and reported through the development of a substantive model.

Bias in research methods may have transpired throughout all phases of the study. In research, Maxwell (2012) suggested "bias may occur when "systematic error [is] introduced into sampling or testing by selecting or encouraging one outcome or answer over others" (pg. 10). I have a substantial level of experience with VSS in educational settings and literature searches. My knowledge of individuals with ASD is based on (a) coparenting a child with ASD from infancy to his current age of 20, (b) coaching adolescents with ASD in athletic programs and (c) extensive literature reviews pertinent to ASD. Maintaining objectivity, professionalism, and a scholarly presence was paramount to avoid influences on participant outcomes. In order to uphold objectivity during this study, the queries and collection of data were approached with curiosity as opposed to preset opinions. Participant selection used rigorous criteria to avoid confounding results. I did not have a personal, professional, or supervisory relationship with any of the special education program's administrators, teachers, or intervention specialists that I interviewed.

During the interviews I used scripted questions specific to administrators (Appendix A) and teachers/intervention specialists (Appendix B) with follow up probes. The identification and management of research bias or power relationships (Rakow,

2011, p. 417) is connected to how the interviewer enhances the trustworthiness, transparency, and accountability of their research (Kvale, 2012, p. 12). Controlled environments at the participants' program facilities were used for the interviews. No incentives or compensation to participate in this study were offered to the members or special education programs.

Methodology

Participant Selection

The target population for this study was special education program administrators, teachers, and intervention specialists. I used a purposeful, homogenous sampling strategy to recruit participants was based on the minimum criteria of (a) 3 years of experience working in a special-education program, (b) providing intervention administration or teaching young adults (ages 16-23) diagnosed with ASD, and (c) familiarity with VSS strategies. Examples of VSS are iPod, iPad, Visual Cues, vSked, Video Modeling, PECS and TEACCH. After an initial consultation to review the study's intent, expectations, and proof of criteria, participants were recruited and selected for this study. Evidence of standards was established using administrative support from the participant's program through a site point-of-contact. Brammer and Walker (2011) indicated, "The purposeful, homogenous sampling method is useful in multiple-case study designs that aim to explain problems by establishing which factors are associated with them or cause them" (p. 454.) These authors suggested that this sampling method assists in assessing influences towards positive outcomes or deficiencies from findings in studies. Information-rich cases, such as how VSS enhances social skill-sets for young adults with ASD, provided findings

related to issues that are central to the intention of the research. Qualitative results from this study led to generalizations germane to broader theory.

Qualitative research using interviews as an instrument to collect data investigates underlying elements of social behavior and seeks to attach meaning to the findings (Patton, 2002). Investigation of the research problem necessitated me to become engrossed in scientific inquiry. When determining the sample size for interview-based qualitative research (Crouch & McKenzie, 2010, p. 484), a small number of cases, such as fewer than 20, provided sufficient opportunities to establish connections with the participants. According to Patton, an approach to determine sample size in qualitative research is to (a) collect data to the point of redundancy, (b) use an emergent method and (c) estimate the scope of the population prior to the study (p. 229). The sample size for this study's target population was predicated upon a cross-section of special education professionals and expected to amass redundant responses. The emerging purposeful, homogenous sample strategy sought to include participants that expressed an initial interest in participation and met the criteria. Eleven participants completed the study.

Identification and Recruitment of Participants

I conducted a multiple-case study where each case was a school where VSS tools were being used in classrooms with students with ASD. The targeted sample size for this study from each location was eight participants from Site A and 10 participants from Site B for a total of 18 subjects. Potential participants for this study were identified and recruited from Site A and Site B schools that used VSS and provided special education interventions for young adults with ASD. In order to solicit participation for my research

study, 10 organizations were queried via e-mail and phone contact. Two schools met the study criteria and, via initial face-to-face meetings with personnel, I obtained agreement for participation. Site A was a private organization located in a metropolitan area that provides education and therapeutic treatment for children and their families facing social, behavioral, and learning challenges. Site A was well-established and personnel used VSS instructional strategies for young adults with ASD to teach self-awareness, self-regulation, and self-advocacy towards problem-solving and conflict resolution. Site B was a suburban high school with a special education department for students between ages 14-22. Personnel at Site B used VSS learning strategies for instruction and other interventions for special needs students with ASD. Due to sparse participation from Site A, approval from the Walden University IRB was granted to include an additional case site (Site C) to participate in the study. Site C was a private school located in a suburban area that provides educational services for students between ages 10-23 that are diagnosed with ASD.

Instrumentation

Data collection in this study was in the form of in-depth, open-ended, semistructured interviews with participants; I sought to collect comparative data from two separate special education organizations. The source of data collection instruments and protocol for participant interviews consisted of five open-ended researcher-produced questions for administrators (Appendix A) and eight questions for intervention specialists and teachers (Appendix B). The interview questions were derived from the primary issues investigated in this study, such as (a) beliefs on cognitive disabilities associated

with ASD, (b) VSS as an assistive technology and (c) VSS teaching strategies. The first research question examined how special education administrators, teachers, and intervention specialists perceived the utility of VSS to meet the social needs of a young adult with ASD. The second research question investigated the VSS learning strategies used by this participant population to enhance social skills-sets for young adults with ASD. The protocol for the study consisted of interviews conducted in a controlled environment at Site A, B and C locations. The duration of the sessions ranged from 45 to 70 minutes. Field notes were taken, and the interviews were audio recorded. No follow up interviews were necessary. Participants were scheduled for the study in collaboration with the organization's administration and facilitated with specific expectations such as times, locations, and the duration of the interview. Data from the interviews were initially transcribed from written notes and memoing, the transcripts were reviewed, and the initial interpretations and reviews employed a member checking process. No historical or legal documents were used as a source of data or data collection instruments.

Sufficiency of Data

Sufficiency of data collection was supported by face-to-face interviews and an opportunity to follow up with the participants provided maximum communication to address the research questions. One hour interview sessions for each participant facilitated in-depth perspectives on the research problem. In addition to using audio recording for the interviews, using field notes (Groenewald, 2004) captures data that may be overlooked during the interview process (p.7). Using a member checking process during the interview process (Krefting, 2010, p. 56) assisted in the clarification of

responses from the participants and interjected additional perspectives. Field notes, memos and member checking were used to clarify the collected data.

Researcher-Developed Instrument

The basis for the researcher-developed instrument required critical analysis, evaluation, and a peer review of the instrument by nonparticipants prior to administering the study. A study on VSS technology for individuals with ASD (Newton, Eren, Ben-Avie, & Reichow, 2013, p.55) used researcher-developed interview questions and audio recording to collect data. My study used peer-reviewed interview questions developed by me. Sixteen sample questions were posed to three teachers not participating in the study that have backgrounds in special education (ASD) and familiarity with VSS (Appendix C). Instruments evaluated by nonparticipants measured content-related evidence (face validity) for the study. Results from the peer-reviewed questions determined that (a) the interview questions covered the breadth of the content area (the instrument contains a representative sample of the content being assessed) and (b) appropriate formatting was used for the target population. A peer review assisted in the identification of ambiguity, stressors, and misleading interview questions. Ambiguous and misleading questions such as, “What are your perspectives on learning-challenges?” and “How do you think research should contribute to enhancing social skills for a young adult with ASD?” were eliminated due to potential distractors to the core research questions. Interview questions as they related to the research questions were synthesized and justified resulting in the use of a total of eight interview questions. Results from this peer review were noted in

Table 1 and Table 2. Establishing sufficiency of data collection was accomplished at the special education program sites to seek rich data from multiple perspectives.

Table 1

Research Question 1

Interview Questions	Teachers and Intervention Specialists	Administrators
1 Please describe your typical experience or exposure to young adults with ASD in an educational setting.	X	X
2. What do you think of the idea that technology can attract and hold a student's attention and why?	X	X
3. What do you think of the idea that technology makes abstract concepts more concrete for the student and why?	X	X
4. How familiar are you with VSS and what types, if any, are being used in your educational setting to teach social skills for young adults with ASD?	X	X

Table 2

Research Question 2

Interview Questions	Teachers and Intervention Specialists	Administrators
5. What learning strategies, if any, that address social skills for young adults with ASD, are you typically using?	X	
6. How do you determine if a particular learning strategy is aligned with the cognitive levels of young adults with ASD?	X	X
7. How have VSS learning strategies been evaluated, and what was determined about its strengths and drawbacks?	X	
8. What other VSS technologies would enhance your strategies when teaching social skills to young adults with ASD?	X	

Procedures for Recruitment, Participation, and Data Collection

Potential participants for this study were identified and recruited from organizations that use VSS and provide special education interventions for young adults with ASD. Ten organizations were queried via e-mail and phone contact. Participants were selected based on initial responses to my request to participate in the study and their ability to meet the criteria:

- Participants' programs had students between the ages of 16-23 classified as ASD in accordance with APA *DSM-5* criteria.
- Participants had evidence of 3 years of experience in either administrative, educational, coordination, or intervention roles of young adults with ASD.
- Participants had existing or past use of VSS in the participant's educational environment.

I collected data from 11 participants over a 3-month period, and the interviews were approximately 1 hour for each participant. The interviews were conducted at the organization's facility in a controlled environment or an alternate site if the school was out of session. The data were recorded using field notes, memoing, transcribing, and audio recording. Denzin and Lincoln (2005) suggested that qualitative research attempts to use textual accounts of social experiences to "create the inescapable problem of representation" (p. 19). Interactions between the researcher and participants during qualitative research (Moustakas, 2011) should seek in-depth connotations as opposed to

mere explanations. If recruitment and participation resulted in too few subjects, I used the snowballing strategy to recruit additional participants.

The interview debriefing was a semistructured process. Participants had an opportunity to reflect on the experience and provide insight towards interests for future studies. I reviewed the interview notes, memos, and transcripts to ensure legibility and accuracy. Participants were thanked for their cooperation and reminded of the confidentiality agreement signed prior to the study. If the need existed for follow-up interviews, the participants were notified via e-mail and arrangements (time, date, and location) were mutually determined.

Data Analysis Plan

Data associated with the research question (McCraken, 2008, p.31) move from a general to particular comprehension of the issue; the researcher's challenge (Stake, 1995) is to recognize this transition. The coding process (Charmaz, 1983) disassembles and reassembles the data. Corbin and Strauss (1990) reported, "The researcher will search for the strings that constitute this web and thereby define the meaning's structural logic and coherence" (p. 57). The results of the data from this study were coded to provide a multiple-case study analysis of the participants of Sites A, B, and C as a means to conceptualize the web of meanings.

Data Coding

Written responses, memos, field notes, and audio recordings collected during the interview were coded and analyzed using NVivo 11. The initial coding process used open coding to fragment, examine, and contrast the transcribed descriptive data from the

interviews. Categories and themes emerged from the initial coding process. Open coding continued until saturation occurred. Axial coding reassembled the data (Strauss, 1987) by focusing on the various categories or themes that emerged during the open coding process. Relationships between categories and subcategories evolved during axial coding. The last step in coding the data was selective coding. Categories were integrated and refined to expand a greater model that depicted the outcomes of the data. Saturation of data was evidenced when identical groups emerged. Themes and patterns evidenced from the data coding were recognized by noting key-indigenous terms (work repetitions), indigenous categories (local terms that may sound unfamiliar or are used in unfamiliar ways), and metaphors or analogies.

Discrepant Cases

Data that evidence an irregular perspective are considered discrepant. The evaluation of discrepant cases in this study was examined by determining if participants provided explanations or contradicting patterns of information pursuant to the interview questions. A potential single discrepant case arose from one participant, and this case was examined in Chapter 4. No other false interpretations or insufficient evidence emerged during the data collection and no irregularities of data collection existed.

Issues of Trustworthiness

Issues of bias in the study were minimized using a verification process (Eisner, 1991) that sought believability through coherent interview questions. Trustworthiness in research, as indicated by (Lincoln & Guba, 1985), is enhanced through the minimization of systematic error (para. 2). The validation of the findings of the study determines

credibility and correspondence to reality (Creswell, 2003; Creswell & Miller, 2002, p. 125). The internal validity measures for this qualitative study sought in-depth information from participants. Credibility for this study was established using member checking and an external audit (peer review). Member checking was used to assure my interpretations matched the understandings of the participants. Peer debriefing was used at the end of the study to assure that the collected data and interpretations were clear and appropriate.

According to Lincoln and Guba (1986), transferability in a study is "the ability of research results to transfer to situations with similar parameters, populations, and characteristics" (para. 1). Transferability in this study was my responsibility and evolved from variations in participant selection from three separate locations. Dependability within the study warranted accountability for the researcher to consider and audit the results and supporting data. Patton (1990) suggested that objectivity in research is difficult due to inevitable bias from researches (p. 91). Strategies to establish dependability in this study included an external audit by a nonpartisan colleague to appraise the research and evaluate the process of inquiry. Haynes (2012, p. 72) described reflexivity as an enlightened awareness of the researcher as the topic being studied evolves. Confirmability in this study was established through a strict focus on the participants' responses to the queries and avoidance of my motivation to induce bias during the interviews.

Ethical Procedures

Ethical issues were considered for all phases of the study. Permission from the Walden University Institutional Review Board (06-19-15-0076816) for conducting the

research was obtained. An abbreviated version of The Walden University Research Ethics Planning Worksheet was used as a guide to predict and control potential breaches of ethics prior to the study. The use of numerical coding and fictitious pseudonyms of the sites and participants ensured confidentiality for the participants. If permission is granted after the study is completed, the results will be shared with the professional community without any trace of the participants' identification. All research data, including peer reviewed sample questions, interview audio tapes, e-mail correspondence, and transcripts will be stored via digital means on the researcher's computer and secured by a confidential password that I will confidentially hold for a minimum of 5 years.

Summary

In this chapter, I presented the research problem, questions, design, and criteria for selecting the participants. The data collection and analysis process, ethical procedures, and evidence of quality for the study were also reviewed. A multiple-case study methodology was used in this research to explore the challenges that young adults with ASD encounter when engaging in appropriate communication and behavior with other people in social scenarios. I investigated how administrators, teachers, and intervention specialists perceive the utility of VSS in meeting the social needs of a young adult with ASD. I also explored the effectiveness of VSS learning strategies used by this population to promote social skills-sets for young adults with ASD. Data from the interviews were collected over a 3-month period. The research findings that were obtained from the analysis of the data were used to elicit perspectives towards how VSS may reduce the barriers for young adults with ASD to integrate into community social settings and

promote social change. I present the results, findings, conclusions and recommendations in subsequent chapters.

Chapter 4: Results

The purpose of this qualitative, multiple-case study was to explore perceptions of school personnel related to the use of VSS technology and the enhancement of social skill-sets for young adults with ASD. The collection of data via interviews provided insights into how the use of VSS affects the social skill-sets of youth with ASD during their transition years. I conducted investigative queries to ascertain how visual assistive technology resources and learning strategies promoted a reduction of the barriers, such as, community integration and independent living, for young adults with ASD.

Research Questions

The research questions investigated for this study were:

1. How do special education administrators, teachers, and intervention specialists perceive the use of VSS meets the social-skill training needs of a young adult with ASD?
2. What VSS learning strategies are being used effectively by special education administrators, teachers, and intervention specialists towards enhancing social skills-sets for young adults with ASD?

In this chapter, I describe the study's setting and organizational conditions as well as the demographics relevant to the study. I discuss my data collection that included the number of participants, frequency of interviews, recording method, and variations that emerged set against Chapter 3. I then review the data analysis process (coding and themes), evidence of trustworthiness, the results of each research question, and a summary of the research questions to complete this chapter.

Research Settings

The qualitative, multiple case-study was conducted at three separate sites. Pseudonyms were created to ensure the confidentiality of the sites. Site A (Alternative Options Academia) was a private school specifically for high school students diagnosed with ASD. Students enrolled in this program were between the ages of 13-23. Study participants were school administrators, intervention specialists, and teachers. Site B (Bravado High School) was a local public high school that provides special education services for students diagnosed with ASD between the ages of 13-22. Study participants were administrators, intervention specialists, and the coordinator of special education. Due to minimal participation from Site A an additional site, C (Wellsfont School) was requested to be added to this study. The addition of the Site C, a private school specifically for students diagnosed with ASD between the ages of 10-23, was approved by the Walden University IRB. Site C's participants included administrators, intervention specialists, and teachers.

I conducted the interviews of personnel from the three different sites in an environmentally friendly setting such as private offices, conference rooms, and classrooms after normal class hours. Privacy was established and maintained during the entire duration of the interviews. Participants were not influenced by any personal or organizational conditions that influenced their experience during the study. All interviewees were supported by their organization's administration to participate in the study without duress or enticement. Site A's point-of-contact suggested appropriate times for interviews. Site B's point-of-contact forwarded potential participants to me and

appointments were established. Site C's point-of-contact arranged for subjects to willingly participate during breaks from parent-teacher conferences. Interpretations of the study's results were not affected by any change in personnel, budget cuts, or other trauma. No interruptions occurred once the interviews commenced. All participants appeared to be under no duress or emotionally upset. To the contrary, a noted amount of enthusiasm and willingness to contribute to this research was noted.

Participant Demographics

Participant demographics (see Table 3) relevant to the study included characteristics germane to administrators, intervention specialists, special education coordinators, and special education teachers. Pseudonyms were assigned to each participant to ensure confidentiality. Common characteristics for this target population were identified and congruent within the three sites. Similar characteristics included organizations that provided special education programs for young adults with ASD, intervention activities that employed VSS, and study participants that had a minimum of 3 years of experience providing special education training to young adults with ASD. Evidence of special education resources such as visual supports, video modeling software programs, and examples of visual support projects were noted in the classroom settings. Ten females and one male provided data for this qualitative study via semistructured, open-ended interviews. The educational range for participants varied from a minimum of a Bachelors of Arts in Special Education to a Master's Degree in Education with a Specialization in Curriculum and Instruction. Ten of the 11participants involved in the research were female with an average age of 41 years. The average experience teaching

young adults with ASD was 12 years. The average length of time in an administrative role was 8 years.

A total of 11 participants were willing to be involved in this research study. It was hoped that more participants could be identified; however, some potential participants initially consented to be interviewed, yet were unavailable due to time constraints and failure to establish firm interview times. The sample size of 11 participants produced both saturation and sufficiency of data.

Table 3

Participant Characteristics and Demographics

Site	Code	Role	Gender	Education	Age	Years Exp.
A	Alice	Admin	Female	MS SpEd	42	18
	Elizabeth	Intervention Specialist	Female	MS SpEd	52	27
B	Nancy	Admin	Female	MS SpEd	48	17
	Diane	SpEd Coordinator	Female	MS SpEd	45	19
	Debbie	Intervention Specialist	Female	MS OT	35	10
	Karen	SpEd Teacher	Female	MS Ed	37	14
C	Christine	Admin	Female	MS SpEd	40	18
	Laura	Intervention Specialist	Female	MS Ed	55	28
	Felicity	SpEd Teacher	Female	MS SpEd	29	5
	Rhonda	SpEd Teacher	Female	BA Ed	31	9
	Mickey	Intervention Specialist	Male	BA Ed	49	10

Data Collection

The 11 participants in the study were administrators, special education coordinators, intervention specialists, and teachers who worked in private and public educational systems with young adults with ASD as students. All data were recorded by the researcher using notes, memos, and audio recording. The responses to either five questions (administrators) or eight questions (intervention specialists/teachers) were reviewed immediately after the conclusion of the interviews. The initial interpretations of the interviews were sent to the individual participants for member checking and to ascertain the accuracy of the participant's responses. One out of eleven (9%) of the participants provided minor corrections to their responses. Site C provided corrected information regarding the correct spelling of a VSS program that was incorrectly recorded during the interview. I transcribed all of the interview responses by referencing notes, memos, and audio recordings. Variation in data collection from the plan presented in Chapter 3 existed. An additional site was approved by the Walden University IRB to be added to the participant pool. No unusual circumstances were encountered during the data collection.

Data Analysis

In this section, I describe the process used to move inductively from coded units to larger representations including categories and themes. I transcribed the data collected for this multi-case study from three different sites and 11 participants. For clarity and accuracy, my notes and memos were cross-referenced to ascertain the trustworthiness of the data. Specific approaches towards credibility, dependability, transferability, and

confirmability are discussed later in this chapter. Subsequent to member checking and peer review of the transcriptions, I uploaded raw data amassed from the member checked and peer-reviewed transcripts to NVivo 11 QSR software to begin the data analysis process. The first step of data analysis was topic coding. Topics (themes) were categorized by creating parent and child nodes within NVivo 11 (see Figure 1).

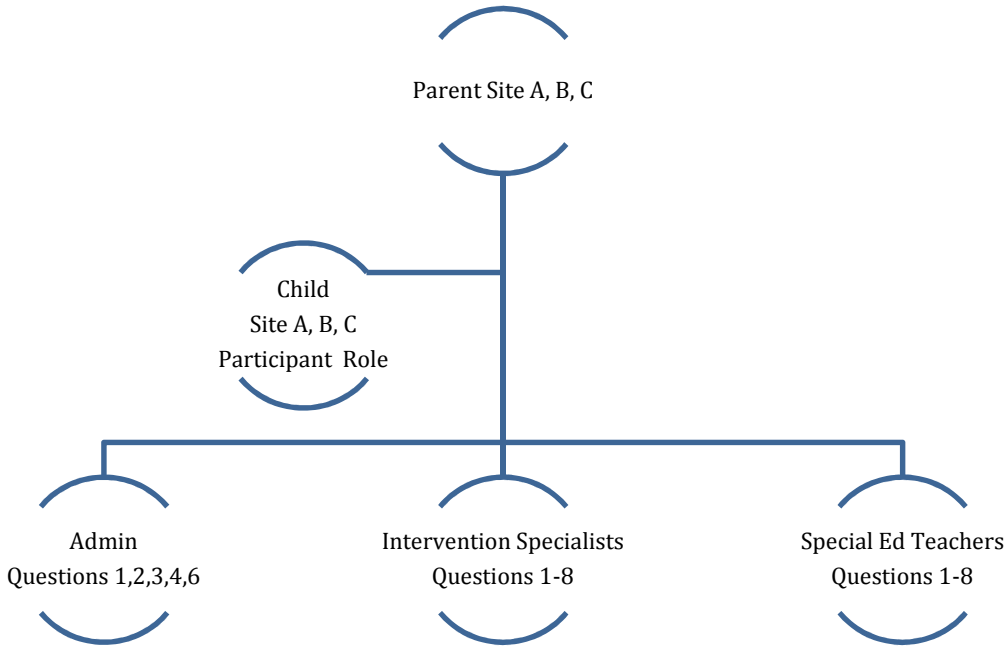

Figure 1. Coding: Parent and child nodes within NVivo 11

The inference to topic coding was to determine what themes emerged from the data collection and what was germane to the research study questions. Qualitative multicase queries were established using the parent codes entitled Site A, Site B, and Site C. Child codes entitled ADM1, ADM2, IS1, IS2, and SET1 were aggregated to the parent codes for categorized and source coding. Codes assigned to each case (Appendix H), pseudonyms for confidentiality, and site participant roles were further categorized by the

role of the participant. Participant roles included administrator, special education interventionist, and special education teachers. Topical themes emerged from the data queries through the use of a word and text search. Once the data sources (transcriptions) were organized within the NVivo nodes and classifications, analytical coding was applied to review the content of the nodes to determine the actual meaning of the content. I then evaluated considerations to reflect on how the themes and subthemes related to my research questions.

Case coding determined the sources of the data, such as who was speaking and what site provided the data. Participant characteristics and demographics attributes (Appendix G) were additional sources of information; however, they were not necessarily germane to the research questions. The specific themes that emerged from the source coding process are revealed in Appendix I.

Evidence of Trustworthiness

As indicated by Lincoln and Guba (1985), trustworthiness in research is enhanced through the minimization of systematic error (para. 2). The validation of the findings of this study determined credibility and correspondence to reality (Creswell, 2003; Creswell & Miller, 2002, p. 125). In addressing trustworthiness for this study, I sought to demonstrate that a true picture of the phenomenon under scrutiny was being presented

Credibility

As outlined in Chapter 3, credibility during the data collection process was evidenced by the congruent and consistent interview responses, level of comfort of participants, and the level of experience of the administrators and intervention specialists

that participated in the study. Credibility for this study was also established by using member checking feedback through themes derived from the interviews. Three collegial peer reviewers, who met the study's criteria but did participate in the data collection interviews, were tasked to determine if evidentiary inadequacy resultant from the data occurred. Peer reviewers were asked to evaluate the anonymous transcriptions germane to the research study questions. A numerical ranking system was used to permit the peer reviewers to interpret and draw conclusions from the data. I also considered the results pursuant to the quality of discrepant cases and how they were factored into the analysis.

Transferability

Transferability of the results of the data collection and analysis were considered to be generalized or transferred to other educational settings that use VSS to enhance the social skill-sets for young adults with ASD. A variation from Chapter 3 occurred when an additional site was added to the sample size due to lackluster participation from Site A. Additional recruitment from Site C enhanced the transferability and methodology of this research for the reason that "the ability of research results to transfer to situations with similar parameters, populations, and characteristics" (Lincoln & Guba, 1986, para. 1) exists. From a qualitative perspective, transferability is primarily the responsibility of the one doing the generalizing. The transferability of educators' perceptions of VSS and its impact on social skills for young adults with ASD was enhanced by thoroughly describing the research context and data analyzed from the interviews. Responses to interview questions warranted considerations that it would be sensible to correlate similar outcomes should this study's methodology be used in other educational settings that use

VSS and teach social skills to young adults with ASD. In the Summary section of this chapter, I discuss evidence to support the correlation to similar outcomes should this study's methodology be replicated.

Dependability

Dependability strategies congruent with Chapter 3 and strict efforts to avoid researcher bias were established and maintained throughout the data collection, coding, and analysis stages. Concise questions that were germane towards investigating educator's perceptions of VSS and connections to social skills for young adults with ASD were posed to the participants and repeated for clarity if necessary. The research results were aligned with the conceptual framework of information processing and social learning theory, enabling the potential for analytical constructs stemming from the data. Data collected from the various sites was recorded, transcribed, and coded in accordance the Chapter 3 data coding and analysis plan without deviation.

Patton (1990) suggested that objectivity in research is difficult due to inevitable bias from researchers. A strategy to establish dependability in this study included an external audit by a non-partisan colleague to appraise the research and evaluate the process of inquiry**.** Morse (2015) recommended that an external audit provides "an opportunity for an outsider to challenge the process and findings of a research study," (p.1212) and provide critical feedback towards developing better articulated outcomes. Feedback from the peer review audit provided the means to assess the adequacy of the data and examine the preliminary results.

Confirmability

The results of the research study were based on data and data analysis from individual interviews. Neutrality of the researcher was maintained throughout the recruitment, consent, interview, and member checking processes. Strict rigor in the data collection methods and the avoidance of bias was maintained by the researcher throughout the study. Coercion, self-motivation, or areas of personal interest germane to the study's outcomes and findings were nonexistent. My approach during the recruitment process, data collection, and data analysis processes required a discipline towards objectivity and exploration. As a parent of a young adult with ASD and an experienced professional employed in education, the opportunity to record perceptions of VSS and tools that enhance social skills provided a different lens towards a richer, more developed comprehension of the social change phenomena.

Results

The compilation of data from three sites and 11 separate interviews of special education administrators, intervention specialists, and special education teachers familiar with VSS strategies in classroom environments were coded and analyzed using NVivo 11 qualitative software. Data to support each finding were presented and, where applicable, excerpts from the interview transcripts were included. The results of these queries by research question and themes were addressed in the following discussion.

Research Question 1

Through a series of either five interview questions asked of administrators or eight questions asked of intervention specialists and special education teachers, the first research question asked the participants to consider, "How do special education administrators, teachers, and intervention specialists believe the utility of VSS meets the social-skill training needs of a young adult with ASD?" Themes that emerged from the coding of the transcripts germane to this research question such as social skills, abstract and concrete concepts, and VSS technologies evidenced congruent perceptions from the participants. Examples of these themes and subthemes (Appendix I) suggested that a mutual and collective perception amongst the diverse participant groups (Sites A, B, and C), as well as direct connections between the use of VSS and social skills for young adults with ASD, existed. The themes from the data collection indicated that participants used visual technology such as video modeling to build social skills and to create learning strategies that make abstract concepts more concrete for young adults with ASD.

VSS as a classroom technology. By conducting a word search within NVivo to query all of the compiled data from the interview transcriptions, *technology* emerged as the most common term. A direct and recurring perception of the use of technology in the classroom (Appendix J) suggested that, VSS as a critical teaching resource for the target population, was important to the participants. All queried participants across the multi-case sites agreed that the use of VSS technology in the classroom environment can attract and hold the young adult with ASD's attention. Consistent responses to interview

Question #2, "What do you think of the idea that technology can attract and hold a student's attention and why?" suggested that the participants embraced technological resources as a pathway towards innovation and the manipulation of learning tools. Alice stated:

> I strongly agree that technology can make a significant difference really for all children, but, in particular, young adults on the spectrum. Computers are placed in lab settings for control of the user; they can start and stop, whenever they want; students can manipulate what they want to do on a computer.

When using technology, a sense of control by the student was considered to be more forgiving when compared to some students with ASD as they were accustomed to in classroom settings. Similar perceptions regarding the student's comfort level with technology arose from two of the special education teachers.

Additional acuity that encouraged VSS technology in the classroom was offered by Debbie, advocating that, "computers and visual supports really engage the students, especially the students on the autism spectrum. That really helps them conceptualize things." A noted increase towards attention and focus on tasks derived from Question 2 was suggested from this participant. When the students *did not* have technology, their attention to task was 40-50 % of the time of the lesson. When VSS technology was used, the student's attention level increased to between 80 and 90 %. Providing each student with technology, not just the students on the spectrum, provided consistent credence towards VSS as a resource to enhance social skills for young adults with ASD. Rhonda supported the use of VSS technology stating, "We live in a world where we are governed

by technology. The Internet, half of my curriculum, I have to log into." Credible evidence of the use of VSS technology such as GPS, iPhones, and iPads was referenced as technological resources that govern educational curriculum. Rhonda said, "It's become an integral part of our life, as if it's an organ now. I think it's very possible that technology can be a way to engage their social activity." Video modeling was an example mentioned by Rhonda highlighting the activity to show students with ASD how to properly engage with other students and, then get that feedback right away.

Challenges or conflicts to introduce and sustain technology as a VSS tool in classroom environments that enhance social skills for young adults with ASD included areas of scope, spectrum, a physical understanding of spatial relationships, and consistent expectations when using visual technologies. Debbie stated, "We strive to promote consistent expectations to reduce conflicts. Some students have a misunderstanding of their environment, intent and space." The potential cautions of the overuse of visual technology for the target population were indicated and suggested that technology could be used to enhance communication and social skills, as long as it's used in an appropriate manner. Christine recommended that VSS can also sometimes be abused; using it for a reward system only. A common iteration to Question #2 suggested that caution should be used when utilizing VSS technology into social skill training for young adults with ASD. Specifically, as stated by Christine, that "technology should not be used solely as a supplement for education, but as an act of integration in teaching how students can actually utilize these tools". The use of VSS as a classroom technology was encouraged and valued as a progressive tool by the queried participants.

Technology that enables abstract concepts. Question # 3 was "What do you think of the idea that technology makes abstract concepts more concrete for the student?" Documented data collected from the study's participants that administer and educate young adults with ASD provided even greater insight and produced advanced evidence that the use of VSS is an instrumental tool towards social skills improvements for this target population. Evidence for this claim was supported by Felicity stating, "Visual support technology can help us take a student's organization schema that is different from ours and give them an opportunity to file it in a way that they can make sense of it." The advancements in VSS technology in classroom settings for young adults with ASD appeared to be closing gaps in the schemas to provide the accommodations and modifications for social skills that allow access to education for students that normally wouldn't have access. Nancy added credence towards VSS technology as she stated, "I think that it's the whole way that you use the technology for the students. Just talking about it, it's not going to go in unless you use some kind of technology."

Responses congruent with VSS as a learning resource that reinforced potential abstract social skill teaching concepts highlighted the use of schedules and apps (software applications) that create school tools. Examples included VSS technology to communicate and create a platform for interactive education and artificial reinforcement. Rhonda reflected that, "technology can help many students, there are so many different ways." Rhonda's perception of technology as a resource was underpinned with the consideration to gradually add technology to the existing curriculum. Additional confidence in VSS as an enabling resource that changes abstract perceptions to more

cognitively clear concepts emerged from the data collection. Mickey suggested that intellectual ideas for the cognitively-challenged may be delivered via social stories using VSS as a model. He said, "You can show videos to simulate a social situation versus just reading through social stories." Mickey suggested that the use of tangible visual representations increased the student's perception of appropriate social skills. Further credence towards the use of VSS as a transitional tool from the abstract to realistic facts and expectations for socially acceptable life-skills was expressed by Rhonda. When queried for an example of taking an abstract concept and making it more concrete, Rhonda offered that the use of Smartboards can introduce facial expressions so that the student can through all the concrete characteristics of facial expressions to determine how the person feels.

Using VSS to simplify complex concepts notions, as Laura advocated, enables the young adult with ASD to extrapolate a complex concept to break it down and simplify the task. Laura implied that technology can also manipulate complex subjects so that you can present tasks in subjects, and then extrapolate what you need or don't need to help the student. Alice suggested that inhibitors to VSS as a technological tool to facilitate abstract concepts into concrete applications for young adults with ASD were a) motivation, b) proper use of the technology, c) the technology not working, d) frustration levels of teacher and students, e) monitoring activities, f) bullying and g) how to handle social interactions.

Familiarity and types of VSS for social skills. All of the research study's participants possessed varying levels of familiarity with VSS technology in classroom

settings. Subsequent to data collection, several consistent themes such as social skills, VSS technology, video modeling, autism, and learning strategies emerged. Alice provided breadth to the knowledge of VSS stating, "I associate VSS with video modeling, communication, PECS, Boardmaker, Dynavox, Ipad, touch chat, group messaging, and group chat within the classroom." The use of VSS that target skills and focus on self and define expectations for students to earn points was mentioned**.** Alice also referred to video modeling as a "VSS technology used in the educational setting to teach social skills for young adults with ASD." An example of this was that the social skills of young adults with ASD improved when skills such as acceptable behavior, turn taking, worksheets and visual books were used to replicate self-improvement. Specific VSS technologies referenced towards improving social skills were Boardmaker, Zones of Regulation, and Symbol Sticks that are bundled with their unique curriculum; a part of the extended standards and an alternate assessment for students with ASD.

The Zones of Regulation program that incorporates flexible thinking was highlighted by eight of 11 participants as a strong tool to enhance social skills for young adults with ASD. Zones of Regulation is a program that helps to encourage flexible thinking using VSS. The students have to be calm in order to interact socially. Alice reported that, "this program is the latest and greatest right now in terms of social skills." Christine declared a high level of familiarity with VSS, using VSS as visual teaching tool for more than 20 years, depending on the type of system. Programs such as TouchCues, visual pictures and Picture Exchange Communication System (PECS) were referenced. Young adults with ASD tend to struggle with perceptions and communication skills. An

additional VSS specific to social skills for young adults with ASD, referenced by Christine, was termed FEVER; an acronym that describes the progressive concept of social skills training for students with ASD. (Figure 2).

Figure 2. F-E-V-E-R graphic. Adapted from the Social Responsibility Support Program, (2001). Copyright 2001. Reprinted with permission.

Christine endorsed the F-E-V-E-R visual model as a proven representation of steps for the young adult with ASD to enhance visual eye contact and improve social skills.

Using video modeling to improve social skills. A predominant and consistent theme of interest and frequent use by participants teaching young adults with ASD was video modeling to promote social skills for this population. Laura said, "One thing that we do for social skills is the visual modeling." Debbie suggested that visual modeling is kind of broad because there are so many types of visual modeling programs, however, special education teachers recognize the role of VSS technology in the classroom when targeting social skills education. Visual schedules were used in the Life Skills Program taught by this participant that enabled the students to communicate in the community. Interactive play was referenced as a tool to develop social skills for young adults with ASD.

The data amassed from participants who responded to interview Questions 4 and 8 (Appendix B) described existing and prospective visual technologies that would enhance social skills for young adults with ASD. Among these software applications and technology-based devices were iPads, holograms, reliable Internet, Skype, and Facetime. In regards to the use of iPads as a VSS assistive technology, one of three sites (33%) were currently using iPads in special education classrooms, however, not all of the young adults with ASD possessed personal iPads to use for social skill training outside the classroom environment. Two of the three sites (67%) were not equipped to use iPads, however, these site participants stated an interest in the use of iPads to enhance social skills for the ASD population in their charge. The prospective use of holograms as a VSS technology was considered to be a future technology that could simulate and allow the young adults with ASD to practice specific social skills. Mickey recommended that social

skills communication tools such as Skype and Facetime has become a technology to enhance the social skills for young adults with ASD. The use of these programs by young adults with ASD could create an ongoing dialogue between local and global young adults with ASD. This was an inference to creating electronic or video "pen pals" to promote social skills and, perhaps, develop underlying confidence levels towards improved communication skills.

Challenges for procuring innovative VSS. When the research study's participants were queried as to why the aforementioned VSS technologies were not available at their sites, the common denominator was attributed to the lack of funding. Felicity summarized that, "We have students who come here because there are scholarships that afford them the opportunity, however, it doesn't cover the entire cost of a child with ASD's education." Additionally, the declassification of *DSM-5* may affect students with ASD to receive the appropriate tools or funding to assist them for social skills education.

Research Question 2

Through a series of either five interview questions (administrators) or eight questions (intervention specialists, special education teachers), the second research question asked the participants to consider, "What VSS learning strategies are effectively being used by special education administrators, teachers, and intervention specialists towards enhancing social skills-sets for young adults with ASD?" Key thematic expressions such as cognitive alignment, research, progress, formative assessments, social skills, video modeling, peer modeling, and life skills emerged from the coding of

the transcripts germane to this research question and evidenced congruent perceptions from the participants. The themes and subthemes (Appendix I) suggested that a mutual and collective perception amongst the diverse participant groups existed. Evidence of diverse perceptions of learning strategies involving the use of VSS for social skills for young adults with ASD and social skills for young adults with ASD became known. A common learning strategy identified as *trial and error* emerged from subquestions germane to the second research question.

VSS learning strategies for social skills. Participant responses, when queried about active learning strategies that utilize VSS, produced diverse results within and between their classrooms. The use of a VSS cognitive behavior approach for higher and lower functioning students was reported to create some difficulty with communication. Felicity suggested that the use of a rational cognitive behavior approach assisted in assessing and assigning purposeful behavior to facilitate the learning strategy. A rational approach considered emotions as a precursor towards developing appropriate strategies. This referenced learning strategy was deemed as effective behavior. Elizabeth, an intervention specialist, indicated that she used VSS self-regulation programs that help the students to increase their social skills. Self-regulation by students appeared to enable better choices and improved sensory integration, adaptation, and how to regulate.

Different forms of VSS learning strategies for young adults with ASD emerged across the queried sites. Rhonda, a special education teacher, stated that different forms of modeling may be based on how the question is posed to the target population. She suggested that modeling can be anything from watching a video on the appropriate way

to use a water fountain or other typical tasks. Rhonda said, “It doesn’t have to be in a video. You can do it with actual student modeling or with student-teacher modeling.” Videotaping and replaying the captured footage from peer-models (college students from local universities) was discussed as a learning strategy that provided social skills training in group formats. Peer modeling was described as a parallel to role modeling by the special education teacher.

Data germane to specialized curriculum that addressed social and emotional behaviors emerged when an intervention specialist reflected on her school’s programs identified as the Zones of Regulation and Model Me (a visual modeling program). Felicity said, “I really use Zones of Regulation for students to address how they feel, interact, and how other people can make you feel. It also addresses the size of the problem.” Emphasis on the need to measure the reaction of the student to the problem and the appropriateness of the reaction was thought to be of importance. Visual support systems learning strategies offered by Elizabeth considered visual modeling to be a principle method to teach social skills to young adults with ASD. Elizabeth added, “Breaking things down into steps and using the Lego program allows me to apply visualizations into social skills, such as building something that shows compassion.” The combination of social thinking theory and the use of the five point scale were used to supplement learning strategies in the participant’s classroom environment. Intervention specialists and special education teachers across all sites were asked to consider what factors assisted them in the decision to select particular VSS learning strategies to enhance social skills for young adults with ASD. Six of eight (75%) of this population

stated that trial and error was often used to select learning strategies that work for their target population. Laura affirmed, “For me, it’s figuring out my students, what works for them. Sometimes, it’s student specific.” Mickey maintained that trial and error is used a lot of times and, also, sometimes it’s what has been taught in college or other training. Another strategy was identified as the Responsive Classroom approach that used several strategies within the assigned textbook. Felicity, an intervention specialist said, “Because we’ve taught that, and you’re asked to incorporate that into your classrooms, a lot of times it’s because what you’ve been asked to incorporate or what you’ve learned.” The Responsive Classroom curriculum referenced by Felicity required a lot of peer interaction where they have to initiate a conversation and keep that conversation going.

Learning strategies that align with cognition levels. Administrative participants were asked to reflect on the types of learning strategies discussed in the previous interview question. Additional inquiry was requested to provide depth towards their perception of how a particular strategy was aligned with the cognitive levels of the young adults with ASD in their classrooms. Administrators and intervention specialist coordinators indicated that a) data, b) ETRs (Evaluative Team Reports), c) IEPs (Individualized Educational Programs), d) IQ, e) skill set evaluations, f) progress reports and g) exposure to the students were common methods to assess the alignment of learning strategies with the cognitive level of young adults with ASD. Alice suggested, “For any student, there has to be data driven decisions. We can’t always use what’s worked in the past for the same type of students.” This administrator asserted that there is often lacking a lot of resources for educators that don’t have the tools to measure the

student's success properly. Alice indicated that cognitive levels vary among young adults with ASD. This statement was reflective of learning strategies that address goals that may be lower than the capabilities of the student. Further deliberation on the topic of the alignment of learning strategies with cognitive levels suggested that smaller groups increased the student's progress and that the size of the group was rotated to adjust for cognitive challenges. Using pilot studies by special education teachers offered methods to adjust learning strategies for students with ASD. The use of data collection to ascertain starting points for learning strategies for young adults with ASD was deemed to be an insufficient method. Alice indicated that it was necessary to also analyze behavior, sensory, and executive functions due to the fact that past data could not be trusted to determine current strategies.

Nancy, an administrator, offered credibility towards gaps that exist in ascertaining and aligning learning strategies based on the cognitive level of a young adult with ASD. She inferred that the academic, cognitive, and understanding of the social side of the learning strategy needed to be met. Nancy added, "There has to be data to understand the progress of the young adults with ASD." Using data to better understand and communicate a young adult with ASD's individualized education plan to the school's staff emerged as a critical point. The alignment of VSS learning strategies based on cognitive levels, quantified by Christine, suggested that visual supports can sometimes augment an existing communication device. VSS technology was deemed to be more successful when higher functioning students were struggling.

Administrators from all sites collectively agreed that learning strategies that used VSS technology improved a student's success on the spectrum regardless of whether or not their cognitive ability fell in a moderate range, a mild range, an average IQ range, or a gifted range. Christine moreover reflected that some of the strategies were based on trial and error, stating, "Our philosophy is that any young adult with ASD can succeed. You provide them with the strategy until proven it's not effective." When Christine was queried as to the role of data used to assist in determining a learning strategy and the alignment of the cognitive level, discussion regarding the use of IEPs, data from previously reviewed assessments, the use of rubrics, and a reading inventory to determine the role of technology emerged. Christine's perception of the administration's desire to involve the teaching staff during the design and evaluation phases of learning strategies that use VSS for young adults with ASD was forthright. Christine indicated that the staff was involved in determining the right technology and curriculum used to assess the students. Learning strategies that were aligned with the cognitive levels of the young adult with ASD resulted in definite increases in social skills development and joint attention to task.

Intervention specialists and special education teachers deduced that cognitive alignment and learning strategies were a result of understanding each of the target population's different skills and then differentiating instruction. Regularly scheduled formative assessments, lines of questioning, trial and error, and informal techniques that addressed the IEP goals and objectives were also discussed. Debbie said, "Young adults with ASD may appear to have lower cognitive skills, however, I have discerned that a lot

of the students are smart and understand, yet they are unable to communicate." A process deemed as an "inquiry strategy" and ways to differentiate and grade the activity to their ability level emerged as a primary learning strategy for young adults with ASD. The alignment of learning strategies with cognitive levels, as suggested by Laura, an intervention specialist, indicated that the content needs to be age appropriate. It was evidenced that the learning strategy would vary and it may require a hand-to-hand approach prior to transitioning to a one-on-one approach. Alignment of the learning strategy and cognitive levels occurred if there was substance to support the achievement of the goals and objectives of the lesson.

Rhonda suggested that the alignment of learning strategies to cognitive levels for young adults with ASD is often trial and error; reporting that changes were made to improve and tweak on what works for the individual young adult with ASD. She additionally posited that it is critical to know your student's limitations. "When you know that your students are at a certain cognitive level, you can intuitively determine if the strategy is age appropriate". Mickey added credence to this interview question advising that the specialist could "tell by the look on their face". If the student was responding with vague answers, this special education teacher reported that it was necessary to delve down deeper and find out where the confusion existed. Other strategic methods referenced by the participant included a) lines of questioning, b) the flow of conversation and c) the completion of the topic of interest to be on task.

VSS Strengths and Weaknesses. Queries of intervention specialists and special education teachers regarding their perception of the evaluation process of the use of VSS

learning strategies were conducted. Data germane to the participant's perception of the alignment of learning strategies and cognitive levels were revealed by asking how the strategies were working for young adults with ASD. Emerging from these inquiries were collective responses that evidenced direct connections to the second research question: "What VSS learning strategies are *effectively* being used by special education administrators, teachers, and intervention specialists towards enhancing social skills-sets for young adults with ASD?" Karen suggested that the principles of ADA (Americans with Disabilities Act) and TEACCH are happening at the college level and it filters down to consultants in the classroom and the students that it reaches. This intervention specialist offered that past assessments of VSS social skill strategies used in the classroom for young adults with ASD with the initiation of conversation worked out really well.

To address the issue that some young adults with ASD struggle to maintain conversations, Karen suggested that proposing questions that you can ask during the conversation leads to promoting a higher level of information interchange. Karen corroborated the efficacy of existing learning strategies used in the sites classroom, simply stating, "Like a Google ad, if it works, keep it." Participants were next asked how existing learning strategies were evaluated. Elizabeth attested that, based on professional experience, her strategies were informal and that, strategies that did not work, there were ways to adjust the strategy through means of programming. Felicity stated that the entire IEP team collaborates as part of the intervention process so that the VSS learning strategy and time frames align with cognitive level of the young adults with ASD. The alignment

of the learning strategies with specific time frames was deemed as a focal point of curriculum development and deployment.

Challenges and barriers to fully evaluate the VSS learning strategies for young adults with ASD divulged by the queried participants highlighted the lack of research studies that provide observations of students with disabilities. Diane suggested that qualitative data were not enough. The use of quantitative data, or mixed methods, was very important and mixed methods research approach would be of value. The issue of mixed methods studies that observe both teachers and students in classroom settings for young adults with ASD emerged as a focus for future research as to how administrators, intervention specialists, and teachers perceive the utility of VSS towards enhancing social skills for young adults with ASD.

Discrepant Cases

The sole discrepant case noted during data collection across all sites and participants was evidenced from Debbie, an Intervention Specialist. The participant articulated a concern of bias in her response when responding to Interview Question 7: "How have VSS learning strategies been evaluated, and what was determined about its strengths and drawbacks?" The participant stated, "I am biased because I worked with a local university professor and special education consultant when they started the social communication program. I probably ascribe to the philosophy, or not really a bias, with a mind with a narrow focus, because this is what I have known and learned in my career." This potential bias was taken into consideration during the peer review. The information did not invoke a partiality towards the study's results.

Summary

Themes such as *social skills, video-modeling, learning strategies, use of visual technology*, and *cognition* developed from the participants' responses to the qualitative multicase research interview questions. Research Question 1 was answered by data from all sites when the administrators, intervention specialists, and special education teachers agreed that the use of VSS may meet the social-skill training needs of a young adult with ASD and that direct correlations between the use of VSS and social skills for young adults with ASD existed. Themes that emerged from the coding of the transcripts germane to this research question evidenced congruent perceptions from the participants. The themes and subthemes (Appendix I) suggested that a mutual and collective perception amongst the diverse participant groups existed. A direct and recurring perception of the use of technology in the classroom (Appendix J) suggested that VSS as a critical teaching resource for the target population was important to the participants. The Alternative Options Academia site administrator, Laura, succinctly asserted that the ccapacity to learn is limitless if given tools and support.

Research Question 2 elicited themes such as cognition, learning strategies, and VSS technology from the coding of the transcripts and evidenced congruent perceptions from the participants. Examples of these themes and subthemes (Appendix I) suggested that a mutual and collective perception amongst the diverse participant groups existed. Evidence of diverse perceptions of learning strategies involving the use of VSS for social skills for young adults with ASD and social skills for young adults with ASD became known. A common learning strategy identified as *trial and error* emerged from sub-

questions germane to the second research question. Felicity suggested that the key to student performance is often student specific. In Chapter 5, I discuss the interpretations of the findings, limitations of the study, recommendations, implications, and conclusions from this research study that address the research study's contribution to social change for young adults with ASD.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore the perceptions of special education school personnel related to the use of VSS technology and the enhancement of social skill-sets for young adults with ASD. There are many challenges that young adults with ASD encounter when engaging in appropriate communication and behavior with other people in social scenarios. This study suggested that practical teaching strategies that use VSS provide pathways to integrate typical social activities into their daily routines. Investigative studies have primarily focused on social education and interventions for children with autism. An insufficient amount of attention has been directed to social skill intervention strategies as young adults with ASD transition into adulthood. This phenomenon was examined by querying special education administrators, teachers, and intervention specialists as to their perceived utility of VSS and any VSS social skill-set teaching strategies that the participants deemed beneficial for young adults with ASD.

Responses from the participants provided insights into how the use of VSS might enhance the social skill-sets of youth with ASD during their transition years. The purpose of this study was achieved as evidence from the study revealed that educators perceived visual technology that uses language resources for young adults with ASD could bolster social skill-sets. By examining the perceptions of the study's participants, I discovered that exploring cognitive learning strategies underpinned with VSS provides alternative methods to teach social skills in classroom settings and promoted future discussion on this topic.

This research study was a qualitative multicase study that followed a systematic methodology. The nature of this multicase study explored the speculative depth of the phenomenon during the interviews with educators from three different sites. Each case was a special education school where VSS tools are being used in classrooms with students with ASD. Administrators, special education intervention professionals, and special education teachers who employed VSS as learning resources when teaching social skills to young adults with ASD participated in the study and shared attitudes, strategies, and particular types of technology tools used. Rich data and accurate analysis provided a succinct insight between the first question that investigated the participants' perception of the use of VSS and social skills enhancement for young adults with ASD and the second question around the efficacy of VSS learning strategies specific to social skills for young adults with ASD. Resultant data were obtained from written notes, audio recordings, memos, and transcribed by me. The data were analyzed using NVivo 11 qualitative research software. Open, axial, and selective coding were used to support emerging themes and relationships to bring a greater order, relevance, and understanding of the data to produce a narrative analysis.

Key Findings

Based on data amassed from three separate educational settings and 11 individual professionals who teach or administer social skills training to young adults with ASD, the themes and subthemes that emerged suggested that a mutual and collective perception amongst the diverse participant groups existed. Candid responses to interview questions from the participants supported the study's premise that, in addition to an academic

education, the use of VSS to enhance *social skills* for young adults with ASD was a vital part of the population's education. Participant perceptions on the use of VSS for social skill guidance during the transitional years of young adults with ASD from public or private education to adult scenarios were revealed. A better understanding of the challenges that this population will encounter when engaging in appropriate communication and behavior with other people in social scenarios also emerged from the study. Practical teaching strategies garnered during data collection used VSS to provide pathways to integrate typical social activities into daily routines.

A key finding from this study proposed that the use of VSS as an educational resource provided viable learning strategies and interventions to better prepare young adults with ASD in adult social scenarios. Another key finding produced realistic and active sources of VSS technologies that administrators, intervention specialists, and teachers endorsed and used in classroom settings to augment social skills for young adults with ASD. Data collected via the interviews provided attestation that VSS technologies were credible sources that could attract and hold the attention of young adults with ASD as well as convey abstract concepts into a more concrete, cognitive thought process.

The congruent learning strategies discovered from the data suggested that the use of the cognitive behavior approach assisted in assessing and assigning purposeful behavior to facilitate the learning strategy. A significant proportion of the intervention specialists and teachers subscribed to the *trial and error* approach; submitting that the learning strategy was often student specific and based on the best method of learning.

The alignment, evaluation, and restructuring process of VSS learning strategies by administrators, intervention specialists, and teachers was derived from and supported by IEPs, IQ tests, skill set evaluations, data collection, progress reports, and the participant's exposure to students. Not all of the participants had the contemporary VSS resources available and the means to properly measure success or failure levels; however, all of the queried sites discussed the VSS tools that were available to them. The cognitive and communicative levels of young adults with ASD varied among age and peer groups creating student-specific learning strategy challenges. Participants noted some of these challenges to be a lack of physical understanding of spatial relationship and how the students perceived the use of the visual technology.

Interpretation of the Findings

I thematically analyzed and documented the rich data produced by participants' responses to the interview questions. The interpretation of the literature reviews and peer-reviewed transcripts was underpinned by the study's conceptual framework. Previous research and literature focused on social skill strategies for children and adolescents with ASD. The findings from this study addressed the role of VSS technology and learning strategies for young adults with ASD.

Visual Support Systems and Social Skills

Evidence-based reviews from the literature explored in Chapter 2 on VSS exploring educational settings and an examination of the social structure of people with ASD projected a broad perspective of this population's needs. Findings and perceptions from the 11 interviews of administrators, intervention specialists, and special education

teachers established similar, yet contrasting, views as compared to recent scientific investigation. Consistent themes from both the literature review and the study's data emphasized the need to examine behavioral and social skill-set interventions for individuals with ASD. As documented in the literature review, the majority of findings pertinent to VSS for ASD interventions provided teacher and intervention specialist perceptions about children and adolescents. Little research existed that addressed the efficacy of interventions for adults with ASD. Walsh, Elsabbagh, Bolton, and Singh (2011) suggested that targeted strategies to diagnose and provide responses to problems for people with ASD may produce precursors to valid biomarkers towards the cause of ASD. Current improvements in the future research on social intervention strategies may create an overall awareness in the scientific community for clinical evaluation. The findings from this study indicated that social skills learning strategies underpinned with visual technology can provide valuable data towards progressive direction and support for adults with ASD and presented future challenges for society and communities.

Learning Strategies that Encompassed VSS

The efficacy of social skills derived from visually-enhanced learning strategies were discovered throughout this study. Fresh data and the translation of the findings into much needed knowledge for this population emerged. Discrete methods discussed in the literature review focused on the analysis of cognitive abilities and social deficiencies of children and adolescents with ASD (Attwood, Garnett, Peterson, & Kelly, 2013; Deisinger, 2011; Pringle, Colpe, Blumberg, Avila, & Kogan, 2012; Tamin, Lowerison, Schmidt, Bernard, & Abrami, 2011). Consideration of the literature review results was

informative; however, the educational and social wellness of young adults with ASD justified future research (Happe & Charlton, 2012; Harmon, 2011; Martin, 2012; Rosenthal et al., 2013). Subsequent to conducting a thorough literature review, I discovered that the search did not produce evidence-based data that examined VSS interventions towards the validation of social, physiological, and psychological impedance for young adults with ASD. I also discerned from the literature review a lack of evidence that the requirements and related interventions for children with ASD equated with the appropriate educational learning strategies for young adults with ASD (Kucukaydin & Cranton, 2012; Solomon, Smith, Frank, Stanford, & Carter, 2011; Tamin, Lowerison, Schmidt, Bernard, & Abrami, 2011; Wilson et al., 2012).

When determining the value of learning strategies and technology, a consistent predictor is the structure of the course. Meislewitz and Chakraborty (2011) suggested that pedagogy was important to students and using computers created more effective outcomes. Based on participant reflections and discussions, results from this research study provided evidence that pedagogical practices that used VSS to enhance social skills for young adults with ASD had the potential to foster successful outcomes. However, as supported by the literature review, when people with ASD age, the inequality of on-going formal social skills perpetuates (Chakrabarti & Fombonne, 2010; Rosenthal et al., 2013; Schmidt et al., 2011b; Stock, Davies, Wehmeyer & Lachapelle, 2011). Further deliberation of the social skill-sets for young adults with ASD to use innovative engagement approaches and enhance appropriate behavior in community settings remains essential for social change.

Theoretical and Conceptual Interpretations

The conceptual framework for this study was based on the information processing theory (Broadbent, 1958) and social learning theory (Bandura, 1977). Young adults with ASD process information differently than those without ASD (Sigman, Dissanayake, Arbelle, and Ruskin, 2012). Cognitive limitations in people with ASD exist in areas of abstract thinking, communication, and social cognition. Social learning theory (Bandura, 1977) posits that people learn from one another via observation, imitation, and modeling. The conceptual theories of information processing and social learning used in this research study provided a disciplined foundation towards a better understanding of VSS as a visual technology teaching resource. Bandura's social learning theory and conceptual framework used in my study supported the tenet that learning strategies underpinned with visual tools, such as video modeling and role modeling, were particularly relevant to understand people with ASD. Vivanti and Rogers (2014) argued that aspects of imitation and social learning are fundamental parallels to the mechanisms that facilitate the implicit mapping of and learning from others' behavior.

As indicated by Diener, Wright, and Anderson (2016) and evidenced from my study, analogous conceptual frameworks suggested that social learning theory characteristics were factors that are also critical for further development of a science of autism pedagogy. Kossyvaki and Papoudi (2016) reported congruent findings in regards to learning strategies underpinned with social learning theory using VSS towards the enhancement of social skills. These authors revealed similar markers that endorsed the capability to bridge the gap between academic research and cooperative methods of

instruction for young adults with ASD. Sperry, Neitzel, and Engelhardt-Wells (2011) supported social learning theory emphasizing empirically-based methods of applying peer-mediated strategies that centered on neuro-typical principles.

Another component of the study's conceptual framework was information processing theory (Broadbent, 1958). Information processing theory described how the human brain limits the processing of sensory inputs and that overload can occur (Sigman, Dissanayake, Arbelle, and Ruskin, 2012). Results from this study that were based on VSS interventions and learning strategies evidenced that young adults with ASD processed information differently than those without ASD. Information processing theory was additionally supported for this study based on recent research by Williams, Minshew, and Goldstein (2015), who suggested that conceptual reasoning for older adolescents and adults with ASD may be difficult. Subsequent behavioral work revealed dissociation between the formation of concepts and the identification of concepts for young adults with ASD (Williams, Minshew, & Goldstein, 2015). The results of my study indicated that the participants recognized a lack of cognitive structure in young adults with ASD to manage increased processing loads. Conceptual reasoning (information processing) deficiencies impacted the adaptive functioning in young adults with ASD.

Limitations of the Study

Due to the difficulty in receiving consistent responses from young adults with ASD, the study's methodological approach was limited to perspectives from administrators, coordinators, and special-needs intervention teachers who met my criteria. To determine weaknesses in the interview questions, Marshall and Rossman (2014)

recommended that peer reviews were conducted using nonparticipants familiar with the topic of interest. Peer reviews were conducted by three nonparticipant colleagues with at least 10 years of experience working in special education with young adults with ASD. All peer reviewers had a minimum of 5 years of experience using VSS as intervention strategies for social skills. The original 18 interview questions were reduced to 5 questions for administrators and 8 questions for intervention specialists and special education teachers. During the interviews with the study participants, the level of expertise with VSS used by the participants was queried subjectively. Bias in this area was addressed using open-ended questions to extract data that examined the participants' level of familiarity with VSS resources and considered during the coding process.

Recommendations for Further Research

Further research that examines both VSS technologies and associated learning strategies that enhance social skills for young adults with ASD should be explored. The use of a quantitative or mixed methods approach to elicit more evidenced-based data would enable researchers to ascertain if specific types of VSS generated more productive outcomes in terms of social skill modifications for young adults with ASD. Technology-based programs and applications for select sites in this study that used video modeling to teach social skills to young adults with ASD were perceived to be an innovative resource. Allen, Vatland, Bowen and Burke (2015) suggested that research that examines innovative methods to provide video modeling across wider domains such as shareware, the Internet, and e-learning websites should be explored. However, due to funding constraints and the lack of access to video modeling programs outside of the classroom,

the majority of the young adults with ASD served by the participants in this study were restricted to VSS learning strategies solely during class time.

Video Modeling

The use of video modeling for social stories to improve social and communicative skill sets was a consistent interest stated by administrators and intervention specialists in this study. Qi, Barton, Collier, Lin and Montoya (2015) suggested that social stories underpinned with video modeling as an intervention strategy promote independent functioning of students with ASD in their least restrictive environments. O'Handley, Radley and Whipple (2015) supported the study's findings reporting that the use of video modeling resulted in increased intervention outcomes. Evidence-based research that can address social and communication skills, as well as behavioral functioning in young adults with ASD, might promote the general use of video modeling across varying environments. More research in areas that consider social skill learning strategies underpinned with visual technology such as video modeling, role-modeling, and iPad applications would be appropriate for neuro-typical students as well. As the student population ages and transitions into adulthood, appropriate sociological behaviors warrant attention for employment and community expectations.

Technology-Based Learning Strategies

Information that expands VSS learning strategies for young adults with ASD was revealed in this study. The VSS technology-based learning strategies identified indicated that the study's participants considered components such as data, formative assessments, group collaboration, and trial and error as best practices to align the cognitive levels of

young adults with ASD to age appropriate strategies. Fleury et al. (2014) suggested that the alignment of learning strategies that uses VSS for young adults with ASD should include expectations for academic performance, the profile of individuals with ASD across contents areas, and proven interventions for this population. Odom et al. (2014) reported that interventions and instruction that utilizes technology have an impact on the academic, social and behavior skills of people with ASD. These authors encouraged more research to capture essential data towards innovative learning strategies. Gentry, Kriner, Sima, McDonough and Wehman (2015) quantified the role of technology, specifically iPads and PDAs, for young adults with ASD as versatile task organizers that assist people with cognitive challenges. Nepo, Tincani, Axelrod, and Meszaros (2015) indicated that adults with ASD who were verbally challenged had a better understanding of the efficacy of basic functional communication using VSS technology.

Research for Social Change

Social skills training for young adults with ASD is complex and multifaceted. As evidenced by my data collection and analysis, teaching young adults with ASD how to navigate social realities is often based on trial and error. There exists a limited knowledge-base of consistent learning strategies and wide gaps in literature that examine the depth of how the use of VSS may enhance the social skills of the young adult prior to exiting public and private secondary education environments. Information garnered in this study from an administrator, when queried as to the evaluation of learning strategies, mentioned that data were instrumental in assessing and aligning appropriate methods to teach social skills to young adults with ASD. Beyond the traditional and required

cognitive testing practices to ascertain the alignment of learning strategies, more research that examines and elicits foresight to the *external signs* that often identify the social impairment of young adults with ASD is warranted. These external signs include but are not limited to (a) a lack of interest to initiate social interactions, (b) the inability to understand and express emotions and (c) literal interpretations of nonliteral language.

Implications

When considering the study's sample of participants from private and public schools that specialize in social skill education for young adults with ASD, participants from all of the sites perceived the use of VSS was an important resource for classroom settings. The availability and use of VSS assistive technology for young adults with ASD in classroom settings, when applied as a basic skill to critical thinking concepts, provided pathways to reduce the complexity of skills required of adults living and working in communities. Loftland (2016) reported that visual assistive technology used to augment teaching practices for academics and social skills increased independence. Implications stemming from my study suggested that specific social skills learning strategies such as trial-and-error were necessary and were being used to foster the needs of young adults with ASD as they transition into community settings. Kellems, Gabrielsen, and Williams (2016) concurred that developing social skills for young adults with ASD is nonspecific to all populations with ASD. An additional implication considered that more research that ascertains best practices, strategies, and resources for social skills for young adults with ASD will promote more successful outcomes as this population ages. Evidence from my study concluded that participants who used VSS technology such as video-modeling,

Model Me programs, and Zones of Regulation software were able to teach complex social skills. The use of iPads, the Internet, and visual application software enhanced role-playing for social situations. Appropriate body language and ensuing interpretations were addressed using VSS technologies. Positive social change was attributed to successful VSS interventions when age appropriate learning strategies were endorsed.

Social Blindness

Learning strategies that enhance social skills for young adults with ASD may be influenced or restricted by educational resources, staff training, administrative support, or governing bodies that fail to grasp the impending impact of the target population's transition into adulthood. Fortunately, the state in which this study occurred has a scholarship that affords students with ASD funding to attend schools that specialize in this population's inherent needs. However, it doesn't cover the entire cost of a young adult with ASD's education. Furthermore, with the declassification of *DSM-5,* most students with ASD are grouped into one category, regardless of their cognitive disability. Visual assistive technology will remain essential to teach social skills. They will need assistive technology devices.

The issue of social impairment is complex. Teachers and intervention specialists who deal with young adults with ASD daily may find it difficult to explain these social deficits to someone unfamiliar with them. The comprehensive literature review indicated that the majority of findings pertinent to VSS for ASD interventions provided data for children and adolescents (Chakrabarti and Fombonne, 2010; Cramer et al., 2011; Hayes et al., 2010; Hirano et al. 2010). Notable gaps in literature existed that addressed the

efficacy of interventions for adults with ASD. Social skills training and education lack a consistent and productive direction for young adults with ASD creating future challenges for society and communities as this population ages. More research on the perceptions of educators and intervention specialists who consider VSS as a resource to enhance social skills is encouraged to combat these challenges.

Learning Strategies that Encompass VSS

The results of this study provided adequate data and translated findings specific to the learning strategies utilized or endorsed by the participants. Valuable knowledge was gained by the research in regards to the variations and similarities of VSS strategies to teach social skills to young adults with ASD. The analysis of the perceptions of administrators, intervention specialists, and special education teachers provided a realistic portrayal of the successes and challenges that are germane to the use of VSS to teach social skills to this population. Consideration of these results are significant; however, the educational and social wellness of young adults with ASD warrants more research. Additional learning strategies that consider VSS technology as core curriculum should be evaluated, and, if appropriate, included in daily classroom settings. Special education schools and intervention specialists should be allocated visual technology resources and training to enhance VSS learning strategies. Additional consideration of the social skill-sets for young adults with ASD to use innovative engagement approaches and enhance appropriate behavior in community settings is essential to promote social change.

Conclusion

Young adults with ASD face unique social skill challenges as they transition into independent living environments and seek fulfilling relationships within their communities. People with ASD are subject to impairments that include social interaction difficulties, communication (verbal and nonverbal) complications, and cognitive learning challenges. Young adults with ASD are experiencing greater isolation from social activities as they transition into adulthood. Assistive technology for young adults with ASD may provide an opportunity for them to adjust to social setting expectations.

Investigative studies have primarily focused on social education and interventions for children with autism. An insufficient amount of attention has been directed to social skill intervention strategies as young adults with ASD transition into adulthood. More research is recommended to determine if young adults with ASD require more VSS than individuals without ASD and thus may become a precursor towards future educational interventions. Special education administrators, educators, and policy makers hold strategic positions to consider how individuals with ASD benefit from VSS intervention strategies. Young adults with ASD seek inclusiveness in social settings. Social skill-sets learned through the use of VSS may empower them to participate with greater confidence. The funding of resources and educational strategies to assess and improve VSS social skills training for people with intellectual disabilities (ID) is often linked to the interpretation of the APA's *DSM-5* diagnostic criteria. As the *DSM-5* categorization of ASD currently remains unclear, the complex issue of diagnosis relative to eligibility for services is impeded.

On March 27, 2014, the CDC released new data on the prevalence of autism in the United States. This surveillance study identified 1 in 68 children as having ASD (CDC, 2014). Based on the typical cognitive and social impediments that are associated with ASD, the aging ASD population and stakeholders will be faced with a formidable challenge to prepare for life and community competencies. Research to enhance the social skill-sets of young adults with ASD warrants future consideration.

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Appendix A: Participant Interview Questions for Administrators

Perceptions of Visual Support Systems toward the Enhancement of Social Skills for Young Adults with Autism Spectrum Disorders

Interviewer:	**Participant Code:**	**Role:**
Date:	**Time:**	**Location:**

Opening Statement: This interview is designed to record information pertinent to the research of this study. Your input is valuable and requires an accurate description for each inquiry. The questions were derived based on recent studies regarding the use of visual support systems towards enhancing social skill-sets for young adults with ASD.

Question# 1. Please describe your typical experience or exposure to young adults with ASD in an educational setting.

Experience

_____

Exposure

_____

Follow up

_____

Follow Up: Could you elaborate on what you mean when you say. ..? You mentioned... Can you give me an example of . . . ?

Question # 2. What do you think of the idea that technology can attract and hold a student's attention and why?

_____

_____

Follow up: _____

Follow Up: Could you elaborate on what you mean when you say. ..? You mentioned... Can you give me an example of . . . ?

Question # 3. What do you think of the idea that technology makes abstract concepts more concrete for the student?

Follow up:

Follow up: Could you elaborate further about…? Could you please give me an example of …?

Question # 4. How familiar are you with VSS and what types, if any, are being used in your educational setting to teach social skills for young adults with ASD?

Follow up:

Follow up: Can you give me an example of ……..?

Question # 6 How do you determine if a particular learning strategy is aligned with the cognitive levels of young adults with ASD?

Follow Up:

Follow Up: Could you elaborate further? You mentioned ……..why do you feel this way? Can you give me an example of ……?

Additional Information: Is there any other information you would like to share that perhaps I did not ask?

Thank you for participating in this qualitative multiple-case study.

Appendix B: Participant Interview Questions for Teachers and Intervention Specialists

Perceptions of Visual Support Systems toward the Enhancement of Social Skills for Young Adults with Autism Spectrum Disorders

Interviewer:	**Participant Code:**	**Role:**
Date:	**Time:**	**Location:**

Opening Statement: This interview is designed to record information pertinent to the research of this study. Your input is valuable and requires an accurate description for each inquiry. The questions were derived based on recent studies regarding the use of visual support systems towards enhancing social skill-sets for young adults with ASD.

Question# 1. Please describe your typical experience or exposure to young adults with ASD in an educational setting.

Experience

_____

Exposure

_____

Follow up

_____

Follow Up: Could you elaborate on what you mean when you say. ..? You mentioned... Can you give me an example of . . . ?

Question # 2. What do you think of the idea that technology can attract and hold a student's attention and why?

_____

Follow up: _____

Follow Up: Could you elaborate on what you mean when you say. ..? You mentioned... Can you give me an example of . . . ?

Question # 3. What do you think of the idea that technology makes abstract concepts more concrete for the student and why?

_____

_____

Follow up:

_____

Follow up: Could you elaborate further about…? Could you please give me an example of …?

Question # 4. How familiar are you with VSS and what types, if any, are being used in your educational setting to teach social skills for young adults with ASD?

_____

_____

_____

Follow up:

_____

Follow up: Can you give me an example of ……..?

Question # 5. What learning strategies, if any, that address social skills for young adults with ASD, are you typically using?

_____

_____

_____

Follow up: _____

Follow Up: Could you elaborate further? What factors do you believe contributed to selecting these strategies?

Question # 6. How do you determine if a particular learning strategy is aligned with the cognitive levels of young adults with ASD?

_____

_____

Follow Up:

_____

_____

Follow Up: Could you elaborate further? You mentioned ……..why do you feel this way? Can you give me an example of ……?

Question # 7. How have VSS learning strategies been evaluated, and what was determined about its strengths and drawbacks?

Follow Up:

Follow up: You mentioned……can you tell me more about this strength/weakness?

Question # 8. What other VSS technologies would enhance your strategies when teaching social skills to young adults with ASD?

Follow up:

Follow up: Can you tell me more about ……?

Additional Information: Is there any other information you would like to share that perhaps I did not ask?

Thank you for participating in this qualitative multiple-case study.

Appendix C: Peer Review Interview Questions

Visual Support Systems: Fostering Social Skill-Set Strategies

for Young Adults with Autism Spectrum Disorders

Interviewer: N/A	**Participant Code:**	**Role: Peer Reviewer**
Date: 11/3/14	**Time:10:51am**	**Location: N/A**

Opening Statement: This interview is designed to record information pertinent to the research of this study. Your input is valuable and requires an accurate description for each inquiry. The questions were derived based on recent studies regarding the use of visual support systems towards enhancing social skill-sets for young adults with ASD.

Question # 1. Based on your understanding, what cognitive and behavioral characteristics are used to identify ASD?

Cognitive
Delayed or lacking communication skills
Lack of age-appropriate peer relationships
Frequently able to memorize large amount of data
Difficulty with non-verbal communication
Oral language problems—unusual voice pitch and tone, generally higher than normal
Perseveration on topics
Narrow range of interests
Difficulty with pragmatics—social nuances, unwritten rules, etc.
Varying IQ scores
Unable to speak on theoretical concepts

Behavioral
Limited or atypical social interactions
Does not understand the feelings of others
Heightened sensitivity to sensory input (noises, touch textures and taste)
Sensitivity to specific clothing, shoes, etc.
Dislikes or avoids physical touch or prefers deep pressure to light touch
Unusual facial expressions
"Fight or flight" reaction to high stress situations
Lack of eye contact

Repetitive physical movements (rocking, spinning, etc.)
Repeating words or phrases, echolalia
Limited or very specific food choices
Reliance on structure or routine
Stress when routine is changed
Strict adherence to rules
Lack of situational judgment
Unable to be spontaneous

Follow up

Follow Up: Could you elaborate on what you mean when you say . ..? You mentioned... Can you give me an example of . . . ?

Question # 2. Please describe your typical experience or exposure to young adults with ASD in the educational setting?

Experience
I have taught Special Education for 20 years. I have my degree in Intervention Specialist M/M as well as Transition to Work.

Exposure
I have worked in a variety of classroom settings for students with disabilities. Most recently I have worked with students with disabilities including ASD in the Transition to Work setting. Previously, my focus was on behavior modification in students with disabilities.

Follow up: _____

Follow Up: Could you elaborate on what you mean when you say. ..? You mentioned... Can you give me an example of . . . ?

Question # 3. What is your perspective regarding learning-challenges for young adults with ASD?
Because my program is designed to prepare students for the world of work within the next 9 months, my focus is on work-appropriate skills and behaviors. Students with ASD typically need support with understanding social situations as they relate to work. Additionally, we do a great deal of teaching and coaching around understanding workplace rules and nuances. I have seen many students with ASD perform successfully when given a predictable routine and schedule of work.

Follow up

Follow up: Could you elaborate further about…? Could you please give me an example of …?

Question # 4.
What are the sources of your perceptions of how young adults with ASD learn, socialize, and exhibit an understanding of new knowledge?
The source of my perceptions is my training in this field as well as my 20 years of experience in working with students with disabilities.
Follow up: _____

_____

Follow up: Can you give me an example of the latest source that you investigated? Did you use this source in the classroom or recommend that it be used to teach this new knowledge to the young adults with ASD?

Question # 5. How do you think research should contribute to enhancing social skills for a young adult with ASD?

I think research could best help students with ASD by determining causes of ASD, treatments and most effective teaching and training techniques.

Follow up: _____

Follow Up: Could you elaborate further? What factors do you believe contribute to a lack of research in this area?

Question # 6. How do you view the following statements about the use of technology in the classroom for young adults with ASD?

6a) Technology is a part of everyone's communication system
I disagree with this statement.

6b) Technology can attract and hold a student's attention
I agree that this applies to most, but not all students.

6c) Technology enables the student to focus on the message and reduce anxiety
I agree that this applies to some students but not all.

6d) Technology makes abstract concepts more concrete for the student
I agree that this applies to some but not all students.

6e) Technology helps the student to express his or her thoughts
I have seen this be effective in some students with ASD.

6f) Technology helps all students
I disagree with this statement.

Follow up:

_____

Follow Up: Could you elaborate further? You mentioned ……..why do you feel this way? Can you give me an example of ……..?

Question # 7. How familiar are you with visual support systems (VSS)?

At Project SEARCH we use visual supports systems frequently and have found them to be successful with many students.

Follow up:
_____

_____

Follow up: You mentioned……can you tell me more about this VSS? How did you become aware of this VSS?

Question # 8. What types of VSS are used in your educational setting?

We use written daily schedules, calendars, checklists, picture charts and maps. Boardmaker is our primary software for these tasks.

Follow up: _____

Follow up: Can you tell me more about ……VSS? Did you use …..VSS prior to working with young adults with ASD?

Question # 9. What type of training do you receive when new technologies are purchased or introduced?
If I purchase the software or technology, I seek out the necessary tools for training. The Career Center offers me a great deal of other technology training.

Follow up: _____

Follow up: Can you tell me about your last technology training session? Did you feel that it was adequate?

Question 10. After using VSS to teach young adults with ASD, is there an evaluation process to determine if the VSS is useful, practical and/or efficient? If so, please describe this process citing the pros and cons of using VSS.

In the course of job coaching, we use visual supports on a trial and error basis. We try to provide as few accommodations as necessary and reduce over time.

Follow up:_____

Follow up: You mentioned .....as a pro; why? You mentioned .....As a con; why

Question 11. In your opinion, are there VSS technologies or resources that would be more efficient, cost-effective or desirable to teach young adults with ASD? If so, what are these technologies?

We have seen several apps that could be used in addition to paper visual supports. These could be effective with students who carry smart phones.

Follow up: _____

Follow up: You mentioned….technology; why would you prefer this technology. Do you have experience using this technology?

Question 12. What learning strategies, if any, that address social skills for young adults with ASD, are you typically using?
Most commonly, we use role playing and direct instruction to teach social skills.
Follow up: _____

Follow up: You mentioned …….learning strategy; how did you decide to choose this strategy?

Question 13. How do you determine if a particular learning strategy is aligned with the cognitive levels of young adults with ASD?

Trial and error.

Follow up: _____

Follow up: You mentioned ……can you tell me more about ……..?

Question 14. Are you using identical learning strategies for all subjects taught to young adults with ASD?
No. Our teaching is individualized.

Follow up: _____

Follow up: Why or why do you not use identical learning strategies? What factors are considered to determine different learning strategies?
Question 15. If you use learning strategies that are specific to curriculum content, what conceptual frameworks are being considered when developing these strategies?
Our content is preparing students for work. Our techniques and supports are individualized for each student in the program.

Follow up: _____

Follow up: Would you be open to considering learning strategies that are grounded in conceptual frameworks such as Information Processing Theory (adults with ASD process information differently than those without ASD) or Bandura's Social Learning Theory (people learn from one another via observation, imitation, and modeling

Question 16. How difficult would it be to incorporate VSS into existing learning strategies or to enhance existing strategies that already use VSS for young adults with ASD?
It is not difficult at all. I currently do it daily.

Follow up: _____

Follow up: You mentioned that……..can you expand on this?

Additional Information: Is there any other information you would like to share that perhaps I did not ask?

_____

_____

_____

Thank you for participating in this qualitative comparative case study

Appendix D: Consent Form

You are invited to take part in a research study that examines visual support system technology and social skills for young adults with Autism Spectrum Disorder (ASD). The researcher is inviting you to participate because you meet the criteria as follows:

- Existing or past use of visual supports systems (VSS) in your educational environment (examples of VSS are: IPod, iPad, Visual Cues, vSked (an interactive and collaborative visual scheduling system), Video Modeling, Picture Exchange Communication System (PECS) , Treatment and Education of Autistic and Related –Communication- Handicapped Children (TEACCH) and/or other VSS resources used in your educational environment.
- Students enrolled in your program between the ages of 16-23 with a diagnosis of ASD in accordance with the most current American Psychological Association (APA) DSM-5 criteria.
- Evidence of 3 years of experience in administrative, educational, and/or special education interventions of young adults with ASD.

This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named David J Miller, who is a doctoral student at Walden University. Please note that this study is not in relationship to any professional capacity in which you may know David J Miller, Aerospace Program Instructor for the Warren County Career Center.

Background Information:
The purpose of this study is to explore perceptions of school personnel related to the use of VSS technology and enhancement of social skill-sets for young adults with ASD.

Procedures:
If you agree to be in this study, you will be asked to:

- Participate in a semistructured face-to-face interview for approximately 1 hour in a controlled environment at a mutually agreed upon date and time. The location of the study will be, if agreeable, at your school, or a convenient location.
- Respond to predetermined questions and have these responses recorded by the researcher using audio, notes, and memos.
- Engage in a review of the transcript of your interview, which will take up to 30 minutes, to make sure your words were captured accurately.
- Review my initial interpretation, in person, of your interview to make sure I have understood your intentions, and this may take up to 30 minutes.
- Participate in a follow-up interview if deemed necessary by the researcher.

Example interview questions include:

- How well do you understand the symptoms that are used to currently diagnose ASD?
- What is your experience or exposure to young adults with ASD?
- What learning strategies are typically being used for young adults with ASD?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at your school will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind during or after the study. You may stop at any time.

Risks and Benefits of Being in the Study
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue or stress. Being in this study would not pose risk to your safety or wellbeing. The central concepts and phenomenon of the study will seek new information that highlights the interpersonal social and communicative milieu of contexts involving the use of visual supports as well as evidence of their effectiveness in enhancing participation, learning and social membership for young adults with ASD.

Payment:
Participants will not be paid to participate in the study, but may be privy to the study results if deemed appropriate by Walden University Institutional Review Board (IRB)
.

Privacy:
Any information you provide will be kept confidential. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. All study data, including the interview audio/video tapes, transcripts, and notes will be stored via digital means on the researcher's computer and secured by a confidential password. Any printed material will be stored in a locked file cabinet. Only the researcher will have access to the data and it will be maintained for five years.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via 513-260-2668 and/or david.miller3@waldenu.edu.If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 06-19-15-0076816 and it expires on June 18, 2016.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below, I am agreeing to the terms described above.

Printed Name of Participant _____

Date of consent _____

Participant's Signature _____

Researcher's Signature _____

Appendix E: Letter of Community Cooperation

Dear David J Miller,

Based on my review of your research proposal, I give permission for you to conduct the study entitled: *Educator Perceptions of Visual Support Systems and the Enhancement of Social Skills for Young Adults with Autism Spectrum Disorders* within the XXX School. As part of this study, I authorize you to recruit potential participants that meet the following criteria:

• Participant's program had students between the ages of 13-23 and classified as ASD in accordance with American Psychological Association (APA) DSM-V criteria.

• Participant has evidence of 3 years of experience in either administrative, educational, coordination or intervention roles of young adults with ASD.

• Participant has existing or past use of visual supports systems (VSS) in the participant's educational environment

Data collection will be in the form of semistructured interviews for a duration of one (1) hour at the XXX School in a controlled environment (conference room or classroom). If a controlled environment is not available to the researcher, the researcher has permission to arrange for alternate accommodations to conduct the interviews as approved by XXX School. Member checking after data collection will be permitted in order to afford the participants an opportunity to correct errors and challenge what are perceived as wrong interpretations as well as to volunteer additional information which may be stimulated by the playing back process of audio recorded interviews. Results from this study, and with the permission of Walden University, may only be disseminated to the XXX School

Principal of Academics. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include:

- Permitting special education administrators, intervention coordinators, specialists, and teachers to voluntarily participate in the study for a one (1) hour duration.
- Provide a controlled, quiet room for the interviews
- Supervision of participant participation for scheduling or permission to participate
- We reserve the right to withdraw from the study at any time if our circumstances change.

The Researcher will be will be responsible for complying with our site's research policies, ethics, research approval process, and requirements, including maintaining confidentiality, signing in/out at the main office, scheduling visits ahead of time, and abiding by all XXX School policies.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,

Name of person authorizing Letter of Participation

Walden University policy on electronic signatures: An electronic signature is just as valid as a written signature as long as both parties have agreed to conduct the transaction electronically. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Electronic signatures are only valid when the signer is either (a) the sender of the email, or (b) copied on the email containing the signed document. Legally an "electronic signature" can be the person's typed name, their email address, or any other identifying

marker. Walden University staff verify any electronic signatures that do not originate from a password-protected source (i.e., an email address officially on file with Walden).

Appendix F: Letter of Invitation to Participate in Study

My name is David J Miller and I am contacting you to query support for a proposed Qualitative Research Study that will seek to investigate the influence of visual support systems (VSS) that may foster social skills for young adults diagnosed with ASD (Autism Spectrum Disorder). This research project is a critical part of my dissertation requirement for the PhD in Educational Technology program in which I am enrolled at Walden University. In order to establish a connection with individuals that may be willing to participate in this study, I am respectfully requesting you to review the minimum criteria for participation and respond to me via e-mail at XXXXXXXXX.

Minimum criteria for participation:

Familiarity with visual support technologies, i.e., IPod, iPad, Visual Cues, vSked, Video Modeling, Picture Exchange Communication System (PECS), Treatment and Education of Autistic and Related –Communication- Handicapped Children (TEACCH) and/or other VSS resources used in your educational environment.

Evidence of at least three (3) years teaching, coordinating, or administering students enrolled in your program(s) between the ages of 13-23 with a diagnosis of ASD in accordance with the most current American Psychological Association (APA) DSM-V criteria.

Willing to be available for a 1 hour interview session and review of digital transcripts of interview at your school or a convenient place to be determined.

The identified problem for this study is the growing isolation in adulthood for those on the ASD spectrum and a decline in socialization activities. Much attention has been

focused on education and treatment for children with autism. Little attention has been paid to what happens as they transition into adulthood.

I will only collect information relative to visual support systems used to enhance learning strategies for young adults with ASD. I do not foresee any unusual risks associated with participating in this study, and there are no guaranteed short or long-term benefits for participation in this study. All measures will be taken to ensure confidentiality, validity, reliability and ethical research practices. Participation in this study is strictly voluntary. You will be helping to create a better understanding of the challenges of social skill-set interventions for young adults with ASD and potential learning strategies that employ VSS.

Thank you for considering this opportunity to expand upon the gaps in research and innovative visual support technology for this population with ASD. Please advise if you have questions, suggestions, or concerns as to your participation.

Sincerely yours,

David J Miller
PhD Candidate
Walden University

Appendix G: Location, Frequency, and Duration of Data Collection

	Location	Frequency	Interview Duration	Review
Site A Code	Private School			
ADM1	Office	Once	55 minutes	10 minutes
IS1	Classroom	Once	65 minutes	12 minutes
Site B Code	Public School			
ADM1	Office	Once	50 minutes	10 minutes
ADM2	Office	Once	53 minutes	8 minutes
IS1	Classroom	Once	70 minutes	14 minutes
SP ED Teacher	Conference Room	Once	75 minutes	10 minutes
Site C Code	Private School			
ADM1	Office	Once	40 minutes	10 minutes
IS1	Classroom	Once	58 minutes	11 minutes
SP ED Teacher	Classroom	Once	45 minutes	12 minutes
SP ED Teacher	Classroom	Once	64 minutes	10 minutes
IS2	Classroom	Once	54 minutes	11 minutes

Appendix H: Coding System for Case Study

Participants	Pseudonym	Role	Site	Interview Question #	Code
CHCADM1	Alice	Administrator	A	1,2,3,4,6	Site A ADM1
CHCIS1	Elizabeth	Intervention Specialist		1-8	Site A IS1
KHSADM1	Nancy	Administrator	B	1,2,3,4,6	Site B ADM1
KHSADM2	Diane	Administrator		1,2,3,4,6	Site ADM2
KHSIS1	Debbie	Intervention Specialist		1-8	Site B IS1
KHSSET	Karen	Special Education Teacher		1-8	Site B SET
LGADM1	Christine	Administrator	C	1,2,3,4,6	Site C ADM1
LSIS1	Laura	Intervention Specialist		1-8	Site C IS1
LGIS2	Felicity	Intervention Specialist		1-8	Site C IS2
LGSET1	Rhonda	Special Education Teacher		1-8	Site C SET1
LGSET2	Mickey	Special Education Teacher		1-8	Site C SET2

Legend:
ADM: Administration

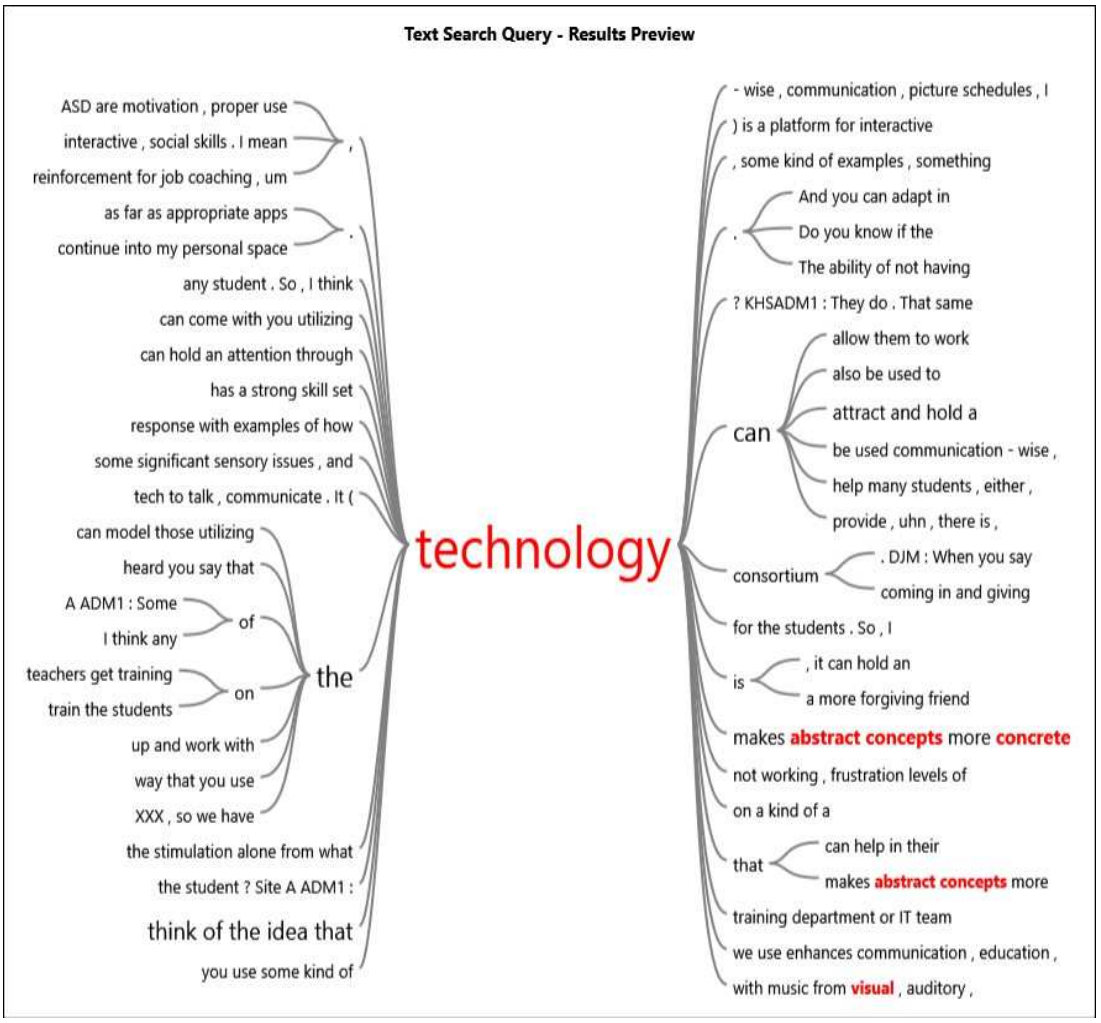
IS: Intervention Specialist

SET: Special Ed Teacher

Appendix I: Themes by Site, Participant, and Interview Questions

Sites ABC ADM1		Sites ABC IS		Sites ABC SET	
Question	Theme	Question	Theme	Question	Theme
Q1	teach, social skills, autism, special needs	Q1	students, technology, adults, social skills	Q1	technology, disabilities, teach, ASD
Q2	social skills, technology, VSS, iPad, agree	Q2	agree, ASD, learning, cognition, technology	Q2	technology, know, apps, education, agree
Q3	students, concrete, attention, technology	Q3	adults, teacher, cognitive, learning	Q3	know, think, look, visual, abstract
Q4	modeling, visual, technology, adults	Q4	technology, ASD, social skills, visual	Q4	social skills, teach, students, iPad
Q6	ASD, technology, strategies, cognition	Q5	data, strategies, cognitive, technology	Q5	modeling, think, know, conversation
		Q6	cognitive, think, strategies, level	Q6	skills, teach, technology, know
		Q7	need, visual, supports, know	Q7	research skills, curriculum, checklist
		Q8	apps, programs, tools, perceptions	Q8	Internet, anything, iPad

Appendix J: Word Search within NVivo



Source: Nvivo 11 QSR. (2015)