2017

Impact of Career and Technical Education Programs

Bradley Eric Gogan
Walden University

Walden University

College of Education

This is to certify that the doctoral dissertation by

Bradley Eric Gogan

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Jennifer Smolka, Committee Chairperson, Education Faculty
Dr. Deanna Boddie, Committee Member, Education Faculty
Dr. David Bail, University Reviewer, Education Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2017

Abstract

Impact of a High School Career and Technical Education Program

On Students with Autism Spectrum Disorder

by

Bradley E. Gogan

M.S., Walden University, 2006

B.S., Arizona State University, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Technology

Walden University

June 2017

Abstract

Autism spectrum disorder rates are climbing in the United States. Because this population is growing, research is needed to understand how to assist these individuals in pursuit of postsecondary educational and employment opportunities. The purpose of this qualitative study, as reflected in the central research question, was to investigate how a career and technical education program impacted the preparedness of students diagnosed with autism spectrum disorder for educational and employment opportunities beyond high school. The conceptual framework was based on Bronfenbrenner's ecological perspective of human development, Zhao and Frank's ecological perspective of technology, and Song's research about distributed cognition. This study used a single case study design, and the case was a career and technical education program at a high school located in Southwestern state. Participants included one program administrator, three career and technical education teachers, and two special education teachers. Data were collected from multiple sources, including individual interviews with participants and program documents. Data analysis included line-by-line coding and category construction to determine themes and discrepancies. Key findings indicated that the CTE program prepared ASD students for postsecondary educational and employment opportunities, differentiated instruction to meet the individual needs of ASD students, technologies such as computers helped ASD students prepare for postsecondary educational and employment opportunities, helped ASD students learn technical skills, life skills, and job skills. As a society we need to recognize ASD students are impacting the paradigm associated with special needs students as they attend universities, work study programs, technical schools, and other opportunities which have evaded this population.

Table of Contents

List of Tables

Chapter 1: Introduction to the Study

Diagnosed autism spectrum disorder (ASD) rates are increasing among children in the United States, and educators in many states are required to use teaching methods that help this population to be successful in their high school education, postsecondary education, and career choices (IDEA, 2004). According to the Center for Disease Control, 1 in 68 children have some form of ASD (CDC, 2013). *The Diagnostic and Statistical Manual of Mental Disorders* noted that “autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships" (American Psychiatric Association, 2013, p. 31). To address the educational needs of these students and other special education students, the United States Congress passed legislation such as the Individuals Education Act (IDEA, 1965) and the Elementary and Secondary Education Act (ESEA, 1965) to ensure that all students receive a fair and equitable education, including students diagnosed with ASD. In a study about postsecondary education and employment among adolescents with ASD, Shattuck et al. (2012) contended that technical education is particularly important to these individuals in gaining higher paying jobs. However, a lack of research exists about the integration of technology into classroom instruction that promotes the rate of graduation and postsecondary education opportunities and career attainment for students identified with ASD. Therefore, the purpose of this study was to explore how a career and technical education program impacted the educational and employment opportunities of these students.

This qualitative study was needed to address the research gap about how career and technical education programs in public school districts impact the educational and employment opportunities of students identified with ASD. The unemployment rate for individuals diagnosed with ASD varies from 50 to 63 %, and living at home is often the social norm for this population (Carter, 2012; Taylor et al., 2012). This study contributes to positive social change by adding to the body of knowledge concerning how career and technical education programs impact the educational and career goals among students diagnosed with ASD. This knowledge may help educators gain a deeper understanding of the technology skill sets that these students need to learn and the challenges that they face as they transition from high school to postsecondary educational and employment opportunities.

Chapter 1 is an introduction to the study and includes background information that is a summary of the research literature related to the scope of this study and the problem statement. In addition, this chapter includes the purpose of the study, the research questions, and the theoretical and conceptual framework that informs this study. This chapter also includes a brief description of the methodology, definitions of key terms, assumptions and limitations, and significance.

Background

In conducting an extensive review of the literature concerning students identified with ASD in schools, a research gap was found in how teachers integrate technologies into high school classroom instruction in order to improve learning for these students. Bouck, Flanagan, Miller, and Bassette (2012) explored how commercially available technologies could be repurposed as classroom assistive technologies to help students with high-incident disabilities

meet their individual educational plans. They found that students using assistive technologies received some benefit in the form of speech to text software, digital textbooks, adapted keyboards, and toys, which created a more inviting learning environment. In another study, Chappel and Somers (2010) investigated employing individuals with ASD and found that training needs to start at the high school level by working with state agencies in areas of student interest, which guides the careers or job training that individuals receive. Gerhardt and Lainer (2011) examined the current crisis in addressing the needs of adolescents and adults with ASD and found that supportive employment services help these individuals achieve greater employment success than those individuals without such services. In other related research, Humphrey and Symes (2011) explored teacher attitudes, experience, and knowledge about inclusion education for students diagnosed with ASD in secondary public schools, and they discovered teachers are supportive of including in mainstreamed classes. In a study about postsecondary education and employment among young people identified with ASD, Shattuck et al. (2012) found that after two years of high school, 50% of ASD high school graduates had not held a job or sought any education.

Individuals with ASD have the lowest rates in postsecondary education and in postsecondary employment. In 2004 the Individuals with Disabilities Education Act or Idea was passed to help schools identify the needs of students diagnosed with ASD. To help these students experience a smooth matriculation process from high school to postsecondary education and employment, support systems are necessary to enable them to be successful in these endeavors (Newman and Maduas, 2014). Schmalzried and Harvey (2013) explored perceptions of high school career and technical education teachers, administrators, general education teachers, and

guidance counselors about the collaborative and communication skills needed to identify the learning needs of shared special education students. Their study revealed that a gap exists between CTE and special education teachers in terms of communicating the learning needs of special education students. This gap in communication is often harmful because teachers are not able to deliver effective differentiated instruction to these students unless they communicate with one another. Southall (2013) examined the use of technology to accommodate differences associated with high functioning students diagnosed with ASD who participate in general education courses and found that differentiation is the key to success for these students. From using digital textbooks to teaching personal interaction skills, special education students, including those students identified with ASD, need differentiated instruction to be successful in the general education environment.

Thus, this brief summary of the research indicated that a gap in knowledge existed about how CTE programs impact students identified with ASD in relation to advancing their postsecondary educational and career opportunities. Therefore, this study was necessary to understand how to successfully educate these students so that they become productive individuals in society.

Problem Statement

In 2012, over six million students diagnosed with ASD received special education services in public schools in the United States, and of those students, 90% were unemployed upon leaving school (Schall, Wehman, & McDonough, 2012). According to the National Council on Disability (NCD), the service in highest demand is vocational rehabilitation, which suggests

that postsecondary education is the most demanded service among the ASD population (Fleming & Fairweather, 2012).

Students diagnosed with ASD need CTE programs and their related courses, including the technologies employed in today's industries in order to become contributing members of society (Okolocha, 2012; Shattuck et al., 2012). The number of students who are diagnosed with ASD is steadily increasing in American society (CDC, 2013), and therefore, it is critical for society to understand implications for the education of these students. Students diagnosed with ASD need extra support to learn interaction skills and job-related skills for future long-term careers.

Educators in public schools are required to educate students diagnosed with ASD. As a result of federal legislation such as the Individual Disabilities Education Act (IDEA), teachers are required to help students identified with ASD learn in the general education classroom through the use of interventions and modifications (Chappel & Sommers, 2010; Fluery et al., 2014). However, educators in many public schools do not execute this mandate effectively (Fluery et al., 2014; Wehman et al., 2014). In a recent study, Neild, Boccanfuso, and Byrnes (2013) explored the impact of CTE schools on postsecondary outcomes and found CTE courses often include building trades, computer technology, child care, and allied health, all of which require some form of technical training. Without technical training for the ASD population, Neild et al. concluded that serious consequences for these students and for society in general could result, including even higher unemployment rates, difficulties in education, and a lack of general technical skills.

Purpose of the Study

The purpose of this qualitative case study was to explore how a CTE program impacted the preparedness of students diagnosed with ASD for employment and educational opportunities beyond high school. I wanted to understand how a particular CTE program influenced the preparedness of these students for employment and/or educational opportunities and the role that technology played in preparing them. To achieve that understanding, I described how CTE and special education teachers believed they differentiate instruction to meet the individual needs of these students in preparing them for these opportunities. Additionally, I wanted to understand the role that high school administrators played in supporting the success of ASD students. I also examined documents and archival data related to the CTE program and its related courses to reach that understanding.

One of the goals of this study was to provide insight into how technologies related to careers can effect change in the lives of the high school students diagnosed with ASD. At the core of this research was an exploration of how CTE and special education teachers prepared ASD students for postsecondary education or employment opportunities currently available through various technologies. Educators have a responsibility to provide identified ASD students with the necessary technology tools for academic success. This responsibility is challenging for many educators because individuals diagnosed with ASD often have significant social and emotional challenges (Humphrey & Symes, 2011; Wehman et al., 2014).

Research Questions

The conceptual framework and the literature review for this study guided the following central and related research questions for this study.

Central Research Question

How does a CTE program impact the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities?

Related Research Questions

R1. What do CTE and special education teachers believe about how the CTE program influences the preparedness of ASD students for postsecondary educational and/or employment opportunities?

R2. How do CTE and special education teachers believe they differentiate instruction to meet the individual needs of ASD students in preparing them for postsecondary educational and/or employment opportunities?

R3. What do CTE and special education teachers believe about the role technology plays in preparing ASD students for postsecondary educational and/or employment opportunities?

R4. What do administrators believe their role is in helping ASD students achieve success?

R5. What do documents reveal about the impact of CTE programs on the preparedness of ASD students for postsecondary educational and/or employment opportunities?

Conceptual Framework

The conceptual framework for this study was based on Bronfenbrenner's (1977) ecology of human development, Zhao and Frank's (2003) ecology of technology, and Song's (2013) concepts related to distributed cognition. These researchers were selected because they have

created conceptual frameworks that were the lens through which the findings of this study were interpreted.

In his research about the ecology of human development, Bronfenbrenner (1977) believed that learning occurred in stages during the course of human existence. These stages allowed humans to grow exponentially. This system in which humans grow is an ecological one that becomes more complex as they age. This system is complex and consists of personal and social roles and relationships and culminates in a large system or environment. The complexity of social roles is such that the study of the human environment is so vast that it needs to be broken up into various microsystems that enable researchers to study these smaller systems by name. Bronfenbrenner's research is important to this study because his ecological perspective of human development was the first of its kind. Bronfenbrenner's research laid the groundwork for Zhao and Frank's research on the ecology of technology.

Zhao and Frank (2003) examined technology through an ecological perspective related to the concept of technology diffusion. Zhao and Frank contended that ecology is a metaphor that could be used to describe factors affecting technology use in schools, such as slow adoption rates and the misuse and underuse of computers and other technologies. Technologies are often considered an invasive species in schools because they change or alter the balance of the classroom ecology. Within any ecology, a point of equilibrium must be achieved for members of the ecology to coexist. Zhao and Frank's research was also important to this study because in examining the use of technology from the perspective of teachers who provide instruction to students diagnosed with ASD, it was necessary to understand the instructional methods these teachers used to ensure the success of these students in high school and in postsecondary

endeavors that will undoubtedly require the use of technology skills sets (Schmalzired & Harvey, 2014; Shattuck et al., 2012; Wehman et al., 2012).

Song (2013) developed a framework for distributed cognition by examining mobile-assisted seamless learning from an ecological perspective. Song believed that technology does not exist alone; rather, the user and the technology together create knowledge. This knowledge is then distributed among peers, students, and teachers. By doing so, Song believed that each user creates his/her own niche that exists separately from the material world. The niche changes or evolves as the persons' interests and networks change. Song's research was important to this study because it represents the single finite point of view that the individual diagnosed with ASD is what matters. Success is individual, the measure is personal, and life satisfaction is determined from this success. Song's view is that learning takes place in a context between the student and the environment. When the educator creates the environment, and implements the use of technology, then the interaction between the student and the environment becomes personal. The student shares the learning experience with peers, and this shared experience deepens meaning. Within this shared experience, Song believed that technology often fills learning gaps for students with disabilities. This study addressed this gap in order to develop a better understanding of how students diagnosed with ASD become successful members of society who are able to share their learning experiences with others.

Nature of the Study

The nature of this study was qualitative and was based on an interactive model of design that Maxwell (2013) described for qualitative research. This design places the research question(s) at the center of the study in an interactive relationship with the research goals,

conceptual framework, research methods, and evidence of trustworthiness. This interactive model was important to this study because it provided a process for understanding the research process, which helps the researcher align the study to the research question(s) (Maxwell, 2013).

This qualitative study used a single case study design. Yin (2014) defined case study as "an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context especially when the boundaries between phenomenon and context may not be clearly evident" (p. 16). Yin also noted that a case study "copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result benefits from the prior development of theoretical propositions to guide the data collection and analysis" (p.17). Thus, case study design is unique because it supports an in-depth investigation of a contemporary phenomenon by using multiple sources of evidence.

The case, or unit of analysis, for this study was a CTE program and its related courses at a high school located in the western region of the United States. I selected this research design because I wanted to collect data from multiple sources to provide a rich picture of the CTE program and its courses at this high school. In addition, case study research is a bounded study, and for this study, the boundaries between the CTE program and its courses and the context of meeting the needs of students diagnosed with ASD in terms of postsecondary educational and employment opportunities were often not clear.

Methodology

This was a qualitative case study. The case involved a small district in the southwest portion of the United States. This case was selected due to the uniqueness of the school district, location, and that the school district understood the study and what parameters were necessary to conduct the study (Yin, 2014). Since a research gap was found in how teachers integrate technologies into high school classrooms the need to improve learning for students with ASD seemed to intrigue the district as to what could be learned. The methods employed by the study included interviews, documents searches, state, county and district polices regarding CTE, and search for participants. These methods were recommended by Yin, (2014) as the tools of the case study researcher.

In relation to the methodology of this study, a total of six participants were selected, including three CTE teachers and two special education teachers who provided instruction for at the selected high school and one administrator who provided support to both special needs students and educators. Purposeful sampling was used to select these participants according to specific inclusion criteria. Data were collected from multiple sources, including individual interviews with an administrator, CTE program teachers, and special education teachers. Documents related to the CTE program and the special education services at the research site were also collected as supporting data. Data analysis was conducted at two levels. At the first level, based on the techniques that Charmaz (2006) and Merriam (2009) recommended for qualitative research, I used line-by-line coding to construct categories for each data source, using the constant comparative method. I also used a content analysis to review the documents and archival data, which involved describing the purpose, structure, content, and use of each

document (Meriam, 2009). At the second level, I examined the categorized data across all sources, using the constant comparative method, to determine emergent themes and discrepant data that informed the key findings for this study. These findings were analyzed in relation to the central and related research questions and interpreted in relation to the literature review and conceptual framework for this study.

Definitions

Accommodations: According to the U. S. Department of Education website (2015), accommodations for special education students include additional time to complete assignments, alternative tests or assessments, slower-paced instruction, and shorter assignments.

Autism Spectrum Disorder (ASD): Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships (American Psychiatric Association, 2013, p. 31).

Career and Technical Education Program

Career and Technical Education programs or (CTE), Prepares youth and adults for a wide range of high-wage, high-skill, high-demand careers; the program design includes 16 career clusters that include agriculture, food, natural resources, architecture, construction, arts, audio visual, technology and communications business management, administration, education, training, finance, government, public administration, health science, hospitality and tourism, human services, information technology, law, public safety, corrections and security,

manufacturing, marketing science, technology, engineering and mathematics, transportation, distribution and logistics (ACTE, 2015).

Ecology: A hierarchy of systems that must remain in equilibrium (Bronfenbrenner, 1977).

Interventions: Various types of behavioral plans created to encourage special needs students to become successful in the educational setting (Lerner & Kline, 2006).

Technology: For this study, technology includes, but is not limited to, the learning environment, teachers, peers, material resources such as learning tasks, learning resources, mobile device tools, computer technologies and facilities (Song, 2013).

Vocational education: A method of preparing students for entry into careers following their completion of high school. The prescribed programs within the high school allow students to become proficient in various careers needed for society to grow (Brunello & Rocco, 2015).

Assumptions

This study was based on several assumptions. The first assumption was that the archival data related to the CTE program and related courses was accurate. This assumption was important because, without accurate data, any conclusions drawn from the data would be inaccurate. The second assumption was that all educators cared about meeting the learning needs of students identified with ASD. This assumption was important because teachers need to provide appropriate instruction to help all students learn. If teachers in this study did not care about these students, their interview responses may not have supported the purpose of this study. The third assumption was that all participants were truthful in their responses during the

interviews. This assumption was important because the credibility of this qualitative research depended on their responses.

Scope and Delimitations

The scope of this case study was a CTE program and related courses at a public high school located in the Southwest region of the United States. This study was further delimited or narrowed by the participants, the time frame, and resources. Participants for this study included an administrator, CTE teachers at this high school who may or may not have expertise in meeting the learning needs of students diagnosed with ASD, and special education teachers who worked with these students. In relation to time, this study was conducted during 2015-2016, which limited the amount and type of data that could be collected. In addition, I was a single researcher who had limited resources to conduct this study.

The transferability of the findings for this study was also limited because it was a single case. Yin (2014) noted that a single case study has limited literal and theoretical replication because similar results may only emerge from similar population samples. This limitation was countered by collecting data from multiple sources.

Limitations

The limitations of a study are usually related to the research design. This study had limited replication because it was a single case study design. Yin (2014) cautioned researchers about the limitations of single case study design. Multiple case studies allow for comparisons and generate evidence on a larger scale. Another limitation was the time constraints of this study because data were collected during one school year. If a longitudinal study was conducted for 3 to 5 years, for example, more data could have been collected and analyzed in order to provide

more robust findings. Another limitation was the possibility of researcher bias. As a CTE teacher with many years of experience working with in this context, the potential for bias existed because I might attribute responses to teachers that do not exist or I might embellish the data. Potential bias was limited through the use of such strategies as triangulation of data, reflexivity, and member checks. In addition, all of the participants were unknown to me in order to reduce any preconceived notions about how both CTE and special education teachers should work with ASD student populations.

Significance

The significance of a study is related to the advancement of knowledge, to practice in the field, and to contributions to social change. In relation to advancing knowledge, this study added to the body of knowledge concerning the impact of a CTE program and its related courses on the postsecondary preparation of high school students diagnosed with ASD for educational or employment opportunities. High unemployment rates among individuals diagnosed with ASD have been reported (Gerhardt & Lainer, 2011). If students diagnosed with ASD do not receive an education that includes CTE program opportunities, they often fail to gain skills necessary to find financially sustaining employment (Chappel & Somers, 2010). The high unemployment rate within the ASD population continues to be a problem (Gerhardt & Lainer, 2011). Therefore, the goal of this study was to provide educators and researchers with a deeper understanding of how a CTE program impacts the preparedness of students identified with ASD for employment or higher education opportunities.

This study was also significant because it advances practice in the field of educational technology by describing how CTE and special education teachers believe they differentiate

instruction using specific technologies to meet the individual needs of students diagnosed with ASD. This study also examined how these teachers determined the benefits of new technologies before they made a decision to adopt them for students diagnosed with ASD in preparing them for postsecondary education or employment opportunities. In addition, this study examined the perceptions of teachers about the role technology plays in helping to prepare students identified with ASD for long-term employment or higher education.

This study was significant because it made several contributions to social change. In the United States today, it is imperative that all students learn technology skill sets to find employment. By exploring the impact of a high school CTE program on students diagnosed with ASD, the findings for this study may contribute to advancing knowledge about new instructional methodologies and technological resources that support teachers in addressing the unique learning needs of this growing population. These findings, in turn, may contribute to positive social change by providing educators and researchers with knowledge about how to improve opportunities for students diagnosed with ASD to secure a vocation or to enroll in higher education courses after leaving high school. A better educated and employed ASD populous may reduce the need for economic relief programs, which may result in a reduced tax burden for society.

Summary

This chapter included an introduction to this study about the impact of a CTE program on students diagnosed with ASD and a brief summary of the research literature on this topic for the background section. In addition, this chapter included he problem statement, and the research questions for this study, which were based on the ecological perspectives of Bronfenbrenner,

Zhao and Frank, and Song. In relation to the methodology, this study used a qualitative tradition and a single case design. In addition, definitions of key terms, assumptions, limitations, and significance were explained.

Chapter 2, which is the literature review, includes the search strategies used to conduct this review. In addition, the conceptual framework is discussed in more detail, and current research is analyzed and synthesized in relation to autism spectrum disorder, secondary CTE programs, transition services, postsecondary education and employment support, and the impact of technology on these students enrolled in CTE courses. This chapter concludes with a discussion of the themes and gaps that emerged from this review.

Chapter 2: Literature Review

The problem that this study addressed was that 90% of students diagnosed with ASD who leave high school are unemployed, and postsecondary education is the most demanded service among these students (Fleming & Fairweather, 2012; Schall et al., 2012). These students also require CTE courses that provide training in the technologies employed in today's industries in order to become contributing members of society (Okolocha, 2012). Therefore, the purpose of this qualitative case study was to explore how a CTE program impacted the preparedness of students diagnosed with ASD for employment and educational opportunities beyond high school.

This chapter is a review of the literature. This chapter includes a description of the search strategy used to conduct this literature review, and the conceptual framework for this study is described in more detail. For the literature review, current research studies are analyzed and synthesized in relation to the following topics: (a) students identified with ASD in high school classrooms, (b) secondary career and technical education programs (c) transition services, (d) postsecondary education support, (e) postsecondary employment support, and (f) ASD individuals in the workforce. This chapter concludes with a discussion of the themes and gaps found in this review of the research.

Literature Search Strategy

In conducting this review, I used the following databases: Academic Search Complete, Computers and Applied Sciences Complete, ERIC, Education Research Complete, Google Scholar, and PsycArticles. I also used dissertations from Walden University. In addition, I used the library at Bowman Gray University to gain access to peer-reviewed journal articles published within the last 5 years that were not available from other sources. I also used current articles that

my dissertation committee members suggested and articles from the United States Department of Education database to inform this review. In addition, I used websites specific to autism, such as the International Society for Autism, and to CTE programs, such as the Association for Career and Technical Education.

Basic search terms included the following: *autism, autism spectrum disorder, ecologies, ecological perspective, special needs,* and *disabilities*. Combined search terms were paired with basic search terms and included the following: *age*, *CTE, education, ESEA, technology, classrooms, employment, idea, legislation, postsecondary, universities,* and *vocational training.*

Conceptual Framework

The conceptual framework was based on the research of Bronfenbrenner (1977), Zhao and Frank (2003), and Song (2013). Bronfenbrenner (1977) is credited with developing an ecological perspective of human development. Zhao and Frank (2003) built on this ecological perspective by examining the factors related to technology diffusion in schools. Song (2013) developed a framework for distributed cognition by examining mobile-assisted learning from an ecological perspective. Therefore, the conceptual framework for this study provided guidance for a seamless integration of technology into the learning environment that supports educators in developing a deeper understanding of how to provide instruction to high school students in CTE courses who are diagnosed with ASD.

Bronfenbrenner's Ecological Perspective of Human Development

Bronfenbrenner (1977) embraced the idea that the development, or study, of human beings is a lifelong pursuit encompassing environments, settings, and social interactions, both formal and informal. The ecological environment is a set of structures that coexist. Conceived as

levels, Bronfenbrenner described four systems, each one containing specific elements necessary to build a perspective on human development. The four systems are the microsystem, mesosystem, exosystem, and macrosystem.

Microsystem. A microsystem contains the immediate environments that each person is in direct contact with, such as family, schools, church, and organizations. Bronfenbrenner (1977) noted, "the factors of place, time, physical features, activity, participants, and the role constitute the elements of a setting" (p. 514). These settings constitute the routines and environments that individuals participate in daily. An example of a setting would be a school, which is comprised of specific physical features, time constraints, and the participation of administrators, teachers, and students.

Mesosystem. Bronfenbrenner (1977) contended that the mesosystem is a system containing microsystems. Considering the previous example of a school, the school belongs to a district. Therefore, the school is a microsystem within the district, which is a mesosystem. School, work, and family can be considered not only as microsystems, but they also exist as sub-systems of the mesosystem. Each example is large enough to play two roles. The complexities of each system are such that they can exist in both the mesosystem and the microsystem. The breadth and depth of the education system, which includes the federal, state, and county levels, influence the daily classroom experiences of students and teachers.

Exosystem. Bronfenbrenner argued that an exosystem follows or examines specific social structures of the world, such as education, banking, the stock market, and governments. The individual is interconnected to these social structures either physically or through the many forms of media available. On some level, the individual is affected, depending on how immersed

these structures are within their lives. These structures evolve; therefore, humanity evolves on a daily basis. The decisions individuals make are influenced by these structures. As the structures change, or make social change world over, everyone is affected.

Macrosystem. Bronfenbrenner contended that a macrosystem examines the culture or subcultures, or the generalities, associated with institutions. Bronfenbrenner noted "each school or classroom functions much like another" (p. 515). This example is relevant to anyone who has spent time in a classroom, and it also holds true for other formal and informal structures with which individuals associate. Bronfenbrenner added, "A macrosystem refers to the overarching institutional patterns of the culture or subculture, such as economic, social, educational, legal, and political systems, of which micro-, meso-, and exosystems are the concrete manifestations" (p. 515). In consideration of a macrosystem, the patterns of how individuals treat each other emerge. These patterns exist among all entities that exist within the macrosystem. Bronfenbrenner believed that the transfer of information among the groups or parts guides the behaviors and motivation that create these environments. The macrosystem also embodies the mesosystems, exosystems, and macrosystems. For example, the federal and state governments, school districts, and schools exist within these systems. Behaviors (i.e. formal and informal), patterns, and groups belong to each of these parts. Bronfenbrenner argued that the treatment of persons within each of these systems is of great importance in a macrosystem.

Zhao and Frank's Ecological Perspective of Technology

Zhao and Frank (2003) added technology to Bronfenbrenner's ecological perspective. Zhao and Frank focused on the participants in an environment from an ecosystem standpoint in relation to the following four areas of interest: (a) classrooms as ecosystems; (b) computers as

living species; (c) teachers as members of a keystone species; and (d) external educational innovations as invasions of exotic species (p. 9). Zhao and Frank believed that schools and classrooms can be viewed as ecological systems where "teachers are a keystone species" (p. 9), meaning that they exert influence over their classrooms at the top of the system. Teachers interact with other teachers to provide training for each other. Students are viewed as a biotic species, which are diverse and interact with each other and the teacher (Zhao, Lee, & Frank, 2006). Technology is viewed as an invasive or alien species, which can move the system out of equilibrium by creating chaos. According to Zhao and Frank:

> Depending upon the properties of the invader and the existing species as well as the types of interactions, several consequences may result: (a) the invader wins and wipes out the existing species; (b) both win and survive, in which case some other species may perish or the ecosystem may eventually become dysfunctional due to its limited capacity; (c) the invader loses and perishes; and (d) both go through a process of variation and selection and acquire new properties. (2003, p. 13)

From this definition, technology can be viewed as an invasive species not limited to computers. The use of cell phones, assistive devices, and smart boards would fall into this category. The flexibility of this framework is necessary due to the different technologies that teachers implement in classrooms. Zhao and Frank contended that what constitutes technology in one school or classroom may not be standard in another.

Song's Ecological Perspective of Distributed Cognition

Song (2013) added to this ecological perspective through the notion of distributed cognition and shared ecological and social perspectives. Song investigated how learning occurs

in different environments, which are defined as formal, informal, and social. These environments may include online social groups, people, and websites. A relationship exists between the learner and the environment. Song contended that the user and the technology together create knowledge, and this knowledge is distributed among students and through their social groups using mobile technology. Song noted, "In the digital age, more and more students bring their own mobile devices wherever they go for their own needs" (p. 167). Students who use these mobile devices are provided with a more seamless learning experience across the whole learning spectrum. Learning, Song contended, requires building on prior knowledge and laying a foundation to bridge the previous experiences so that new learning occurs while sharing learned ecological and social perspectives.

Thus, Bronfenbrenner (1977), Zhao and Frank (2003) and Song (2013) believed that the learning environment is dependent on distributed resources. Song and Zhao and Frank added the use of technology to the ecological framework that Bronfenbrenner created. Song also addressed the use of technology in relation to members of a group, be it social, academic, or cyber, because teachers elicit prior knowledge and teach new concepts primarily to members of a class or social group. The ecological frameworks of these researchers also included the idea that educational resources are based on their availability in the environment and on understanding how students interact with these resources. Students diagnosed with ASD use various mobile technology devices on a daily basis in CTE courses, including cell phones, computers, iPads, and assistive technologies. Therefore, the ecological perspectives of these researchers created a solid conceptual framework for this study that explains why schools and their instructional programs exist as ecologies or systems. Schools are based on a hierarchy that allows individual groups or

species to interact and collaborate with each other in order to meet the needs of all involved. It is this symbiotic relationship that keeps the ecosystem in balance. In turn, each species is allowed to evolve as necessary to fulfill their learning goals and to demonstrate high levels of achievement. Therefore, this investigation into the impact of a CTE program on preparing high school students diagnosed with ASD for postsecondary educational and employment opportunities was necessary to understand how these students learn within this ecosystem. Technology integration into CTE programs and related courses was also a critical component of this investigation because technology drives many of the future careers that will employ.

Students Identified with Autism Spectrum Disorder

Autism affects 1 in 68 school age children (Autism Speaks, 2013; CDC, 2013), and this number is on the rise (Hall & Graff, 2011). Because ASD is becoming more prevalent, it is critical to understand how it is defined. As stated earlier, *The Diagnostic and Statistical Manual of Mental Disorders 5* defined ASD as "characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships" (American Psychiatric Association, 2013, p. 31). Students diagnosed with ASD need extra support to achieve academic success, to learn interaction skills, and to receive appropriate training for future career goals.

ASD Students in High School Classrooms

In general education, high school classrooms, students diagnosed with ASD often perform poorly in most subjects, in part, due to the behaviors associated with this disability **(**Fleury et al., 2014). According to the website Autism Speaks (autismspeaks.org, 2015),

individuals diagnosed with ASD demonstrate social-interaction difficulties, face communication challenges, and have a tendency to engage in repetitive behaviors. These behaviors may interrupt their learning, and therefore, classroom teachers are required to make accommodations for these students. How these disruptive behaviors are addressed in the classroom depends on the student's specific disability. The Association for Career and Technical Educators (ACTE, 2015) noted:

> Students with disabilities must have plans in place to determine positive behavior interventions that decrease or prevent behaviors that hamper the learning of that student or the learning of others. When disciplining students with disabilities, whether or not the behavior was a result of the student's disability must be considered (para. 1).

Thus, teachers are required to accept, modify or adjust curriculum, instruction, and assessments for students identified with ASD as part of their IEP. In addition, ASD students must declare their diagnosis to receive any adjustments in relation to educational institutions at the postsecondary level. In high school, the IEP that special education teachers and classroom teachers create determines the accommodations that ASD students receive.

Accommodations

Federal legislation (IDEA, 2004) requires teachers to address a student's IEP by making the necessary modifications to instruction (Newman & Madaus, 2014). According to the U. S. Department of Education website (2015), accommodations include additional time to complete assignments, alternative tests or assessments, slower paced instruction, and shorter assignments. After students diagnosed with ASD completes high school, interventions or supports may not be available in the postsecondary school of choice (Newman & Madaus, 2014). If postsecondary schools accept federal monies for students diagnosed with ASD, however, educators are required

to make accommodations for these students. However, if students do not declare ASD as a disability, school personnel cannot force them to make this declaration. Conditions are improving because high school educators are working with transition specialists to help these students matriculate to postsecondary educational opportunities (Newman & Maduas, 2014).

In a significant study about accommodations for these K-12 students, Southall (2013) explored the use of technologies to accommodate learning differences in the general education classroom setting for students diagnosed with ASD. Southall noted that the universal design for learning (UDL) method allows the teacher to design the learning environment using technologies to meet the individual needs of ASD students. These accommodations include text to speech software, enlarged font on a computer screen, and hand hand-held devices. Reinforcement and video modeling are also methods of UDL.

In other related research, Costley, Clark, and Bruck (2014) explored the ASD evaluative education model, which is a school-based method of assessing and determining interventions for classroom use with ASD students. They found that effective interventions often include specific methods of communication therapy to help ASD students and teachers work together by creating verbal reassurances and reminders to help these students correct their communication problems in the classroom. In a study about addressing the needs of adolescents and adults diagnosed with ASD, Gerhardt and Lainer (2011) found that modeling and/or direct teaching of social skills helps these students achieve success in the classroom environment.

Secondary Career and Technical Education Programs

Career and technical education (CTE) programs at the high school level encourage all students to prepare for college and careers by giving them hands-on experiences in today's skills

sets and occupations (ACTE, 2014; Hirschy, Bremmer, & Castellano, 2011). In CTE courses at the high school level, students have the opportunity to earn certifications and credentials relevant to the existing job market (acetonline.org, 2014). Students who actively participate in CTE programs have a graduation rate of 90.18% compared to 74.9% of students who do not participate in CTE programs in high school (ACTE, 2014). The on-time graduation rates of students who participate in CTE programs are also 53 % higher than students who do not graduate (Neild, Boccanfuso, & Byrnes, 2013). The job outlook through the year 2022 includes many of the highest paying technical jobs that are taught in CTE classes (ACTE, 2015).

The CTE program at the high school level in the United States is based on 16 career clusters and 79 career paths, depending on available resources (ACTE, 2015). These career clusters include agriculture, food, natural resources, architecture, construction, arts, audio visual, technology and communications business management, administration, education, training, finance, government, public administration, health science, hospitality and tourism, human services, information technology, law, public safety, corrections and security, manufacturing, marketing science, technology, engineering and mathematics, transportation, distribution and logistics (ACTE, 2015). A typical CTE program at the high school level may offer courses in health care, agriculture, technologies, and automotive care. In these CTE courses, students learn various trades and earn certifications that are valued in the workforce. Students are able to apply these course completion credits toward a two or four-year college degree or to course requirements at various trade schools (ACTE, 2015).

In an exploration of the academic impact of career and technical courses on students in a large urban school district, Neild et al. (2013) noted, "More than 90 percent of the approximately

18,000 public high schools in the United States offer some type of career and technical education course" (p. 10). All students, including special education students, are able to select one of many CTE courses available to them in an area of interest. Neild et al. also noted, "One of the goals of career and technical education is to engage students in their education by making clear the connections between what they are learning in their classes and their occupational interests" (p. 7). Neild et al. found that CTE students had a more positive attitude about education, which was demonstrated through higher attendance rates, better grades, higher test scores, and earning more credits than their peers (p. 75). Thus, the employment needs of many students are met in CTE courses because students learn about the diverse careers available to them. Community stakeholders also often employ students who are involved in high school CTE programs (acte.org, 2014).

It is also important to distinguish between career education and vocational education programs. Career education is the broader concept of preparing all students for future employment, which encompasses vocational education that involves learning a narrower skill set within a specific category of employment (Clements, 1977). CTE programs help prepare students for postsecondary education and employment in multiple courses that range from introductory to advanced and include practicums and internships within fields like agriculture, health science, and construction. An individual CTE course could be classified as a vocational education course, even though the entire program constitutes a career and technical education program that provides “sufficient information and experiences for career decision making” (Clements, 1977, p. 5). Within the 21st century high school, students may choose from over 40 different career paths. (Demarest & Gehrt, 2015). As a part of the narrower vocational training, however,

students build “skills, training, knowledge and social interaction competencies” through college credits and industry certifications, which offer students employment opportunities that until now were unavailable (Clements, 1977. p 5.)

Impact of Technology on ASD Students

The impact of technology on public and private school students has been considerable because they understand how to use many of the current technologies due to their daily exposure to cell phones, video games, and other modern technologies (O'Malley, 2012). One example is the iPad, which has been extensively released into public and private schools. Software programs have been implemented on the iPad to help with language acuity, assist the sight impaired, and direct behavioral modifications in the daily instructional tasks associated with the classroom environment. Teachers have often implemented these program options to help satisfy IEP goals for students identified with ASD. These software programs also level the playing field of secondary inclusion classrooms because special needs and general education students utilize technology to complete assignments (Jameson et al., 2012; Liu, Wu, & Chen, 2013). The technology that educators purchase makes lessons easier for both students and teachers while raising both technology awareness and understanding of the materials presented (Jameson et al., 2012; Liu, Wu, & Chen, 2013).

Students diagnosed with ASD often benefit from specific technologies that teachers use in the classroom. Mobile technologies have been correlated to higher achievement among ASD populations in the classroom setting (O'Malley & Donehower, 2013). In a study about using tablet computers as instructional tools to increase task completion by students identified with ASD, O’Malley et al. (2013) examined behavior, independent task completion, and mathematics

skills in a special needs classroom environment with a 1:1 student to teacher/aide ratio. They found general improvement in mathematics test scores for these students. Targeted behavior had mixed results based on a lack of understanding about the use of the iPad. O'Malley et al. also cited off-task student behavior when using the iPad as an issue. Overall, classroom behavior and independent task completion improved because students enjoyed using this technology rather than traditional classroom resources. Students were more engaged in classroom activities and needed less prompting from teachers to stop disruptive class behaviors. In general, computer use had a positive impact on these special needs students. However, O'Malley et al. also cited training and maintenance as issues that needed future resolution.

Teachers and parents have used various types of interventions involving technology in classrooms and homes for years to improve student learning. In particular, computers, video gaming systems, and hand-held devices have a high success rate in helping individuals with ASD (O'Malley et al., 2013; Ploog, Scharf, Nelson, & Brooks, 2012). Technology can be a great asset for these students due to its flexibility, portability, and suitability. Computers, hand-held devices, and gaming systems encourage students identified with ASD to learn new skill sets and to modify behavior, particularly if a teacher, aide, or parent monitors its use (O'Malley et al., 2013). Such technologies are not a cure, but they are methods to assist ASD students in attaining higher academic achievement than was possible in the past.

Behavior is also an overarching theme in many studies (Fleury et al., 2014; Mintz, 2013; O'Malley et al., 2013; Ploog et al., 2012; Ramdoss et al., 2012). Federal laws mandating the inclusion of special needs populations in general education instruction has given rise to these behavioral studies. Students identified with ASD are often disruptive in the classroom

environment. Their tantrums and self-injurious behavior can put a damper on the learning environment (Ploog et al., 2012). Mobile technologies, however, show great promise in aiding ASD students in curbing their detrimental behavior patterns by allowing them to set reminders about their behavior, using software that emits sound or vibrations (Fleury et al., 2014; Mintz, 2013a; Ploog et al., 2013).

The performance of ASD students is gauged by two factors in CTE classes: the ability to excel in the classroom and the ability to gain employment. These students are often employed through strategic alliances that the CTE instructor has formed with employers in the community. Employment allows ASD students to use the technology skills that they have learned in the classroom and to make cognitive connections through the application of these skills in the job environment (Casale-Giannola, 2012; Neild et. al, 2013). These connections encourage ASD students to excel not only in CTE classes but in general education classes in which they are enrolled (Casale-Giannola, 2012). Several researchers have suggested that ASD students perform poorly in the general education environment due to the lack of connection between learning and the application of that learning (Casale-Giannola, 2012; Fleury et al., 2014). Learning in CTE classes often improves because of the connections that students are able to make to real life circumstances **(**Casale-Giannola, 2012; Schmalzried & Harvey, 2013). Computer skills, group interaction skills, employment skills, and programming skills are all part of the CTE course curriculum in which ASD students participate**.** Repetitive skills sets, real life connections, and active learning have been cited as the reasons for the CTE classroom success of these students (Casale-Giannola, 2012). In the workplace, the use of the Internet, automation, and smart phones are also some of the skills associated with evidenced-based practices for ASD students (Schall,

Weiman & McDonough, 2012). These skills have been found to increase output and success at work.

Transition Services

Transition services are an important aspect in the education of students diagnosed with disabilities. According to the United States Department of Education, transitional services are:

> designed to be within a results-oriented process that is focused on improving the academic and functional achievement of the child with a disability to facilitate the child's movement from school to post-school activities, including postsecondary education, vocational education, integrated employment (including supported employment), continuing and adult education, adult services, independent living, or community participation. (2004, para 1)

Transition services include the support systems necessary to fulfill the objectives related to vocational education, postsecondary education, and the social interactions of individuals with disabilities (Molinelli, Riehle, Ham, & Thiss, 2012; Rydzewska, 2012; Schall et al., 2012). Supports include the local community, the school, social and emotional interactions with the community at large, and social skills training (Friedman, Warfield, & Parish, 2013). It is these areas that experts agree are the nexus of concentration to help individuals with disabilities reach their goals (Friedman, Warfield, & Parish, 2013; Wehman et al., 2012; Wehman et al., 2014). It is the use of these supports and the implementation of these transition services that help individuals with disabilities become more independent, educated, and employable (Friedman et al. 2013; Rydzewska, 2012; Shogren & Plotter, 2012; Wehman et al., 2012). Support systems are utilized in the transition process, which involves moving from high school to postsecondary

education, vocational education, or into a job or career. While experts agree that these individuals are often underemployed, unemployed, or lack education (Fleming & Fairweather, 2011; Friedman, Taylor et al., 2012; Warfield, & Parish, 2013; Wehman et al., 2012), these outcomes do not have to be the case. With proper vocational supports, such as counseling, training, and assistance (Parr & Hunter, 2013), individuals with disabilities can find better paying jobs. This same attitude can help them in secondary and postsecondary educational attainment.

Transition Programs

One example of a transition program is Project SEARCH, which is a school-to-work program designed for students identified with ASD in order to increase competitive employment opportunities for them in their transition from high school (Wehman et al. 2012). Project SEARCH includes an emphasis on training, education, behavior, living skills, and classroom academics. Project SEARCH has had a major impact on the lives of students diagnosed with ASD (Wehman et al., 2012). Students in their senior year in this transition program receive intensive vocational training, with the end goal of determining a career. Project SEARCH is a transition model where businesses in a community hire, support and train students identified with ASD. Wehman et al. found that this transition service increased competitive employment opportunities for these students who had completed high school. Wehman et al. also found that the support systems provided counseling, emphasized social skills, provided intensive instruction, and monitored student success.

JobTIPS is another transition program that has demonstrated employment success for students identified with ASD. In their examination of this transition to employment program for these students, Strickland, Coles, and Southern (2013) noted that teachers and students conduct

practice interviews in an online environment. Students receive information about specific interview strategies, online instruction in how to participate in interviews, and feedback from their practice sessions. Strickland et al. found that students identified with ASD who participated in JobTIPS demonstrated improved interview skills that should lead to better employment opportunities.

Transition Planning

Beginning in 2004, the Individuals with Disabilities Education Act, or IDEA, mandated transition planning for persons with disabilities. While no specific definition of transition planning was given in this mandate, the boundaries of transition planning were defined. According to the IDEA mandate (2004), student with identified disabilities must be placed on an IEP and provided with opportunities for postsecondary education, supported employment, employment, community services, and independent living. The IDEA mandate also stressed skill sets that include daily living, academic, and employment objectives.

The transition process begins at the ages of 14 to 16 (depending on state mandates) and continues until the student either graduates from high school or turns 22 years of age (U.S. Department of Education, 2007). Once the student reaches 22 years of age, services are diminished. According to the IDEA mandate (2004), students between ages 14-21 are "removed to an interim alternative educational setting under section 615(k)(1)" (2004). The importance of transition planning cannot be stressed enough. States who impose the transition process on ASD students at the age of 14 have higher employment outcomes for individuals who participate in transition programs than for individuals who do not (Cimera, Burgess, & Wiley, 2013).

Upon leaving high school, individuals with disabilities tend to be underemployed or unemployed and lack the necessary social skills to exit these populations (Burgess & Cimera 2014; Cullum & Cole, 2014; Shattuck et al., 2012). When students reach the age of consent, additional training outside the school system may be required to facilitate job acquisition (Cullum & Cole, 2014). One form of training is called vocational rehabilitation, and it is an important part of the transition process because individuals with disabilities are more likely to be gainfully employed when vocational rehabilitation services are sought out (Burgess & Cimera, 2014). At the high school level, this type of training is used when a vocational rehabilitation counselor assists special need skills, training, knowledge and social interaction competencies" s populations by discussing high school and postsecondary achievement goals and matching programs and services to help them meet those goals (Flemming & Fairweather, 2011). By using counseling services, these individuals can have greater success in achieving their postsecondary education goals.

Postsecondary Education Support

Postsecondary education outcomes vary among ASD populations. Studies show that one factor for this variation is low participation levels in vocational rehabilitation programs (Migliore, Timmons, Butterworth & Lugas, 2012; Newman & Madaus, 2014; Shattuck et al., 2012). Reasons cited for low participation include poor high school transition programs, limited skill sets, and stigma associated with having a disability (Casale-Giannola, 2012; Shattuck et al., 2012). Postsecondary education opportunities among these ASD populations are not very different than opportunities for general education populations. Studies indicate that students

identified with ASD enroll in two-year, four-year, and CTE programs (Anderson, 2014; Newman & Madaus, 2014; Shattuck et al. 2012; White et al., 2014).

Opportunities for Matriculation

Armed with technologies and high school skills sets, students identified with ASD generally matriculate to some form of postsecondary education program after high school. Even though many ASD students lack language and social skills and may demonstrate lower cognitive functioning, these same individuals may excel in the fields of science, technology, engineering, and mathematics (STEM). In a study of postsecondary enrollment and persistence for STEM and non-STEM majors among college students diagnosed with ASD, Wei et al. (2013) collected data utilizing the National Longitudinal Transitional Study-2 (NLTS-2). Many researchers use this data set because it is the largest informative government study of individuals with ASD and other special needs categories. Wei et al. found that participants demonstrated high rates of STEM enrollment but overall lower enrollment rates. Students diagnosed with ASD were more likely than the general population and those students with other disabilities to enroll in a STEM program. Individuals identified with ASD who attend college usually major in one of the STEM areas.

Since most jobs require some form of technology, employers often find that ASD individuals are a good job fit because they demonstrate interest and skill in technology-related fields, and therefore, their technical education is of the upmost importance (Taylor et al., 2012). Students diagnosed with ASD often enroll in a vocational education program in college where support systems are necessary. Using a hands-on approach in these programs to make

connections to the general curriculum is also necessary for individuals with ASD (Cullum, 2014).

Accommodations and Support Systems

Because students identified with ASD are no longer in high school does not mean the end of accommodations and support systems for them in relation to postsecondary education opportunities. IDEA (2004) mandated that these students receive any necessary accommodations and support systems. At the postsecondary education level, however, these accommodations and supports are required, but only if students diagnosed with ASD declare their disability in order to receive them. Without the voluntary declaration of acknowledging ASD and requiring assistance, no support will be offered (White, Summers, Zhang, & Renault, 2014). ASD student support systems in postsecondary education may include the use of scribes to help students take notes, technology assistance to tutor or explain necessary systems, and readers, or texts online so the student can listen if sight impairment is an issue (Anderson, 2014; Newman & Madaus, 2014).

In an examination of reported accommodations and supports provided to secondary and postsecondary students with disabilities, Newman and Madaus (2014) found that only a small percentage of ASD students in the postsecondary setting requested some form accommodation, which may be due to a lack of understanding of the benefits that these students receive. Most individuals identified with ASD have problems with social and language skills, and therefore, postsecondary education is often difficult for this population (Anderson, 2014). In a recent study of 3,190 students identified with ASD who sought accommodations at the high school level, only 50% of these same individuals sought accommodations at the postsecondary level (Newman et al., 2014). Thus, non-disclosure of a learning disability by these individuals may be due to the

comfort level of students with the school or to a lack of understanding about the availability of supports at the schools these individuals attend (Newman et al., 2014). Other reasons for non-disclosure included unemployment or career attainment goals. ASD students also reported that they believed they no longer had a disability and/or did not disclose their disability for unknown reasons (Newman et al., 2014).

Researchers have confirmed that need some form of support system to be successful in an academic environment (Cullum, 2014; Fleming & Fairweather, 2011; Miligore et al., 2012; Taylor et al., 2012). Students diagnosed with ASD often lean toward technology for this support because they possess high levels of systemizing, mathematical, and analysis skills (Wei et al., 2014). Even though ASD students need support systems to be successful in gaining an education and employment, they are, in fact, able to achieve the same goals as their counterparts, regardless of having a disability, and therefore, education often leads to a better career, well-being, and independence (Lee & Carter, 2012; Taylor et al., 2012)

Educational support systems for individuals diagnosed with ASD at the postsecondary level include extended time on exams, alternative exam formats, text-to-speech software/devices, note takers, registration assistance, adaptive equipment technology, textbooks on tape, sign language interpreters, course substitutions, and waivers (Newman et al., 2014). Even though these supports are offered, success is not guaranteed. still have a condition that manifests itself in a wide variety of symptoms and behavior deviations. Students often lack basic skills that may prevent them from interacting with peer groups to complete tasks (Anderson, 2014; Nevill & White, 2011; White et al., 2014). In particular, communication and adaptive skills are necessary components to successful education attainment. Because many ASD students lack these skills,

they need to seek guidance from postsecondary counselors. In a study about predictors of employment and postsecondary education of youth with autism, Migliore et al. (2012) found that individuals who sought counseling and other university services were more likely to graduate from their programs. In a study of 19-23-year-old students identified with ASD, Shattuck et al. (2012) reported that only 28% attended a two-year college and 12.1% attended a four-year college.

Thus, because issues related to language, social skills, and underemployment for ASD individuals have come under fire, it would seem that technology would be an area of interest to all concerned. The support systems currently in place do assist ASD individuals at the postsecondary level in attaining academic and often employment success. Understanding the behavioral and social limitations of individuals diagnosed with ASD and providing training specific to their job and career paths in which these limitations are not considered as liabilities seems to be the obvious course. In their study about preparing adults with ASD for employment, Collum and Cole (2014) noted, "Creating and evaluating software and hardware, writing computer programs, and testing equipment can be autonomous, require little social interaction, and rely on an individual's experience and technical skill" (pp. 3-4). ASD students at the postsecondary level who effectively utilize these supports available to them could achieve greater success in school and in job attainment. Technology skills are necessary in both the academic and work environment. In order to be successful in current and future endeavors, technology must be included in all levels of postsecondary education for ASD students.

Postsecondary Employment Support

Employment training starts with leadership. Parr and Hunter (2013) explored how to enhance work outcomes of employees with ASD through leadership and found that management styles are not important when working with these individuals. The values that are effective with individuals identified with ASD are honesty, respect, morality, and integrity, which do not differ from what non-disabled individuals prefer in their bosses or subordinates. In a study about increasing competitive employment on transition from high school for youth diagnosed with ASD, self-determination, self-advocacy, and parental involvement were found to be important to the success of these individuals (Wehman et al., 2012). However, these skills and supports also do not come naturally to these individuals. Parents and extended family are important in the transition and support process for these individuals. The involvement of parents in establishing contacts in the community helps establish a smooth transition for ASD individuals in gaining employment and postsecondary education opportunities (Shall, Wehman, & McDonough, 2012).

Workplace supports also vary among the ASD population. Because ASD manifests itself with different symptoms, each individual's support needs differ. Career search, job interviews, transportation, and instructional support are only some of the areas in which individuals need help (Wehman et al., 2012). One type of employment is supported employment, which includes skilled employment specialists who provide a high level of social support and compensatory training strategies for skill acquisition (Wehman et al., 2012). In their study of supported employment for young adults with ASD, Wehman et al., noted,

> Specifically, employment specialists supported individuals through four steps of an individualized supported employment model: (a) the development of a jobseeker profile

> and assessment, (b) guiding the job development and career search, (c) conducting job site training, and (d) designing long-term supports to promote job retention. (p. 160, 2012)

Supported employment is only one method used to guide the transition from high school to the workforce for students diagnosed with ASD.

Another support for job attainment is sheltered employment or sheltered workshops (Cimera, 2012). Sheltered employment or workshops consist of special needs individuals working with other special needs individuals in relation to community-based concerns. Most of the work is piecework, in which individuals are paid on the basis of work completed (Pounds et al., 2012). This work often includes some form of assembly work. The individual works with a job coach to secure employment. The average length of employment is 30 months, with special needs individuals averaging between 15 to 30 hours a week (Pounds et al., 2012). This form of employment builds the argument that these individuals are often underemployed. Even though these individuals gain experience and have a job, they often live below the poverty line (Cimera, 2012).

The review of the research literature for this study also indicated that employment support is particularly critical for students identified with ASD, due to the challenges they face in mastering social skills. The JobTIPS program, for example, shows why learning how to effectively participate in an interview is important to individuals identified with ASD. Whether or not these individuals are designing computer programs, assembling computers, or learning about specific technology devices, the need for CTE programs at both the secondary and postsecondary levels exists. It is only by demonstrating the advanced capabilities of this

population that society will accept the knowledge and abilities of these individuals, and ASD populations will finally earn wages above the poverty line.

ASD Individuals in the Workforce

Employment opportunities often escape individuals identified with ASD. In a study about postsecondary education and employment among young people with ASD, Shattuck et al. (2014) noted, "Youth with an ASD disorder have poor postsecondary outcomes, especially in the first two years after high school" (p. 1042). Individuals diagnosed with ASD who gain employment often find they are employed below their level of scholastic achievement or are not scheduled enough hours in a workweek to establish or sustain independence (Burgess & Cimera, 2014; Cullum, 2014). This problem may have as much to do with the employers' lack of understanding of the capabilities of the ASD individual as it does the individual's inability to communicate those capabilities. Issues of language and lower cognitive functioning often create difficulties for employers in finding the right job fit for these individuals (Shattuck et al., 2014). The Bureau of Labor reports the number of disabled persons on an annual basis, but does not separate disabilities into categories. This reporting means that only persons with physical disabilities who have normal linguistic and social skills are included. Although the national unemployment rate for persons with autism is unknown, in a separate study of only persons with autism, Shattuck et al. (2012) found 55.1% of individuals with autism failed to be employed 6 years after leaving high school and 34.7% attended college, while over 50% did not obtain employment or attend college within 2 years after leaving high school. To put this data into perspective, the November 2014 United States unemployment rate was 5.8% (Bureau of Labor Statistics, 2014).

Even though over 50,000 individuals turn 18 every year (Roux et al., 2013; Shattuck et al., 2012), little is known about how children and adolescents identified with ASD change as they become adults (Geurts & Vissers, 2011). Decreasing the effects of autism as the individual ages have been cited; however, normal social interactions for these individuals still do not occur (Geurts et al. 2011; Wehman et al., 2014). Because these social interactions are minimal or nonexistent, ASD individuals often have difficulty obtaining employment. However, employment is especially helpful for the overall wellbeing of ASD individuals because it contributes to a normal routine that most persons' experience as they become adults (Roux et al., 2013; Shattuck et al., 2012). Roux et al. (2013) examined postsecondary employment experiences among young adults diagnosed with ASD and found that they were often employed in office and administrative support occupations, transportation jobs, production work involving assembly, food processing, factories, food preparation and serving, and building or grounds cleaning and maintenance. Further investigation suggested that adults with ASD are also often employed below their academic attainment level (Shattuck et al., 2012).

Thus, the impact of ASD on adults is a subject lacking in research (Geurts & Vissers, 2011; Perkins & Berkman, 2012). This lack of research is due partly to the fact that most studies are about children and young adults identified with ASD (Perking et al., 2012). Because many ASD individuals work in areas of supported employment or sheltered workshops (Cimera, 2012), patterns have emerged from the research as to the types of opportunities adults transition specialists or healthcare providers offer to these adults (Friedman, Warfield & Parish, 2013). As ASD adults continue to age, it is imperative to research how they support themselves and the services they use to find employment. Little research has also been conducted about aging and

ASD (Perkins et al., 2012), particularly in relation to the education or training that ASD individuals may need to earn and sustain a viable income in old age.

Summary and Conclusions

This chapter included a description of the search strategy, which was used to conduct this literature review. The conceptual framework for this study was presented, which is based on the research of Bronfenbrenner (1977), Zhao and Frank (2003), and Song (2013) that will be used as the conceptual lens to analyze the impact of high school CTE programs on students diagnosed with ASD. The basis of this conceptual framework is the ecological perspectives of these researchers as they relate to schools, instructional programs, and courses as systems. Because schools and instructional programs exist as ecologies, they must be kept in equilibrium in order to help ASD students achieve success.

From the literature review, several themes emerged. The first theme was that in order for to be successful in work and school, support systems such as IEPs or school-to-work programs are necessary for ASD students to achieve success. The second theme was that often demonstrate behaviors of a repetitive and singularly focused nature in which the skill sets achieved by this population are clearly aligned with the goals of CTE programs described in this literature review. A third theme was that employment assistance is necessary for individuals identified with ASD, including transition programs and sheltered employment.

Several gaps in the research also emerged from this review of the literature. The first gap was a lack of knowledge about how CTE teachers work with stakeholders to provide transition services for postsecondary education and employment opportunities. The second gap was a lack of understanding about the types of behavioral interventions that CTE teachers at the high school

level need to implement in the classroom to aid in the education of students. A third gap was a lack of understanding about the technologies that individuals with ASD are interested in learning in the postsecondary educational and work environment. Therefore, this qualitative study was needed to understand the impact of a CTE program and related courses on the preparation of students diagnosed with ASD for postsecondary education and employment opportunities.

Chapter 3 is about the research method. This chapter includes a discussion of the research design and rationale and the role of the researcher. In addition, this chapter includes a description of the data collection and analysis procedures that were used for this study and a discussion of issues of trustworthiness and ethical procedures for qualitative research.

Chapter 3: Research Method

The purpose of this qualitative study was to explore how a CTE program impacted the preparedness of students diagnosed with ASD for employment and educational opportunities beyond high school. In order to accomplish that purpose, I described the beliefs of CTE teachers, special education teachers, and administrators about how the CTE program influences the preparedness of these students for employment and/or educational opportunities and the role that technology plays in preparing them. In addition, I described how CTE and special education teachers believed they differentiate instruction to meet the individual needs of these students in preparing them for these opportunities. I also examined documents and archival data related to the CTE program at the research site in order to provide support for or to contradict the interview data.

This chapter includes a description of the research method that will be used for this qualitative study, including the research design, rationale and role of the researcher. In addition, the selection of participants, the instrumentation, and procedures for recruitment, participation, and data collection and for data analysis are described. This chapter concludes with a discussion on the issues of trustworthiness for qualitative research and ethical procedures related to the Institutional Review Board (IRB).

Research Design and Rationale

The research design for this qualitative study was a single case study. Yin (2014) defined a case study as an "empirical inquiry" that investigates a phenomenon in depth within a real-world context and in relation to the contemporary world. The boundaries between the phenomenon and the context are often not. In addition, Yin noted that case study design:

> relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis (p. 17, 2014).

The case, or phenomenon, for this single case study was a CTE program and its related courses offered at a high school in a large public school district in the western region of the United States. The theoretical proposition that guided this case study was that this CTE program had a positive impact on the preparedness of students for postsecondary educational or employment opportunities.

The rationale for using a case study design was related to the merits of this design. As Yin (2014) noted, case study design involves collecting data from multiple sources in order to present a rich picture of the case or the phenomenon. For this study, data were collected from individual interviews with CTE teachers and special education teachers who provide instruction for and one administrator. In addition, documents were collected about the CTE program and its related courses, including the CTE program structure, the course guide, and course standards. In addition, case study design requires step-by-step procedures for collecting and analyzing data in order to create a thick, rich description of the phenomenon and the context (Patton, 2002). Using triangulation (Patton, 2002), the researcher also compares and contrasts these data sources to synthesize the data and determine the results. The knowledge acquired from the data triangulation created a rich picture of the CTE program and its impact on the postsecondary education and employment opportunities for ASD students. For this study, interview data was also compared to and contrasted with documents to determine key findings.

Therefore, the central research question for this study was: How does the impact of a high school CTE program prepare students diagnosed with ASD for postsecondary educational and/or employment opportunities? The related research questions were as follows:

R1. What do CTE and special education teachers believe about how the CTE program influences the preparedness of ASD students for postsecondary educational and/or employment opportunities?

R2. How do CTE and special education teachers believe they differentiate instruction to meet the individual needs of ASD students in preparing them for postsecondary educational and/or employment opportunities?

R3. What do CTE and special education teachers believe about the role technology plays in preparing ASD students for postsecondary educational and/or employment opportunities?

R4. What do administrators believe their role is in helping ASD students achieve success?

R5. What do documents reveal about the impact of CTE programs on the preparedness of ASD students for postsecondary educational and/or employment opportunities?

For this study, I also considered other qualitative research designs, such as phenomenology, grounded theory, and ethnography. I considered a phenomenology design in relation to the perceived experiences of CTE and special education teachers who provided instruction to. However, I wanted to focus on the impact of a CTE program on the preparedness of ASD students for postsecondary educational and employment opportunities. I also considered grounded theory as a qualitative research design for this study. Trochim and Donnelly (2008)

defined grounded theory design as research that is immersed in an experience of interest in order to develop a theory that is grounded in the data. The purpose of this study, however, was not to develop a theory about CTE programs and their relationship to students identified with ASD. Another qualitative research design that was considered for this study was ethnography, which Trochim et al. (2008) defined as examining a culture over an extended period of time. The use of ethnography was inappropriate for this study because I did not want to explore the cultural environment of students with ASD.

Role of the Researcher

The role of the qualitative researcher is multi-faceted. For this study, I was responsible for designing and selecting the sample and the data collection instructions. In addition, I was the only person who collected and analyzed the data. Therefore, the potential for researcher bias existed. Bias often emerges from the researcher who may be subject to creating personal relationships with the participants, school staff, and instructors (Miles et al., 2014; Patton, 2002). This potential for bias needed to be controlled in order to produce ethical research outcomes. Exercising control over language and category construction alleviated some of these potential issues (Patton, 2002). Using such strategies as peer evaluation and member checks also helped to reduce researcher bias in relation to data analysis (Miles et al, 2013). These strategies are described in more detail later in this chapter.

Participant Selection

The participants for this study included three CTE teachers and two special education teachers who provided instruction for students with ASD at a public high school located in the southwestern region of the United States. One administrator who worked with these teachers was

also included as a participant in order to gain additional perspectives about the needs of ASD students.

For this study, I used purposeful sampling to select these participants based on specific inclusion criteria. CTE teachers needed to meet the following inclusion criteria: (a) they must be employed as CTE teachers at the proposed high school research site, (b) they must teach CTE courses that include technology, (b) they must teach CTE courses that include students diagnosed with ASD, and (c) they must teach CTE courses that include skill sets based on industry standards for postsecondary education or career attainment. Special education teachers needed to meet the following inclusion criteria: (a) they must be employed as special education teachers at the proposed high school research site, (b) they must provide instruction for students diagnosed with ASD in relation to their IEP, (c) they must teach students technology skills in a manner consistent with postsecondary education or career attainment, and (d) their students identified with ASD must be enrolled in a transition program in which technology is used. Administrators needed to meet the following criteria: (a) they must have direct contact with the teachers of, (b) they must have contact with special needs teachers, and (c) they must be involved in implementing policies regarding CTE and ASD students.

In relation to the sample size, I used a purposeful sampling technique that Merriam (2009) recommended for qualitative research in order to obtain the richest data possible. From the pool of potential participants who meet the inclusion criteria, I selected two CTE teachers, two special education teachers, and one administrator.

Instrumentation

For this study, I designed four interview protocols that were used to conduct the interviews with participants, based on guidelines for conducting effective interviews for qualitative research that Merriam (2009) recommended. I designed an interview protocol for CTE and special education teachers (Appendix E), which I used to collect data about the beliefs that CTE teachers and special education have about how the CTE program influences the preparedness of students with ASD for postsecondary educational and employment opportunities. I also designed an interview protocol for administrators (Appendix G), which I used to collect data about the beliefs that administrators who work with teachers of have about how the CTE program influences the preparedness of these students for postsecondary educational and employment opportunities.

Tables 1, 2, and 3 below demonstrate the alignment between the interview questions and the research questions for each participant group.

Table 1

Interview Protocol 1 for CTE and Special Education Teachers

Interview Questions	RQ1	RQ2	RQ3
1. Please describe the CTE courses that you teach or the special education services that you provide and explain why you believe they are important in preparing ASD students for postsecondary educational and/or employment opportunities.	X		
2. Explain why you believe the CTE courses that you teach are important in preparing ASD students for postsecondary educational and/or employment opportunities.			X
3. How do you integrate technology into your instructional activities?			X
4. What do you believe about the role that technology plays in the lives of students identified with ASD?			X
5. Do you believe technology has improved learning for students identified with ASD? Why or why not?		X	
6. How do you differentiate instruction for students identified with ASD in your classroom?			
7. How do you provide instruction for ASD students that helps prepare them for postsecondary educational and/or employment opportunities?	X		

Table 2

Interview Protocol for Parents of Students with ASD

Parent Interview Question	RQ 4
1. What special education services that your child received at the high school	X
2. Please describe how CTE courses that your child completed prepared them for college or postsecondary activities??	X
3. How would you describe your ASD child's success in obtaining education and/or employment opportunities beyond high school as a result of their participation in these CTE courses and special education services at this high school?	X
4. Has technology use in these CTE courses improved educational and/or employment opportunities for your ASD child beyond high school? Why or why not?	X
5. What issues or concerns has your ASD child faced concerning educational opportunities beyond high school?	X
6. What issues or concerns has your ASD child faced concerning employment opportunities beyond high school?	X
7. How should teachers help your ASD child improve their learning in CTE courses and special education services?	X

Table 3

Interview Protocol for High School Graduates with ASD

Graduate Interview Questions	RQ5
1. Please describe the CTE courses that you completed and special education services that you received at this high school?	X
2. Please describe the special education services that you received at this high school.	X
3. How would you describe your success in obtaining education and/or employment opportunities as a result of your participation in these CTE courses and special education services at this high school?	X
4. Has technology use in these courses improved your postsecondary educational and/or employment opportunities? Why or why not?	X
5. What issues or concerns have you faced concerning educational opportunities beyond high school?	X
6. What issues or concerns have you faced concerning employment opportunities beyond high school?	X
7. How should teachers help you improve your learning in CTE courses and in special education services	X

Procedures for Recruitment, Participation, and Data Collection

Before recruitment began, the assistant superintendent for curriculum for the school district to granted permission to conduct the study at the selected high school in the district. The assistant superintendent signed a letter of cooperation, indicating the willingness of the school district/s to be the research partner (Appendix A). The high school principal signed letter of cooperation indicating their willingness to be my research partner (Appendix B). The principal placed letters of invitation in the teacher's school campus mailboxes by a person of their choosing. Only teachers who met the inclusion criteria were invited to participate in this study. In this manner, participants remained anonymous and still only participated if they wished to help with the study. All of the participants who responded were selected due to the small population of school.

Participation

In relation to participation, the principal or a delegated individual of the principal's choosing invited all CTE and special education teachers who met the inclusion criteria by placing an invitation letter and an attached consent form in their campus mailboxes explaining the purpose of the study (Appendix C). The invitational letter included a request for an email address and phone number on the consent form if they were interested in participating in this study. All potential participants returned the consent forms to me via email. All participants were selected due to the small population.

Data Collection

After the participants were selected, I began the data collection process by contacting participants by phone or email to schedule the individual interviews. Using the interview protocols, I conducted all interviews with teachers and administrator by telephone during non-instructional hours. All interviews were audio recorded. At the end of the interviews, I thanked participants. I began to code all interviews which took seven days. As I completed each transcript I emailed it to the interviewee and asked them to review their individual transcriptions for accuracy.

Document Collection

School district documents described the goals and structure of the high school CTE program, including a description of the courses that were offered during 2015-2016 and their outcomes as well as any specific competitions and activities that teachers in this program sponsored during the year of this study. The department CTE chairperson at the high school or

the school website was the source for these documents. I also collected documents related to how special education services are provided for students identified with ASD at this high school.

Data Analysis

For this single case study, I analyzed data at two levels. At the first level, I transcribed the interview responses from all participants. Then I coded all of the transcripts, using line-by-line coding that Charmaz (2006) recommended for qualitative research in order to stay as close to the data as possible. I examined the coded data to construct categories, using the constant comparative method that Merriam (2009) recommended for qualitative research. I used a content analysis (Merriam, 2009) to review the documents, which involved describing the purpose, structure, content, and use of each document.

At the second level of analysis for this case study, I examined all categorized data across all sources, again using the constant comparative method that Merriam (2009) recommended for qualitative research to determine emergent themes and discrepant data that formed the key findings or results for this study. The results were analyzed relation to the research questions and interpreted in relation to the conceptual framework and the literature review.

Issues of Trustworthiness

The trustworthiness in qualitative research is important because readers need to have confidence in the results. Merriam (2009) noted that qualitative researchers needed to ask these questions: Can this study be repeated with the same results? Has rigor been applied? Are the conclusions reliable? And is the researcher ethical? Merriam also noted that people are not static so the exact same results are not possible. Thus, all qualitative research must be rigorous and follow clearly described procedures for data collection and analysis. Merriam also suggested

using a planned design with accepted standards for scientific methods and rigor in order to conduct a trustworthy study. Therefore, the constructs of credibility, transferability, dependability, and confirmability are critical to consider in developing a planned design for conducting trustworthy qualitative research.

Credibility

Merriam (2009) defined credibility in qualitative research as congruency or how the research findings match reality. Merriam also recommended that researchers should use the following strategies to improve the credibility of qualitative research: triangulation, member checks, and adequate time in data collection, reflexivity, and peer review. For this study, I used the strategies of triangulation, member checks, and adequate time in data collection to improve the credibility of this study. I used triangulation by comparing and contrasting multiple sources of data as well as member checks by asking the participants to review the tentative findings of this study for their credibility. I also spent enough time collecting data until reaching a saturation point.

Transferability. For qualitative research, Merriam (2009) defined transferability as the extent to which the findings of a study can be applied to other situations. Merriam recommended that researchers use the strategies of rich, thick description and either maximum variation or typicality of sampling to support the transferability of qualitative research. For this study, I used the strategy of rich, thick description by describing the settings, participants, and findings in as much detail as possible to allow the transfer of findings for this study to other similar populations (Merriam, 2009). I also used the strategy of typical sampling by selecting a CTE program and its related courses that was similar to other CTE programs in this southwestern state.

Dependability. Merriam (2009) defined dependability as consistency or the extent to which the findings can be replicated and yield the same results. For qualitative research, Merriam recommended that researchers use the following strategies to improve dependability: triangulation, peer examination, clarification of the researcher's position, and the audit trail. For this study, I used the strategy of triangulation by comparing and contrasting multiple sources of data, including interviews with teachers and an administrator and documents related to the CTE program. To utilize the strategy of peer examination, I asked members of my dissertation committee to review the raw and analyzed data to determine the credibility of the findings. Finally, I used a researcher's journal to provide an audit trail in order to keep track of the decisions and interactions that I made during the research process.

Confirmability. For qualitative research, Merriam (2009) recommended that researchers use the strategy of reflexivity or clarification of the researcher's position to improve the confirmability or objectivity of the study. For this study, I used this strategy by maintaining a researcher's journal to make an inventory of my personal expectations while conducting this study, including reflections on any potential biases that I may have had about how CTE teachers should meet the needs of students diagnosed with ASD.

Ethical Procedures

The trustworthiness of qualitative research depends on the ethics of the researcher (Merriam, 2009; Patton, 2002). In seeking trustworthiness, Merriam noted that qualitative researchers in particular must adhere to rigor, accurate observations, the use of rich, thick description, and accurate data collection and analysis. Patton noted that qualitative researchers should create a "track record" by which other scholars will judge their findings (p. 570).

In order to conduct an ethical study, I first submitted an application to the Institutional Review Board (IRB) at Walden University in order to obtain approval to collect data. After receiving this approval, I began data collection. All potential participants were asked to sign consent forms, which allowed them to understand the purpose of the study and the data collection process. To protect the data, I stored it in a locked safe in a secured location and on a password-protected computer. I treated all participants with respect and kept their responses confidential. I also used pseudonyms for all information that was deemed confidential. Examples include the state, the school district, the high school, and the participants.

Summary

Chapter 3 included a description of the research method used to conduct this study. This chapter also included a description of the research design and rationale and the research questions and a discussion of the role of the researcher in this single case study. In addition, this chapter included an explanation of the data collection process that was used to conduct individual interviews with CTE and special education teachers and administrators. Documents related to the CTE program were also collected. In addition, the data analysis plan and issues related to the trustworthiness of qualitative research and to ethical procedures were described.

Chapter 4: Results

The purpose of this study was to explore how a CTE program impacts the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities. To accomplish this purpose, the central research question with related research questions were developed.

Central Research Question: How does a CTE program impact the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities?

Related Research Questions

1. What do CTE and special education teachers believe about how the CTE program influences the preparedness of ASD students for postsecondary educational and/or employment opportunities?
2. How do CTE and special education teachers believe they differentiate instruction to meet the individual needs of ASD students in preparing them for postsecondary educational and/or employment opportunities?
3. What do CTE and special education teachers believe about the role technology plays in preparing ASD students for postsecondary educational and/or employment opportunities?
4. What do administrators believe their role is in helping ASD students achieve success?
5. What do documents reveal about the impact of CTE programs on the preparedness of ASD students for postsecondary educational and/or employment opportunities?

This chapter is about the results of this study. In this chapter, I describe the setting for this study, the participant demographics, and the data collection procedures. In addition, I describe the procedures used to analyze the interview data as well as documents. I also describe the strategies used to improve trustworthiness of this qualitative research and the results in relation to the research questions.

Research Setting

This single case study was conducted in the Smith School District (pseudonym), which is located in a southwestern state. This school district is located in Lowery (pseudonym), a city that is both suburban (89%) and rural (11%). Since 2000, the population change was +51.0% (http://www.city-data.com/zips/75165.html). The total population in 2014 was 32, 344, including 15,478 males and 16,866 females, and the median income was $51, 252 (www.city-data.com/city). A breakdown of the Lowery population by race and ethnicity is presented below in Table 4.

Table 4

Percent and Number by Race and Ethnicity for Lowery Population in 2012

Race	Percent	Number
White	59.2%	18,477
Hispanic	25.5%	7,945
Black	13.4%	4,169
American Indian	0.6	194
Native Hawaiian and Other	0.4	121
Asian	0.5	164
Other races	0.01	4
Two or more races	0.9 %	281

Data from Table 3 presents a diverse picture of the racial and ethnic demographics of its citizenry. Even though the majority of the population was reported as White in 2014, almost 40% of the population was Hispanic or Black in terms of racial and ethnic demographics, which is a sizable percentage of the population.

The Smith School District provided a K-12 public school education for the children of Lowery. In 2014-2015, this school district provided seven elementary schools, two middle schools, and one traditional high school challenges. Lowery High School (pseudonym) was the traditional high school and in 2014-2015, it included 1,980 students in Grades 9-12, with a teacher student ratio of 14:1 (www.publicschoolreview.com). In 2014-2015, 53% of the students were eligible for free lunches, and 7% of the students were eligible for reduced lunches (https://www.publicschoolreview.com/texas/waxahachie). Lowery High School offered dual enrollment programs with early college placement as the goal (wisd.org, 2016) as well as a standard high school diploma as part of a comprehensive academic program that includes courses in the arts, English language arts, mathematics, physical education, science, social studies and economics, speech, and foreign language (wisd.org, 2016).

In 2014-2015, the special education population was 344 students, and in 2015-2016, the special education population increased to 366 students. Special education services included audiology, counseling, interpreting, occupational therapy, orientation and mobility, parent training, physical therapy, psychological services, recreation and rehabilitation counseling, school health, speech-language therapy, and transportation (wisd.org).

Career and Technical Education Program

In 2014-2015, the career and technical education (CTE) program at Lowery High School included 16 career clusters, which provided a broad range of career paths across many disciplines (wisd.org), These 16 career clusters included agriculture, food, and natural resources, architecture and construction, education and training, arts, a/v technology and communications, business, management and administration, finance, government, and public administration, health science, hospitality and tourism, human resources, information technology, law, public safety, corrections and security, manufacturing, marketing, sales, and service, science, technology, engineering and mathematics, and transportation, distribution and logistics (wisd.org). These 16 clusters were aligned with the Association of Career and Technical Education (ACTE) guidelines for college readiness (ACTE.org). Students selected a career cluster of interest and were placed into related classes with the end goal of certification in career readiness (wisd.org). The dual enrollment program provided CTE students with early college placement options by encouraging students to earn college credits while attending high school (wisd.org). In 2015-2016, 642 students were enrolled in the CTE dual credit program (www.wisd). The CTE program during this school year included 22 teachers who provided instruction to students. The CTE program also offered the following certifications or licenses: Servsafe, Pharmacy Technician, Emergency Medical Technician (EMT), Cosmetology Beautician, Texas Jr. Master Gardener, National Center for Construction Education and Research core (NCCER), NCCR Industrial Welding, and NCCER Carpentry and Plumbing (wisd.org).

In relation to special education services for the CTE program at Lowery High School, the same services provided in special education classes were also provided in CTE courses. These

services included audiology, counseling, interpreting, occupational therapy, orientation and mobility, parent training, physical therapy, psychological services, recreation and rehabilitation counseling, school health, speech-language therapy, and transportation (wisd.org).

Participant Demographics

Participants for this study included three CTE teachers, two special education educators and one administrator, who was the CTE program coordinator. CTE teachers were selected according to the following criteria: (a) must be employed as CTE teachers at the proposed high school research site, (b) must teach CTE courses that include technology, (b) must teach CTE courses that include students diagnosed with ASD, and (c) must teach CTE courses that include skill sets based on industry standards for postsecondary education or career attainment. Special education teachers were selected according to the following inclusion criteria: (a) must be employed as special education teachers at the proposed high school research site, (b) must provide instruction for students diagnosed with ASD in relation to their IEP, (c) must teach students technology skills in a manner consistent with postsecondary education or career attainment, and (d) their students identified with ASD must be enrolled in a transition program in which technology is used. Administrators were selected according to the following inclusion criteria: (a) must have direct contact with the teachers of special needs students, (b) must have contact with the special needs teachers, and (c) must be involved in the implementation of policies regarding CTE and ASD students. All participants were provided a pseudonym for the purpose of data reporting and analysis.

Irene had been an English and CTE teacher for 21 years in the Lowery School District, and she had taught English 1, English 2, and English 3. Irene also taught CTE courses titled Parenting, Food Production Management, Services Co-operative, and Diversified Co-operative.

Marie had been a CTE teacher for 3 years at Lowery High School. Marie taught CTE courses titled Restaurant Management, Nutrition, and Interpersonal Studies. The Restaurant Management course allowed students to earn certification toward a degree in that area.

Eric had been a CTE teacher for 15 years in the Lowery School District. Eric taught CTE courses titled Construction and Construction Management, and both courses included special education students. Eric's classes included opportunities to earn certifications in construction.

April was special education teacher who served as a transition specialist for special education students at the high school, which meant that she coordinated activities or courses of study in high school that helped students move toward their post high school goals, including students in the CTE program. April had been employed by the Lowery School District for 29 years. April was also a content mastery teacher, which meant that she taught learning strategies to district teachers.

Helen was a special education teacher who had taught in the Lowery School District for 20 years. For the first 9 years of her teaching career, Helen was an English teacher. For the past 11 years, Helen has been a content mastery teacher working with special education students.

Sandy had taught a marketing course in the CTE program for 6 years and had been an administrator for 2 years in the CTE program. All of Sandy's teaching and administrator experience had been in the Lowery School District. Sandy had earned licenses in the following areas: EC-12 principal, EC-12 school counselor, 8-12 marketing education, 6-12 business

education, and 4-8 generalist, which allowed her to teach any subject and some electives. As a CTE program administrator, Sandy's job was to insure student access to CTE classes regardless of grade point average, handicapping condition, or other issues of concern.

Data Collection

Data were collected for this single case study of the CTE program at Lowery High School from August, 2016 through November, 2016. Multiple data sources included interviews with three CTE teachers, two special education teachers, and one administrator and documents related to the CTE program.

Interviews

Participants used a telephone during non-instructional hours for each interview. The first individual interview was conducted with Marie, a CTE teacher, on August 8, 2016 at 2:27 p.m. and lasted approximately 19 minutes. The second interview was conducted with Sandy, an administrator, on August 24, 2016 at 2:27 p.m. and lasted approximately12 minutes. The third interview was conducted with Eric, a CTE teacher, on August 25, 2016 at 9:55 a.m. and lasted 7 minutes. The fourth interview was conducted with Irene on August 25, 2016 at 10:15 a.m. and lasted 10 minutes. The fifth interview was conducted with April, a special education teacher, on August 31, 2016 at 2:09 p.m. and lasted 4 minutes. The sixth interview was conducted with Helen, a special education teacher, on September 9, 2016 at 1:57 p.m. and lasted 5 minutes. Table 5 below is the schedule of the aforementioned interview times.

Table 5

Interview Schedule

Interview Schedule for Participants		
Interviewee	Date	Duration
Marie	8-24-2016	19 minutes
Sandy	8-24-2016	12 minutes
Eric	8-25- 2016	7 minutes
Irene	8-25-2016	10 minutes
April	8-31-61	4 minutes
Helen	9-9-16	5 minutes

One of the reasons why some of these interviews were brief may have due to the fact that I conducted these interviews by telephone, which may have limited participant responses because of the lack of interactions associated with conversational in-person communication. One more reason may have been due to the lack of context clues that were absent during the interview process such as facial expressions, body language, and posture. In addition, my inexperience as a researcher with the nature of interviewing protocols may have resulted in my failure to ask probing questions when needed. However, I asked some additional probing questions via email to address any gaps that appeared in the interview responses of participants. Some examples are What is a generalist certification? I know you are an administrator, but what subjects did you teach?

Documents

Documents related to the CTE program and the special education program at Lowery High School were also collected. The first document that I collected was titled the *Lowery School District Career and Technical Education Program,* which I collected from the district website (wisd.org) on October 25, 2016. The second document that I collected was titled the *2014-2015 Southwestern District Academic Performance Report*, which I retrieved from state website (www. http://tea.texas.gov) on October 25, 2016. The third document that I collected was titled the *2014-2015 Southwestern State Lowery Campus Academic Performance Report*, which I retrieved from the state website (www. http://tea.texas.gov) on October 25, 2016. The fourth document that I collected was titled the *2016 District Profile (School Year 2014-15) State Performance Plan Indicator Targets,* which I retrieved from the state education agency website (www. http://tea.texas.gov) on October 25, 2016. Other documents that I collected included the *Lowery High School Student Handbook 2015-16*, which I retrieved from the school website (www. http://tea.texas.gov) on November 5, 2016 and the *2014–15 School Report Card Lowery School District*, which I retrieved from the state website (www.southwesternstate.org) on November 10, 2016. I also collected the *Comprehensive Biennial Report of Southwestern State Public Schools*, which I retrieved from the state website (www. http://tea.texas.gov) on November 10, 2016, and the *State Performance Plan Indicator Targets: Lowery School District*, which I retrieved from the state website (www. http://tea.texas.gov/) on November 10, 2016.

Data Analysis: Level 1

For this single case study, I analyzed data at two levels. At the first level, I transcribed the interview responses from all participants by plugging the USB drive of my Sony-IDCPX-440

digital audio recorder into the USB drive on my computer, which allowed me to listen to the recording at a slower speed and enter the audio as text into a Microsoft Word document. Once this transcription was accomplished, I coded all of the transcripts, using line-by-line coding that Charmaz (2006) recommended for qualitative research in order to stay as close to the data as possible. I examined the coded data to construct categories, using the constant comparative method that Merriam (2009) recommended for qualitative research. I used a content analysis (Merriam, 2009) to review the documents, which involved describing the purpose, structure, content, and use of each document.

Analysis of Interview Data

The first teacher interview question was: *Please describe the CTE courses that you teach or the special education services that you provide.*

The three CTE teachers briefly described their courses. Marie stated, "I teach several CTE courses: restaurant management, interpersonal studies, and lifetime nutritional enrollment. I personally believe all three of these courses are important because they teach real life skills." Marie added that in the restaurant management course, she taught students how to use a POS system, how to interact with customers, and how to be professional in a workplace environment. Marie also noted that in the interpersonal studies course, students learned how to develop positive family relationships, how to read people, and how to sympathize with others. Marie added that in the nutrition course students learn how to make good choices about food on a daily basis and how to lead a healthy life. The second CTE teacher, Irene, noted that because students work one-on-one with educators in a workplace environment, she believed that students were learning skill sets which they will use in the future as teachers. Irene added,

> There are career tech classes designed for students that want to become teachers, and it's similar to student teaching for high school kids. They are placed with teachers in our district to work with kids hands on, one-on-one in their classrooms with them.

The third CTE teacher, Eric, believed that the time management skills associated with the construction management course were valuable skills because "in construction management, they have to manage a project to completion. It can be a small storage building or a house." Thus, all CTE teachers believed that real life experiences in CTE courses were critical to student engagement.

The two special education teachers also briefly described their services. Helen worked as a tutor for students who qualified for special education services. Helen also worked as a content mastery teacher for the CTE program at this high school. Helen stated, "I am the content mastery teacher so I provide support to the CTE classes, [which includes] all CTE classes at the ninth-grade level." April worked as the transition specialist for special education students. April reported that she helped special education students to attend either postsecondary schools or trade schools.

The second interview question was: *Explain why you believe the CTE courses that you teach are important in preparing students with ASD for postsecondary educational and/or employment opportunities.*

The CTE teachers believed that the courses they taught were important in preparing students with ASD for postsecondary options. Marie believed that social interaction creates relationships and promotes a learning environment. Irene believed her classes provided hands-on experience in the education field. Irene stated, "These experiences allows students to make

decisions regarding a field of interest for postsecondary goals." Eric believed that all students, regardless of special learning needs, should enroll in his classes because they improve home repair skills for students. All of the CTE teachers believed their courses were essential in providing postsecondary workplace skills that improved employment opportunities for ASD students.

One of the special education teachers also believed that the CTE courses helped prepare students with ASD for postsecondary options. Helen stated, "I think the CTE courses give an opportunity to explore other options out there in the working world that they may not already be aware of, and we may be finding that they have a gift in a certain area that without a CTE class they would not know they had." However, April, also a special education teacher, did not respond to this question, stating that "I am not in the instructional setting." Thus, one of the special education teachers believed that the CTE program for ASD students may have helped them discover their talents in a certain CTE area they did not know about.

The third interview question was: *How do you integrate technology into your instructional activities?*

CTE teachers believed technology integration was important to student engagement in the instructional activities, and they also believed that these courses provided skills sets necessary to support student interactions. Marie reported that she integrated technology into class activities in a variety of ways, such as through note taking activities, PowerPoint presentations, concept enhancement activities, and class interactions. Irene had adopted a more technocentric approach. Irene stated, "We adopted Google classroom, but in one of my classrooms, everything is based on a webpage, and they do digital portfolios as well as submit all their documents

through Google documents to me." Eric believed technology is not integrated but instead exists, for without technology there would not be a construction technology curriculum. Eric believed that a strong pro-technology stance existed in CTE program because teachers had integrated many different technology skills sets into each of these classes.

Special education teachers expressed similar views about technology integration. Helen noted that the types of technology integration depended on the teacher she was working with on any given day. Helen stated, "Usually that is dictated by the teacher of record; however, I utilized Chrome book on a regular basis to aide in assisting students' research of different topics or different careers." Even though April was not in an instructional setting as a special education transition specialist and content mastery teacher, she noted that transition planning involved the use of technologies in order to track student improvement in learning. In working one-on-one with students to set realistic goals, April used technology to help these students keep track of their success.

The fourth interview question was: *What do you believe about the role that technology plays in the lives of students identified with ASD?*

All of the CTE teachers agreed that technology enhanced the educational experiences for students diagnosed with ASD. Marie believed that technology could be used to alleviate the stress and overwhelming feelings that ASD students had about class assignments and homework. Marie also noted that teachers understood the stress ASD students felt, and she believed that technology could provide "down time" between class assignments. Irene noted that technology allowed freedom of expression for students identified with ASD because they were not limited to one method of assignment production, and therefore, they could be more creative. Helen

believed that because learning styles differ for each student, technology encourages clear avenues of communication for these students. Eric added, "I believe that technology is crucial, and that from the educational stand point we too many times tie technology to the computer when technology is everything that we use. We use table saws, we use band saws, those are also technology." Thus, CTE teachers believed that technology provided ASD students with various methods of communication, expression, and assignment production that gave them a positive educational experience.

Special education teachers shared similar opinions about the role that technology plays in the lives of ASD students. Helen believed technology was "an invaluable tool" for ASD students in communicating with others. Helen noted that especially for nonverbal students, technology provides communication methods that these students might not have without it. Special education teachers also believed that experiences with technology are necessary to improve learning and communication skills for ASD students. April added, "I think sometimes that their main mode of communication is through a device, maybe not verbally being able to tell teachers or even their peers some of their inner thoughts" April also noted that ASD students are "very tech savvy," which improves their academic and interpersonal skills.

The fifth interview question was*: Do you believe technology has improved learning for students identified with ASD? Why or why not?*

CTE teachers believed that technology improved learning for ASD students. Marie stated. "So yes, I believe in technology with kids with ASD [but] it really depends on their environment." Marie added that she observed parents and some teachers using technology as means to keep students busy as a tool to placate them instead of as a learning tool. Irene believed

that technology addressed the different learning styles of students because it allowed for unlimited formats for students to produce assignments. Eric also agreed that technology had improved learning for ASD students. Eric stated, "The use of technology absolutely improves [their] ability to do things." In the construction environment, Eric noted that many technologies are utilized, which allows students to choose those technologies that suit their learning styles.

Special education teachers were adamant that technology is necessary and has improved learning for students diagnosed with ASD. Helen stated, "I would say yes. In one respect, it does aide in instruction as most students find typing on a keyboard easier than the pen and paper route. So, I feel like technology is going to be a great tool for them." April believed that communication technologies are necessary because many ASD students are non-verbal. Thus, both special education teachers believed that technologies had a positive impact on the learning and communication skills of ASD students.

The sixth interview question was: *How do you differentiate instruction for students identified with ASD in your classroom?*

CTE teachers described how they differentiated instruction for students identified with ASD. Both teachers described starting with the stated accommodations in the ASD student's individual education plan or IEP and then using additional instructional strategies to suit each student. For example, Marie utilized verbal cues. Marie stated, "Constant reminders [like] stay on task [or] like I really need you focused, [or] I really need you to get through this." Irene used spatial positioning in the classroom to create a calm environment for these students. Irene noted that sounds and vibrations would upset students, so she strategically placed ASD students in areas of the classroom that were more conducive to their learning. Eric reviewed skills sets one-

on-one with ASD students until they demonstrated comfort levels in using machines, tools, and instructions.

One of the special education teachers, Helen, described how she differentiated instruction for ASD students. Helen explained that she used chunking of information, concepts, and objectives to differentiate instruction. Helen stated, "Typically, I would break the assignment down into smaller portions that are more manageable and focus on concepts and make sure a concept is mastered before moving to the next objective." April, the special education transition specialist, did not provide instruction in a classroom environment, and therefore, she did not answer this question.

The seventh interview question was: *How do you provide instruction for students identified with ASD that helps prepare them for postsecondary educational and/or employment opportunities?*

CTE teachers described how they provided instruction for ASD students that they believed was helpful in their preparation for postsecondary educational and employment opportunities. These teachers noted that they taught goal achievement and planning for the future, and they used real life examples to prepare these students for life in the working world. Marie used simulations and demonstrations to bring skills sets to the forefront of the CTE experience for ASD students. Students learned specific skills related to customer service, food handling, and table settings, which allowed them to gain experience for future employment in the food or dining industries. Irene provided instruction in goal attainment for students with ASD enrolled in junior and senior CTE classes. Irene stated, "As I have them as seniors, we try to look at different options for what's required if you do that, how long will that take, really breaking that

down specifically into: Are you going to go to this junior college? What kind of class[es] would you maybe be taking?" Eric required ASD students to be responsible for their projects and related completion dates. Eric believed when ASD students completed construction classes, they had mastered the skills sets necessary to gain employment in the construction field.

Both special education teachers believed that they helped ASD students prepare for postsecondary education and employment opportunities. Helen believed that all CTE classes prepare ASD students for the workplace because students are given opportunities to explore their strengths and weaknesses, which encourages them to grow in a technology driven workplace. Both special education teachers helped ASD students identify these areas and in turn created a relationship with them that was built on trust and allowed them to grow. As a special education transition specialist, April worked with students and their parents to define student interests and skills sets through individual assessments. April stated, "I give an interest and preference assessment, and we define their interest areas. We also have a variety of meetings with parents and the students." Thus, special education teachers believed that they prepared ASD students for postsecondary achievement.

Table 6 below is a summary of categories that I constructed from the coded interview data for the CTE and special education teachers.

Table 6

Summary of Categories for CTE and Special Education Teacher Interviews

Interview Questions	Categories
IQ1: Description of CTE courses	Teaching courses about customer service, construction, education, restaurant management, interpersonal studies, nutrition, education training, POS systems, and wellness
	Believing in importance of CTE courses for developing such

IQ 2: Importance of CTE courses in preparing ASD students for postsecondary educational and/or employment opportunities	life skills as home repair, personal growth and development, and social interactions
IQ3: Integration of technology into instructional activities	Integrating technology by using Chrome books, computers, google classroom, and web quests
IQ4: Role technology plays in lives of ASD students	Aiding students in improving communication skills, engagement in instruction, motivation to learn, and tactile skills
IQ5: Using technology to improve learning for ASD students	Improving learning through emphasis on assignment production, depth of knowledge, environment, learning styles, communication skills, task quality
IQ6: Differentiating instruction for ASD students	Differentiating instruction by chunking information and emphasizing content mastery, one-on-one communication, and proximity to students
IQ7: Providing instruction for ASD students to prepare them for postsecondary educational and/or employment opportunities	Providing instruction related to career identification, construction skills, employability skills, exploration of learning strengths and weaknesses, parent involvement, preference assessments, and career simulation activities

The first administrator interview question was: *What areas of the CTE program need improvement to insure ASD students are successful?*

Sandy believed that specific areas in of the CTE program could always be improved. Sandy noted that technology advances slowly in education due to financial constraints. Sandy explained, “I think there are always things that could be done differently or implemented as technology advances. Sometimes it doesn't advance as quickly in a school setting because you are dealing with money from government.” In relation to special education students in the classroom setting, Sandy also believed that some classes may be more difficult than others for ASD students, and therefore, peer tutoring should be implemented. Sandy believed that peer tutoring would help ASD students learn while the teacher was providing instruction to all students and working one-on-one with some students. Sandy explained this type of environment

would be conducive the success of ASD students. Sandy also believed that more technology would be helpful for ASD students but may not be necessary in the high school setting. Sandy stated,

> I think for high functioning [ASD students], I don't think maybe more technology [is needed]. I don't think we're lacking in technology. I just think maybe giving them more challenging work more challenging assignments to add in to what they are already learning.

Sandy believed that more challenging activities at the high school level are needed for ASD students, not more technology. Sandy added, "I just think maybe giving them more challenging assignments to add to what they are already learning might help them to be more successful." Thus, Sandy believed that more challenging assignments should be available to the autistic students as long as they are ready for the challenge.

The second administrator interview question was: *How is the CTE program broadening its appeal to entice ASD students to take CTE classes?*

Sandy believed the attraction of the CTE program is the real-life experiences that ASD students have in the classroom, which makes the CTE program so popular. Sandy stated, "I think the biggest draw for CTE is that it teaches life skills, not just how add to or how to do algebra." Sandy believed that learning skills necessary to gain employment and to be able to perform job related tasks is what draws ASD students to the CTE program. Sandy added,

> If an autistic student is going to be working in any shape or fashion, any type of CTE program should appeal to them because it can help them in classes [in which] they are looking to learn soft skills in addition to technical skills and in addition to technical

knowledge, so you are bringing in three areas that they really need if they are going to be career ready.

Thus, Sandy believed that the CTE program appeals to ASD students because they learned skills sets pertinent to the employment opportunities available to them.

The third administrator interview question was: *How can strategic alliances work with the CTE program to benefit ASD students?*

Sandy believed that alliances with business have been successful in providing training and jobs for ASD students. Sandy stated, "We have an advisory committee that is made up of government, education, community, and industry, and we want to increase the number of internships students have, and we strive to have those internships turn into careers." Sandy added that explaining the benefits of hiring ASD students with experience is more cost effective than hiring individuals from the community through a want ad or job board. Sandy stated, "Instead of going out and finding some job off the street, high school students are a lot easier to train than people that have been in the workforce for a long time and so the ability to train somebody who [is] more trainable is really beneficial." Thus, Sandy believed that strategic alliances were beneficial to schools and businesses alike. Businesses gain skilled employees, and students gain employment.

The fourth administrator interview question was: *How can the school district help improve socialization skills sets for ASD students?*

Sandy believed that the least restrictive environment (LRE) and group work were efforts school district educators have used to help ASD students improve their socialization skills. Sandy noted, "I think one of the biggest things that has been done lately is LRE so [ASD]

students can be supported outside of an inclusion class." Sandy believed that ASD students need to enroll in general education classes. Sandy added, "Sometimes they may not be on the academic level of the class they are in, but they are there because they are with their peers." Sandy also believed that ASD students who work in teacher-selected groups rather than peer-selected groups are more effective in improving their socialization skills. Sandy believed that group work is very important in developing socialization skills for ASD students. Sandy added that student-selected groups are detrimental to the socialization skills of ASD students because students do not select other students that represent a mixture of intelligences. Sandy noted, "You don't want to always let students choose their own groups [because] you're going to have a really high group and a lower group and [a] middle group, and so I told [CTE teachers] [to] try to create groups where you have multiple levels of intelligence." By creating groups of different academic levels, Sandy believed that everyone has an equal chance to learn from one another, including ASD students.

The fifth administrator interview question was: *What are your roles in working with CTE educators and special needs educators who work with ASD students?*

As the CTE program access coordinator, Sandy reported that she attended all admission, review, and dismissal (ARD) meetings. These meetings allow parents and educators to make informed decisions regarding the IEPs for ASD students. Sandy noted that she has worked with special education personnel to help with class selection for ASD students. Sandy stated, "My whole job is working with the special education system and special populations to insure students have equal access to all classes." Thus, Sandy's major role was working with teachers,

parents, and ASD students to coordinate these efforts so that these students achieved success in the CTE program.

The sixth administrator interview question was: *What is the most difficult problem going forward considering the educational needs of ASD students?*

Sandy believed that teacher training is important in understanding the academic needs of ASD students. Sandy stated, "I think a lot of it is educating teachers and students, but more importantly of what autism is and how they can most help their students in the class." Sandy believed that a major difficulty in working with ASD students stems from the fact that every person is unique and has different learning needs. Sandy believed that all students are unique, and they all learn differently so training teachers to work with these students is of paramount importance. When preparing, and delivering lessons for ASD students, teachers should consider how to be effective when teaching these students. Sandy stated, "It's not changing lessons; it's just verbalizing [differently] and offering things for them that can be really beneficial." Thus, Sandy believed that teacher training was the biggest need in working with ASD students.

The seventh administrator interview question was: *If you could change anything in the CTE program to meet the needs of students with ASD, what would you change, and why?*

Sandy believed that teacher training is key to helping teachers work with ASD students. She added, "Giving teachers strategies in their classroom for high functioning [ASD students] to increase the challenge and for low functioning [ASD students] to increase their challenge would be something that would be beneficial." Sandy believed that teachers get nervous having special education students in their classrooms because they know that they lack training and strategies to

help these students be successful. Thus, Sandy believed that teacher training was one of the most important areas for CTE teachers to address at this high school.

Table 6 is a summary of the categories that I constructed from the data analysis for the CTE administrator interview.

Table 7

Summary of Categories for Administrator Interview

Interview Questions	Categories
IQ 1: What areas of the CTE program need improvement to insure ASD students are successful?	Needing improvement in providing technology, more peer tutoring, and better funding Understanding 16 clusters that make up CTE
IQ 2: How is the CTE program broadening its appeal to entice ASD students to take CTE classes?	Emphasizing real-life skills needed in the workforce
IQ3: How can strategic alliances work with the CTE program to benefit ASD students?	Benefiting ASD students by helping them obtain community internships and jobs
IQ4: How can school district educators improve socialization skill sets among ASD students?	Using least restrictive environment (LRE) and emphasizing teacher-designed group work in CTE classrooms
IQ5: What are your roles working with CTE educators, and special education teachers who work with ASD populations?	Ensuring that ASD students have access to all CTE classes
IQ6: What is the most difficult problem going forward considering the educational needs of ASD students?	Believing teachers need to be trained about how to provide effective instruction for ASD students
IQ7: If you could change anything in the CTE program to meet the needs of ASD students, what would you change, and why?	Providing CTE teachers with instructional strategies for high functioning and low functioning ASD students

Analysis of Document Data

The first document that I collected from the school district website was the *Lowery School District* (LSD) *Career and Technical Education Program Overview*. The purpose of this document was to describe the CTE program to administrators, teachers, and counselors. Administrators used this document to determine personnel needs and schedules for the coming

year. Teachers used this document to plan course curriculum, instruction, and assessment. Counselors used this document to plan students' tentative schedules. This document was organized according to the following topics: (a) the 16 career clusters that the CTE program offered, (b) principles of the CTE program, (c) professional communications for students, (d) practicums for students, and (e) a brief description of the content of all CTE courses, presented alphabetically. The 16 clusters included (1) agriculture, food, and natural resources, (2) architecture and construction arts, (3) a/v technology and communications, (4) business management and administration, (5) education and training, (6) finance, (7) health sciences, (8) hospitality and tourism, (9) human services in relation to cosmetology, (10) human services, (11) information technology, (12) law, public safety, corrections, and security, (13) manufacturing, (14) science, technology, engineering, and mathematics or STEM, (15) transportation distribution and logistics, and (16) career preparation.

The second document that I collected was the *2014-2015 Southwestern State Lowery Campus Academic Performance Report*. This document was developed to inform interested stakeholders at Lowery High School, including educators, parents, and community members, about student performance for the Lowery School District. All high schools across the state received an individual report with performance indicators in mathematics, science, and reading from the state department of education. This document was used by school district and high school educators to compare and contrast student achievement results at Lowery High School on state performance indicators to results from other high schools. Anyone interested in student achievement could access this report from the state department of education website. Administrators, teachers, counselors, and parents used this report to find out how students at

Lowery High School performed against state indicators and to compare and contrast their results to other schools in the district and in the state. Results for Lowery High School were as follows: (a) 17% of special education students in English 1 were proficient on the state English standards compared to a state average of 71%, (b) 22% of special education students in English 2 were proficient on the state English standards compared to a state average of 72%, (c) 33% of special education students in Algebra I were proficient on state mathematics standards compared to the state average of 81 %, (d) 52% of special education students were proficient on state science standards compared to the state average of 91%, and (d) 19% of special education students were proficient on state reading standards compared to the state average of 77%. These results are relevant to the CTE program at this high school because ASD students need proficient English, mathematics, and reading skills to do well in CTE classes, see table 8 below.

Table 8

State Test Result Comparisons

Lowery High School State Test Indicators		
Subjects	Special needs Scores	State Test Levels
English 1	17%	71%
English 1	22%	72%
Algebra	33%	81%
Science	52	91%
Reading	19%	77%

The third document that I collected was the *2014-2015 Southwestern State Academic Performance Report*. The purpose of this document was to inform state, district, and school educators and other interested stakeholders about the academic progress of students enrolled in the Lowery School District. This report included the accountability rating for the Lowery School District, which was that the district had met state expectations. The average academic performance of all K-12 students in the district was 72% in English language arts, 80% in reading, 82% in mathematics, and 79% in science. Lowery High School special education students were at or above state expectations in English at 18 %, in reading at 10%, and their performance in mathematics and science was not reported. Administrators, teachers, counselors, and parents could use this report to compare the performance of district students against state and regional scores.

The fourth document that I collected was the *2016 District Profile State Performance Plan Indicator Targets.* The purpose of this document was to provide school district educators

and other interested stakeholders with the state performance targets that the local education agency (LEA) was challenged to meet for 2014-2015. An LEA is defined as a "local educational agency [that] maintains the level of state and local funds they spend to support federal programs from one fiscal year to the next" (southwestern state.org). The Lowery School District reports funds needed and spent to this agency. Principals, teachers, counselors, and parents used this document to help them understand the state goals for the year. The evaluation or grade for the LEA was presented as a *Yes* or *No* based on a goal of 100%. The following were the target indicators and results important to this study: (a) statewide assessment participation rate of 95 % overall, and LEA *Yes*, (b) statewide assessment participation rate in reading of 95 %, overall and LEA *Yes*, (c) statewide assessment participation rate in mathematics of 95% overall, and LEA *Yes*, (d) statewide proficiency in reading at 83% overall, and LEA *No*, and (e) statewide proficiency in mathematics at 83% overall, and LEA *No*. These results indicated that the LEA met the state targets for the number of students assessed in reading and mathematics but did not meet the statewide proficiency in reading and mathematics. The report did not include scores for special education students in reading and mathematics.

The fifth document I collected was the *Lowery High School Student Handbook 2015-2016.* The handbook was available online and not distributed in a hardcopy format. The purpose of this document was to educate the public about the mission, goals, and purpose of the school. The purpose of this handbook was also to describe the rules and regulations of the high school and to describe the courses available to students. Parents, students, and anyone interested in learning about the high school would find this document useful. The CTE program was described in this document in relation to the courses provided.

The sixth document I collected was the *Comprehensive Biennial Report of Southwestern State Public Schools*. The purpose of this document was to inform the governor, lieutenant governor, speaker of the house of representatives, and members of the Southwestern state legislature, and other interested stakeholders about the following: (a) state progress on academic performance indicators, (b) student performance on state assessments, (c) performance of students at risk of dropping out of school, (d) number of students in disciplinary alternative education settings, (e) number of secondary school graduates and dropouts, (f) number of student grade-level retentions, (g) district and school performance in meeting state accountability standards , (h) status of the curriculum in English language arts, reading, mathematics, science, social studies, career and technical education, fine arts, health education, languages other than English, technology applications, gifted/talented education, kindergarten and prekindergarten, this southwestern state initiative in science, technology, engineering, and mathematics (STEM) (i) charter schools and waivers, (j) school district expenditures and staff hours used for direct instructional activities, (k) district reporting requirements, (l) funds and expenditures, (m) performance of open-enrollment charters in comparison to school districts, (n) character education programs, and (o) student health and physical activity (http://gov/acctres/comp_annual_index.html).

The last document that I collected was titled *Lowery School District Transition: Planning for the Future.* The purpose of this document was to inform parents and students about the transition process for special education students, including identified ASD students. This document included a description of transition services, including postsecondary planning, employment training, and simulations for special education students and information about the

timeline of these services. The document also included a brief description of the process guidelines for these services.

Table 9 below is a summary of the categories that I constructed from a content analysis for each document.

Table 9

Summary of Categories for Content Analysis of Documents

Title	Categories
Lowery School District CTE Program Overview	Listing 16 career clusters as well as principles, professional communications, and transition services for special education students, including ASD students
Lowery High School Student Handbook 2015-2016	Providing information about high school courses, rules and regulations, and courses
Lowery School District Transition Planning for the Future	Informing special education community about transition services, student qualifications, and agencies who provide services
2014-2015 Southwestern State Lowery Campus Academic Performance Report	Providing information about state, district, and school racial and ethnic statistics, special education student readiness in all subjects, dropout rates, 5 and 6 year academic plans, student readiness for college, and enrollment rates
2014-2015 Southwestern State Academic Performance Report	Describing state, region, and district standards, including district accountability rating, special education status, academic performance reports according to race, special education, and second languages
2016 District Profile State Performance Plan Indicator Targets	Describing annual performance of local education agencies, state academic performance targets, measurable objectives, assessments, early child outcomes, secondary transition, and postsecondary school outcomes
Comprehensive Biennial Report of Southwestern State Public Schools	Providing information to the public about Southwestern school systems in this state, including performance indicators, standards, growth and development, curriculum and development

Data Analysis: Level 2

Level 2 analysis involved examining all categorized data across all sources, using the constant comparative method that Merriam (2009) recommended for qualitative research to determine emergent themes and discrepant data that formed the key findings or results for this study. The results were analyzed in relation to the research questions and interpreted in relation to the conceptual framework and the literature review.

Emergent Themes

The following themes emerged from an analysis of all data sources for this single case, which was the CTE program and its related courses at Lowery High School:

Theme 1: CTE teachers and special education teachers believed that the CTE program prepared ASD students for postsecondary educational and employment opportunities because courses provided hands-on experiences related to their chosen professions, such as instructional activities to improve their skills in home repair, personal growth and development, and social interactions.

Theme 2: CTE teachers and special education teachers believed they differentiated instruction to meet the individual needs of ASD students by chunking information into smaller parts and emphasizing content mastery, one-on-one communication, and close proximity as a calming effect.

Theme 3: CTE teachers and special education teachers believed that technologies such as computers helped ASD students prepare for postsecondary educational and employment opportunities, particularly in relation to communication skills.

Theme 4: The CTE program administrator believed that the CTE program helped ASD students learn technical skills, life skills, and job skills that transferred to other courses and that these real-world experiences were a major reason for the success of this program.

Theme 5: Documents revealed that the CTE program was comprehensive because it offered 16 different career clusters and offered transition services for special education students, including ASD students. Documents also revealed that special education students scored lower in reading and mathematics at this high school for 2014-2015, which are subjects critical to the

postsecondary educational and/or employment success of all students in this CTE program; however, group scores for ASD students were not available. It should be noted that a diagnosis of ASD does not mean scores will be lower. If fact scores could be higher if the student/s are exhibiting other spectrum behaviors which do not affect math or reading.

Discrepant Data

Discrepant data is data that challenges the theoretical proposition of a study (Merriam, 2009; Yin, 2014). The theoretical proposition for this study was that the CTE programs at this high school would have a positive impact in preparing ASD students for postsecondary educational and/or employment opportunities. No evidence from the interviews and documents was found to challenge this theoretical proposition. Participants for this study believed that the CTE program had a positive impact in preparing ASD students for postsecondary educational and/or employment opportunities. However, the special education coordinator and the CTE chairperson at Lowery High School both acknowledged that student performance related to the CTE program was not included in any of the state reports.

Evidence of Trustworthiness

Trustworthiness in qualitative research is important because research depends on the ethics of the researcher (Merriam, 2009; Patton, 2002). In seeking trustworthiness, Merriam noted that qualitative researchers in particular must adhere to rigor, accurate observations, the use of rich, thick description, and accurate data collection and analysis. Patton noted that qualitative researchers should create a "track record" by which other scholars will judge their findings (p. 570). Yin (2014) believed that trustworthiness comes from the transparency of research conducted in a public setting.

Credibility

Merriam (2009) defined credibility in qualitative research as congruency or how the research findings match reality. Merriam also recommended that researchers use the following strategies to improve the credibility of qualitative research: triangulation, member checks, adequate time in data collection, reflexivity, and peer review. For this study, I used the strategy of triangulation by comparing and contrasting multiple data sources to determine the key findings or results. These multiple data sources included interviewing CTE teachers, special education teachers, and a CTE administrator and collecting state and district documents related to the CTE program. I used member checks by asking participants to review the tentative findings of this study for their credibility. After the review there were no changes made to the findings.

Transferability

Merriam (2009) defined transferability as the extent to which the findings of a study can be applied to other situations. Merriam recommended that researchers use the strategies of rich, thick description and either maximum variation or typicality of sampling to support the transferability of qualitative research. For this study, I used the strategy of rich, thick description by describing the settings, participants, and findings in as much detail as possible to allow the transfer of findings for this study to other similar populations. I also used the strategy of typical sampling by selecting a CTE program and its related courses that was similar to other CTE programs in this southwestern state.

Dependability

Merriam (2009) defined dependability as consistency or the extent to which the findings can be replicated and yield the same results. For qualitative research, Merriam recommended that researchers use the following strategies to improve dependability: triangulation, peer examination, clarification of the researcher's position, and the audit trail. I used the strategy of triangulation as described earlier to improve the dependability of the findings. I also used the strategy of an audit trail by providing a clear trail of data collection and analysis procedures in this dissertation, including the appendices.

Confirmability

For qualitative research, Merriam (2009) recommended that researchers use the strategy of reflexivity or clarification of the researcher's position to improve the confirmability or objectivity of the study. For this study, I used this strategy by maintaining a researcher's journal in order to reflect on decisions that I made during data collection and analysis, including reflections on any potential biases that I may have had about how CTE programs should meet the needs of students diagnosed with ASD.

Research Results

The results for this study are analyzed in relation to the central research and related research questions. I will present the findings for the central research question last because those results are a synthesis of the results from the related research questions.

Related Research Question 1

Question one asked, *What do CTE and special education teachers believe about how the CTE program influences the preparedness of ASD students for postsecondary educational and/or employment opportunities?*

The key finding for this question was that CTE teachers and special education teachers believed the CTE program prepared ASD students for postsecondary educational and employment opportunities because courses provided hands-on experiences related to students' chosen professions, including instructional activities designed to improve skills related to home repair, personal growth and development, and social interactions.

Interview data supported this finding. Teachers believed that placing ASD students in training or actual work environments was what created the positive experiences they received in CTE classes. In relation to home repair skills, Eric, a CTE teacher, stated,

> I believe the courses I teach are important for anybody. It doesn't matter if they're special education or not because people learn basic home repair through the course. I fully believe we should be teaching it to everybody. If somebody is going to live independently, they do need to be able to make small repairs and be able to work with their hands at least to some degree.

Irene, a CTE teacher, noted that the CTE course she taught emphasized personal growth and development for ASD students. Irene stated,

> The last student I had that was labeled autistic was wonderful. Seeing that development and going through the stages [of personal growth] is important because it gives them that hands-on work with the kids. It allows [them] to see if education is something that they

> are still interested in after they see everything involved in it or if they maybe just know that they want to work with kids but not necessarily teaching.

Marie, a CTE educator, believed that CTE courses emphasized social interaction skills for ASD students. Marie stated,

> I think for kids with ASD, depending on where they range in the spectrum, it can be hard for them to grasp some of those life skills and social skills. So then my courses really helps you know they are into the content and learning how to interact with other people. Even just being in a classroom setting, regardless if it's my class or other classes, they're getting that social interaction that sometimes they might not get at home. Even in the relationships with their table peers or the other kids in the class, they're always learning something. Even if they make a mistake, they know they're in a learning environments [and that] it's okay for them to learn from that and change. These are different experiences they might not get at home all the time.

Helen, a content mastery teacher in special education, added, "I think the CTE courses give students with ASD an opportunity [to] explore other options out there in the working world that they may not already be aware [of]." Thus, both CTE and special education teachers believed that CTE program courses positively influenced the preparedness of ASD students for postsecondary educational and/or employment opportunities.

Related Research Question 2

This question asked, *How do CTE and special education teachers believe they differentiate instruction to meet the individual needs of ASD students in preparing them for postsecondary educational and/or employment opportunities?*

The key finding for this question was that CTE teachers and special education teachers believed they differentiated instruction to meet the individual needs of ASD students by chunking information into smaller parts and emphasizing content mastery, one-on-one communication, and close proximity as a calming effect.

Interview data analysis supported this finding. Marie, a CTE teacher, noted that an emphasis on one-on-communication and breaking information into smaller parts with ASD students. Marie noted,

> I make sure I have a hard copy of the Power Point we are going through, [and] I give them[students] a handout of the notes sometimes. I also make sure when the rest of the class is off on some independent work that I'm one on one with the child saying, "Are you focused? Break it down into smaller chunks; for instance, you can do this part, then we'll hold off on this other part." Or try not to overwhelm them. . . because I know it can be a lot sometimes.

Irene, another CTE teacher, believed that calming ASD students through close proximity is critical before beginning instruction. Irene added,

> So I would have to send them down to a teacher that knew they were coming [and] knew that behavior. It was kind of a calming cool down place that they could go to, and that was a big modification that I had never had to deal with [before].

Irene also believed that typing on the computer instead of writing and using colored pencils, markers, and highlighters were calming to ASD students. Helen, a special education teacher, also believed that chunking information into smaller parts and emphasizing content mastery were important. Helen added,

> Typically, I would break the assignment down into smaller portions that are more manageable and focus on concepts and make sure a concept is mastered before moving to the next objective. At times, I look at a concept, and I feel if they've got the foundational [understanding of the concept] and I'm seeing a little anxiety level, then I will eliminate a portion of it and wait until next time or I will eliminate the portion altogether.

Thus, these three teachers believed that specific strategies such as breaking information into smaller parts, emphasizing content mastery and one-on-one communication as well as calming ASD students was the first step before working on the daily assignments.

Related Research Question 3

This question asked, *What do CTE and special education teachers believe about the role technology plays in preparing ASD students for postsecondary educational and/or employment opportunities?*

The key finding for this question was that CTE teachers and special education teachers believed technologies such as computers helped ASD students prepare for postsecondary educational and employment opportunities, particularly in relation to communication skills.

Interview data analysis supported this finding. Both CTE and special education teachers believed that computers can be configured to multiple learning modalities. Because students learn in different ways, they believed that computers helped ASD students to address their course work and plans for future education and employment. Eric, a CTE teacher, believed technology was very beneficial to teaching ASD students. Eric stated,

> I believe that technology is crucial, and that from [an] educational standpoint, we too many times tie technology to the computer when technology is everything that we use,

> we use table saws, we use band saws, those are also technology. In the education field we sometime overlook that fact so anybody that can learn to use any of those tools could possibly gain employment with the ability to use the tools.

Helen, a special education teacher, also believed that technologies are important in teaching ASD students, specifically in relation to communication skills. Helen added,

> In one respect, [technology] does aide in instruction as most of students with ASD do find typing on a keyboard easier than the pen and paper route so I feel like technology is going to be a great tool for them.

Other interview data revealed how important technology can be to ASD students. April, another special education teacher, believed that for some students, technology is the only tool available for communication purposes. April noted, "I think sometimes that their main mode of communication is through a device maybe not verbally being able to tell teachers or even their peers some of their inner thoughts." Helen also believed in the communication aspects of technologies. Helen noted.

> I believe technology is an invaluable tool for them. Often it can be a great source of communication, [because] when they cannot communicate verbally, it gives them a voice to the outside world where they might not normally feel comfortable communicating in a face-to-face conversation.

Thus, both CTE and special education teachers agreed that technology is beneficial in teaching ASD students in CTE courses and giving them a voice to communicate with others.

Related Research Question 4

This question asked, *What do administrators believe their role is in helping ASD students achieve success?*

The key finding for this question was that the CTE program administrator believed that the CTE program helped ASD students learn technical skills, life skills, and job skills that transferred to other courses and that these real-world experiences were a major reason for the success of this program.

Interview data analysis supported this finding. Teaching ASD students presented unique challenges to CTE teachers, and therefore, Sandy believed that technology has been invaluable to CTE teachers and ASD students. Sandy noted,

> I think the biggest draw for CTE is that it teaches life skills, not just how to add [or] do algebra. Its teaching things that they will need in the workforce. If an autistic student is going to be working, any type of CTE program should appeal to them because they are looking to learn soft skills in addition to technical skills so your brining in three areas that really they need if they are going to be career ready.

Sandy agreed with the CTE and special education teachers about the value of using technologies to help ASD students learn. Sandy also believed that technology was invaluable in training ASD students for jobs. Sandy noted that ASD students often receive skills training in CTE courses and then work in the community as interns. Sandy added,

> We have students in some internships right now, [and] we've been talking about how to get some more with our community. We have an advisory committee . . .made up of government, education, community, and industry, and we want to increase the amount of

> internships students have. We strive to have those internships turn into careers, not just for six months, [instead], we've been talking about partnering with certain businesses and then those businesses using our students as their workers. High school students are a lot easier to train than people that have been in the workforce for a long time and so the ability to train somebody more trainable is really beneficial.

Sandy believed that strategic alliances were necessary to the success of this CTE program. Concerning life skills, Sandy believed that ASD students need to learn socialization skills. Sandy noted,

> I think that's a really important thing with autistic students, especially because a lot of times they are not good at socializing and so trying to get them with peers working on projects can bring about conversation and can open them up a little bit out. Allowing group work in classes is a really good way to increase their socialization.

Thus, Sandy believed that the CTE program prepared ASD students for postsecondary and/or employment opportunities and improved their socialization skills.

Related Research Question 5

This question asked, *What do documents reveal about the impact of CTE programs on the preparedness of ASD students for postsecondary educational and/or employment opportunities?*

Two findings emerged for this question. The first finding was that the CTE program was comprehensive because it offered 16 career clusters and transition services for special education students, including ASD students. The second finding was that documents revealed special education students scored lower in reading and mathematics at Lowery High School for 2014-

2015, which are subjects critical to the postsecondary educational and/or employment success of all students in this CTE program; however, group scores for ASD students were not available.

A content analysis of documents supported these findings. In relation to the comprehensiveness of the CTE program, the document titled *Southwestern State Career and Technical Education Program Overview* described each career cluster in depth. These clusters were developed by the Association for Career and Technical Education (ACTE), which is the national organization that provides direction for all CTE programs in the United States. The school district also provided an explanation of the transition services that are offered for special education students in the document titled *Lowery School District Transition: Planning for the Future*. A review of district accountability documents included group state assessment scores in 2014-2015 for general education students of 77% in reading and 81% in mathematics and for special education students of 37% in reading and 35% in mathematics. However, these scores alone did not provide enough data to draw any relevant conclusions for this study because group scores for ASD students were not available.

Central Research Question

The central research question asked, *How does a CTE program impact the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities?*

The finding for this question was that the CTE program positively impacted the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities by (a) helping them learn specific life skills, (b) providing differentiated instruction for their special learning needs, (c) using technology to help them learn, particularly in relation

to communication skills, (d) providing them with opportunities for internships and other on-the-job training, and (e) providing a comprehensive program that offered a variety of courses supported by strategic alliances.

All data sources supported this finding, including interviews with CTE teachers, special education teachers, and a CTE administrator as well as related CTE program documents. In relation to helping ASD students learn specific life skills, Sandy, a CTE administrator, stated, "I think the biggest draw for CTE is that it teaches life skills, not just how add [or] how to do algebra; it's teaching things that they will need in the workforce." Sandy also noted that the skill sets were also different for each class. Sandy added, "If an autistic student is going to be working any type of CTE [course] should appeal to them because it can help them in classes [where] they are looking to learn soft skills in addition to technical skills." Eric, a CTE teacher, also believed in the importance of learning life skills and noted,

> I believe the courses I teach are important for anybody, it doesn't matter if they're special education or not because people learn basic home repair through the course, and I fully believe we should be teaching it to everybody.

Marie, another CTE teacher, added, "I teach several CTE courses [including] restaurant management, interpersonal skills, and lifetime nutritional enrollment. I personally believe all three of these courses are important because they teach real life skills."

When discussing how to provide differentiated instruction for the unique learning needs of special education students, teachers reported that chunking or breaking information into smaller parts was is a common form of differentiation. Marie, a CTE teacher, stated,

I make sure I have a hard copy of the Power Point we are going through. I give them a handout of the notes sometimes, [because] that something that will work for them. I also make sure when the rest of the class is off on some independent work, that I'm one-on-one with the child saying. 'break it down into smaller chunks; for instance, you can do this part [so] then we'll hold off on this other part.

Helen, a special education teacher, agreed, adding,

> Typically, I would break the assignment down into smaller portions that are more manageable and focus on concepts and make sure a concept is mastered before moving to the next objective. At times, I look at a concept and I feel if they've got the foundational [understanding], and I'm seeing a little anxiety level, then I will eliminate a portion of it and wait until next time or I will eliminate the portion altogether.

Teachers also described other differentiation strategies, which included emphasizing content mastery and one-on-one communication and using close proximity as a calming effect.

Teachers also described technologies were available to help ASD students learn, particularly in relation to computer use. Eric, a CTE teacher, believed that technology was important because of the learning styles of special education students. Eric noted, "Every course, everything we do, is with technology. You can't do this course without [using] technology." Teachers also believed improved communication skills for ASD students was one of the benefits of using technology in CTE courses. Helen, a special needs teacher, stated,

> I believe technology is an invaluable tool for them. Often it can be a great source of communication, [because] when they cannot communicate verbally, it gives them a voice

> to the outside world where they might not normally feel comfortable communicating in a face-to-face conversation.

April, another special education teacher, also believed that improving communication skills was a driving force for using technology with ASD students in CTE classes. April stated,

> I think that these kids are very "tech savvy" now. I think sometimes that sometime their main mode of communication is through a device [and] maybe not verbally being able to tell teachers or even their peers some of their inner thoughts.

Thus, both CTE and special education teachers believed technology was critical in helping ASD students communicate with other students using different visual mediums, completing class and homework assignments, and demonstrating their understanding of course materials.

In relation to internships and other on-the-job training, CTE teachers and special education teachers agreed on the importance of providing ASD students with experiences that prepared them for future employment and postsecondary educational opportunities. Sandy noted,

> We have an advisory committee and that advisory committee is made up of government, education, community, and industry, and we want to increase the number of internships students have [so] we strive to have those internships turn into careers.

Irene, a CTE teacher, noted that she taught a course for students interested in teaching as a career. Irene added,

> I teach [a course called] Education and Training Practicum. One is a first-year class, and one is a second-year class. They are career and [technical education] classes designed for students [who] want to become teachers, and it's similar to student teaching for high

school kids. They are placed with teachers in our district to work with kids one-on-one in their classrooms.

Thus, both CTE and special education teachers agreed that internships and other on-the-job training was important for ASD students enrolled in CTE courses.

Documents also revealed that Lowery High School offered a comprehensive CTE program in relation to 16 career clusters that provided ASD students with practical training to prepare for their chosen professions and/or for further education. In addition, CTE program related documents also revealed that transition services were available to all special education students and their parents, which included information about qualifications for these services, instruction, postsecondary education planning, and integrated employment, based on students' needs and interests. Accountability documents indicated that special needs students scored below district expectations in reading and mathematics. According to the *Southwestern State Academic Performance Report,* reading and mathematics scores for special education students at Lowery High School for 2014-2015 were 19% and 33% respectively. These accountability documents also revealed that 17% of special education students scored at the satisfactory level or above on English 1 assessments, and 22% scored at the satisfactory level or above on the English 2 assessments. Mathematics results for special education students were not available. Group results for ASD students were also not available so no conclusions could be drawn about their performance in reading and mathematics. Table 7 includes a summary of the results of this study.

Table 10

Summary of Results

Research Question	Results
CRQ: What is the impact of CTE program on postsecondary education and/or employment for ASD students	Impacting preparedness of ASD students positively Helping ASD students learn specific life skills Providing differentiated instruction Using technology to help ASD students learn Providing ASD students with internships Providing a comprehensive program Offering courses based on 16 career clusters Including strategic alliances
RRQ1: What do CTE and special education teachers believe about how the CTE program influences the preparedness of ASD students for postsecondary educational and/or employment opportunities?	Learning home repair skills Learning personal development skills Learning socialization skills
RRQ2: How do CTE and special education teachers believe they differentiate instruction to meet the individual needs of ASD students in preparing them for postsecondary educational and/or employment opportunities?	Chunking information into smaller parts Emphasizing content mastery Emphasizing one-on-one communication Using close proximity as a calming effect
RRQ3: This question asked, What do CTE and special education teachers believe about the role technology plays in preparing ASD students for postsecondary educational and/or employment opportunities?	Helping ASD student prepare for postsecondary opportunities Noting special role of computers in relation to communication skills
RRQ4 This question asked, What do administrators believe their role is in helping ASD students achieve success?	Helping ASD students learn technical skills, life skills, job skills Noting that skills transferred to other courses
RRQ5: This question asked, What do documents reveal about the impact of CTE programs on the preparedness of ASD students for postsecondary educational and/or employment opportunities?	Noting CTE program was comprehensive Noting CTE program included 16 career clusters Noting scores for ASD students not available

Summary

This chapter included the results of this single case study. This chapter included a description of the setting, participant demographics, and the process that I used to collect data. In relation to the first level of data analysis, I coded the interview data using line-by-line coding that Charmaz (2006) recommended for qualitative research. Using the constant comparative

method that Merriam (2009) recommended, I analyzed the coded data for each individual interview question for the CTE teachers and the special education teachers as well as the CTE administrator. I also presented summary tables of categories that I constructed from the coded data for the teacher interviews and for the administrator interview. Document were analyzed using a content analysis that involved a description of the purpose, content, and use of each document. I conducted a second level of analysis to find emergent themes and discrepant data that formed the key findings or results for this study. I also presented evidence of trustworthiness in relation to specific strategies that I used to improve the credibility, transferability, dependability, and confirmability of this qualitative research.

Chapter 5: Discussion, Recommendations, and Conclusions

The purpose of this study was to investigate the impact of a high school career and technical education program on the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities. A single case study design was selected for this study because, as Yin (2014) stated, this design is "an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context especially when the boundaries between phenomenon and context may not be clearly evident" (p. 16). Using this design, I had the opportunity to gather data from different points of view that allowed the complexities of this case study to be realized. A rich picture would never exist without the formula for case study imparted by Yin (2014). Yin also noted that a case study design

> copes with the technically distinctive situation in which there will be many more variables of interest than data points and as one result relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result benefits from the prior development of theoretical propositions to guide the data collection and analysis. (p.17)

The case study design is unique because it supports an in-depth investigation of a contemporary phenomenon by using multiple sources of evidence. I collected data from multiple sources to present a rich picture of the case, which was the CTE program at Lowery High School. In order to carry out this design, I collected interview data from CTE teachers, special education teachers, and a CTE administrator as well as CTE program accountability documents.

This study was conducted because a lack of research was found about the impact of a CTE program on the postsecondary education and/or employment opportunities for ASD students. No research was also found about technology applications, work, or college and/or trade school activities involving ASD students.

Several key findings emerged from an analysis of the data. Key findings included helping ASD students learn specific life skills, providing differentiated instruction, using technology to help ASD students learn, providing ASD students with internships, providing a comprehensive program offering courses based on 16 career clusters and strategic alliances with the community stakeholders.

Interpretation of Findings

The findings were interpreted in relation to the conceptual framework for this study, which was based on Bronfenbrenner's ecological perspective of human development, Zhao and Frank's ecological perspective of technology, and Song's research concerning distributed cognition in relation to technology instruction. The findings were interpreted in relation to the literature review presented in Chapter 2, which included an analysis of current research related to (a) students identified with ASD in high school classrooms, (b) secondary career and technical education programs, (c) transition services, (d) postsecondary education support, (e) postsecondary employment support, and (f) ASD individuals in the workforce.

Teacher Beliefs about Preparing ASD Students

The first key finding was that CTE teachers and special education teachers believed the CTE program prepared ASD students for postsecondary educational and employment opportunities. They believed that CTE courses provided hands-on experiences related to

students' chosen professions, including instructional activities designed to improve skills related to home repair, personal growth and development, and social interactions. Teachers also believed that placing ASD students in actual work environments created positive experiences for them.

Current research supports this finding that the CTE program prepares special education students for postsecondary educational and employment opportunities. Bouck et, al. (2012) explored the use of assistive technology to meet students' IEP goals and found students using assistive technologies received some benefits using software and adaptive hardware which created a more inviting work environment. Bouck et al. recommended that teachers need to increase the use of technology for special education students because of the benefits in language and the use of technologies to further educate special needs students. Belson, Hartmann and Sherman (2013) investigated the use of electronic pens for students with learning disabilities and found that digital notetaking promotes independence and positive personalized academic experiences for these students. In a case study of career and technical education programs in a large urban school district, Neild et al. found that CTE students had a more positive attitude about education, which was demonstrated through higher attendance rates, better grades, higher test scores, and earning more credits than their peers (p. 75). Thus, research studies indicate that postsecondary educational and employment needs of many students are met in CTE courses because students learn about the diverse careers available to them. Community stakeholders also often employ students who are involved in high school CTE programs (acte.org, 2014).

Teacher Beliefs about Differentiating Instruction for ASD Students

The key finding was that CTE teachers and special education teachers believed they differentiated instruction to meet the individual needs of ASD students by chunking information

into smaller parts, emphasizing content mastery, one-on-one communication, and close proximity as a calming effect. According to Morgan (2014) using methods which pique student interest, adjusting assignments, working one-one one, and letting students decided on topics of interest are just some of the methods of differentiation used in special needs classroom.

Differentiation of classroom assignments for special needs students was reported by Southall (2013) who found that differentiation is the key to academic success for special needs students. Differentiated instruction involved varying content, process, and product according to students' abilities, interests, and learning styles. In a discussion about how to meet the needs of adolescent ASD students Darrow (2015) found that all students learned better when instruction is "flexible" and allows for variance. The findings found in this study agree with current literature that differentiation is an important tool when working the special needs populations.

Teacher Beliefs about Using Technology to Prepare ASD Students

The key finding was that CTE teachers and special education teachers believed technologies such as computers helped ASD students prepare for postsecondary educational and employment opportunities, particularly in relation to communication skills because they addressed specific learning modalities of these students.

Current research supports this finding. In a study about using an iTouch to teach sight words and their definitions to special needs students. Jameson et al. (2012) found WHAT that three out of four students preferred using the I Touch to learn and evidence showed a modest increase in the learning of special needs students. In a review of journal articles published in 2008-2012, Liu et al. (2013) investigated trends for implementing technology in special education services and found a positive correlation between the use of technology and special

needs student's ability to learn subject matter. Research also indicates that classroom teachers use various types of interventions for ASD students that involve technology because computers, video gaming systems, and handheld devices have demonstrated a high success rate in helping ASD individuals improve their learning (O'Malley et al., 2013; Ploog et al., 2012 and Liu et al.). In a study about using tablet computers to help ASD students' complete instructional tasks, O'Malley et al. (2013) found Mobile technologies have been correlated to higher achievement among ASD populations in the classroom setting (O'Malley & Donehower, 2013). Ploog et al. (2012) explored the use of computer-assisted technologies to improve language and social skills of ASD students and found technologies aided in learning and curbed behavioral issues in the classroom. Ploog et al. recommended the use of tablets in the classroom along with hand held devices. Thus, current literature supports teacher beliefs that using technology can help prepare ASD students for postsecondary or employment.

Administrator Beliefs about Helping ASD Students Achieve Success

The key finding was that the CTE program administrator believed that the CTE program helped ASD students learn technical skills, life skills, and job skills that transferred to other courses and that these real-world experiences were a major reason for the success of this program. Current research supports this finding. Taylor et al., 2012 conducted a review of vocational interventions for young adults who were diagnosed with ASD and found technical education is of the upmost importance in educating ASD students because most jobs require some form of technology, employers often find that ASD individuals are a good job fit because they demonstrate interest and skill in technology-related fields, and therefore, their technical education is of the upmost importance (Taylor et al., 2012). Students diagnosed with ASD often

enroll in a vocational education program in college where support systems are necessary. Using a hands-on approach in these programs to make connections to the general curriculum is also necessary for individuals with ASD (Cullum, 2014). Students with autism often show a propensity toward vocational programs and/or STEM programs (Science Technology Engineering and Mathematics). In a 2013 study Wei et al. found that participants demonstrated high rates of STEM enrollment but overall lower enrollment rates. Students diagnosed with ASD were more likely than the general population and those students with other disabilities to enroll in a STEM program. Individuals identified with ASD who attend college usually major in one of the STEM areas. The STEM program as LHS provides training and apprenticeships for these students which is supported through strategic alliances. The CTE administrator overseas this area (among others) and according to Sandy, more efforts to gain an increase in community support is an ongoing effort.

Impact of CTE Program

The key finding was that the CTE program positively impacted the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities by (a) helping them learn specific life skills, (b) providing differentiated instruction for their special learning needs, (c) using technology to help them learn, particularly in relation to communication skills, (d) providing them with opportunities for internships and other on-the-job training, and (e) providing a comprehensive program that offered a variety of courses supported by strategic alliances.

Although research on ASD students was limited, research supports this finding that CTE programs have a positive impact on the postsecondary educational and/or employment

opportunities for special education students. Student performance is gauged by two factors in CTE classes: the ability to excel in the classroom and the ability to gain employment. As previously stated, students are often employed through strategic alliances formed with employers in the community. Employment allows students to use the technology skills that they have learned in the classroom and to make cognitive connections through the application of these skills in the job environment (Casale-Giannola, 2012; Neild et. al, 2013). These connections encourage students to excel not only in CTE classes but in general education classes in which the student is enrolled (Casale-Gianola, 2012). Student learning in CTE classes often improves because of the connections that they are able to make to real life circumstances **(**Casale-Giannola, 2012; Schmalzried & Harvey, 2013;). In the workplace, the use of the Internet, automation, and smart phones are also some of the skills associated with evidenced-based practices (Schall, Weiman & McDonough, 2012). These skills have been found to increase output and success at work. The impact of the CTE program on the students, school and community is almost immeasurable when considering all of the aforementioned factors.

Conceptual Framework

The conceptual framework for this study was based on Bronfenbrenner's (1977) ecology of human development, Zhao and Frank's (2003) ecology of technology, and Song's (2013) concepts related to distributed cognition. In the following paragraphs, I discuss the key concepts related to their research and how they support the findings of this study.

Bronfenbrenner (1977) believed that this growth occurred in intellectual stages and the sum of these stages is described as the ecological system human development. The roles both personal and social culminate in a large system or environment. This system is complex and

consists of personal and social roles and relationships and culminates in a large system or environment. The complexity of social roles is such that the study of the human environment is so vast that it needs to be broken up into various microsystems that enable researchers to study these smaller systems by name. Bronfenbrenner's research is important to this study because his ecological perspective helped to guide this research since the CTE program is in itself an ecology of growth that can be divided into subsystems e.g. 16 clusters of CTE. Zhao and Frank's (2003) research on the ecology of technology further added to this study as it examined technology through an ecological perspective related to the concept of technology diffusion. Zhao and Frank contended that ecology is a metaphor that could be used to describe factors affecting technology use in schools, such as slow adoption rates and the misuse and underuse of computers and other technologies. Technologies are often considered an invasive species in schools because they change or alter the balance of the classroom ecology. Zhao and Frank's research was important to this study because in examining the use of technology from the perspective of teachers who provide instruction to students diagnosed with ASD, it is necessary to understand the methods that these teachers use to ensure the success of these students in high school and in postsecondary endeavors that will undoubtedly require the use of technology skills sets (Schmalzired & Harvey, 2014; Shattuck et al., 2012; Wehman et al., 2012).

Song's (2013) work builds this framework by the addition of distributed cognition in which technology does not exist alone; rather, the user and the technology together create knowledge. This knowledge is then distributed among peers, students, and teachers. By doing so, Song believed that each user creates his/her own niche that exists separately from the material world. The niche changes or evolves as the persons' interests and networks change. Song's

research was important to this study because it is the single finite point of view of the individual diagnosed with ASD that matters. Song's view was that learning takes place in a context between the student and the environment. When the educator creates the environment, and implements the use of technology, then the interaction between the student and the environment becomes personal. The student shares the learning experience with peers, and this shared experience deepens meaning. Within this shared experience, technology often fills learning gaps for students with disabilities. This study addresses this gap so that students diagnosed with ASD become successful members of society who are able to share their learning experiences with others.

Thus, this conceptual framework guided this study because from the ecology of Bronfenbrenner we established that the subsystems within the school include ASD and special needs students. In turn these students' lives are being invaded by technological advances which aid or hinder the learning of all students depending on aptitude, directions, hands-on instruction, public and private use and or instruction and finally Song (2013) that these skills are passed to and from these students existing in the microsystem of learning. By analyzing student and teacher development skills, experiential learning, hands-on training of skills sets the technology centric program helps educate LHS students and the community by training these students to enter the workplace trained and ready to meet the needs of the community. Finally, the students both in school and out in the workplace share learning of technologies utilizing Song's distributed cognition working in this environment.

Limitations of the Study

The limitations of qualitative research are often related to the design of the study. The first limitation was related to a single case design. A multiple case study design yields richer data

than a single case study design. Yin (2014) noted that a single case study design has limited literal and theoretical replication because similar results may only emerge from similar population samples.

The second limitation was related to the number and type of participants. This study, included 3 CTE teachers, 2 special education teachers, and one CTE program administrator in relation to one case. Additional CTE and special education teachers and program administrators would have provided richer data. The addition of parents and ASD students would have also yielded richer data.

The third limitation was related to data collection. For this study, only one interview was conducted with one administrator. Multiple interviews over a longer period of time might provide richer data since immersion on a daily basis from that point of view would add experiences overlooked when only a single interview was used. In addition, observations of instruction for ASD students might yield undiscovered data that only can be gained by the observation lens. Concerning documents, scores for ASD students on state assessments in reading and mathematics was not available. Certification data in for CTE programs was not available, an example such as data for Microsoft Certification exams were not available. Microsoft offers many certifications for students in CTE programs wishing to advance in many areas of business, programing, and end user exams which would offer a first, best, evidentiary example of the quality of the CTE program in LHS. Finally, the ability to interview past students would fulfill a gap in this study as to the successes of LHS.

Recommendations

Recommendations are based on the findings for this study. The first recommendation is that group scores on state assessments in reading and mathematics should be presented for ASD students. Because this population is identified as a subgroup of the special education student population, group scores for ASD students could possibly be reported. This information might help administrators, teachers, and parents understand the specific content and skills that ASD students need to improve in reading and mathematics, which are core skills that reach beyond CTE, not only to academic skills sets but employment as well.

The second recommendation is to conduct additional qualitative research that includes ASD students and their parents. The past student population has details and POV (point of view) that cannot be gained without one to one interviews spread out of over short periods of time. Thus student population has lived the experiences gained in CTE and LHS and would provide richness as well as evidence to support the benefits of CTE programs for special needs students. The parents offer a unique POV since they live through their children's lived experiences which brings another piece of the puzzle.

The third recommendation is that the Southwestern state and LHS district needs to offer/ should provide professional development for all. These interviews exposed an area in which educators are in need. Many expressed a lack of knowledge as to what Autism is, and how to differentiate instruction. Many believe differentiation is the same as accommodation or vice versa. The administration stated this is an area to work on for the benefit everyone. One of the CTE teachers believed that she needed more information about ASD students and how to teach these students in a general education classroom.

Implications for Social Change

This study may contribute to positive social change at the individual, organizational, and societal level. At the individual and organizational level, this study may contribute to positive social change by helping CTE teachers and administrators realize the need for training, implementing instructional methods, and reporting results concerning ASD populations at the program level. Training CTE teachers about instructional methods to help ASD students is particularly necessary. CTE teachers in this study reported that they did not have enough skills to teach these students effectively. The CTE program administrator also supported this training for CTE teachers. Therefore, this study may be a call to action on behalf of all CTE teachers who need training focused on how ASD is defined, best practices in teaching ASD students, and characteristics and behaviors of ASD students and how to defuse their behavior in classroom settings. All CTE teachers also need training in how to provide accommodations and differentiate instruction for ASD students. This study may provide all CTE teachers and administrators with that knowledge.

At the societal level, this study may increase the body of knowledge about the academic needs of ASD students. If this knowledge base is extended, more individuals and businesses can help this population. Educational stakeholders will develop a better understanding about the educational and employment needs of ASD students and how communities can benefit by collaborating with high school CTE programs to employ these individuals. Educators also need to reach out to ASD students and their parents to help them if they just ask.

Conclusion

The goals of this study were to analyze current research related to ASD students enrolled in CTE programs, to investigate how CTE teachers provided instruction to these students, and to determine how a specific CTE program supported the postsecondary educational and employment opportunities for these students. This study contributed to positive social change by adding to the body of knowledge concerning how a specific CTE program located southwestern state positively impacted the postsecondary educational and employment opportunities for students diagnosed with ASD. However, findings also indicated that CTE teachers reported a lack of knowledge about ASD as a syndrome and a lack of knowledge about instructional strategies that they could use in the classroom to improve learning for ASD students. Findings also indicated that the community in this study said no to the negative connotations often associated with the behavior of ASD students, and instead, they collaborated with local businesses to supply an educated workforce that included ASD students. The fight to provide this continued support for ASD students is up to all educators, community members, and parents of ASD students because they will need to educate society about the benefits of teaching, training, and hiring these students. The more we educate, the more we will embrace what was once misunderstood. ASD students do not have to live with past social norms. Change is coming, and these students will be educated to live a fulfilling life.

References

ACTE. (2015a). *Career clusters. Retrieved* October 15, 2015 https://www.acteonline.org/general.aspx?id=8644#.VjIGB6SFOP8

ACTE (2015b*). CTE Prepares the Qualified Workforce*. *Retrieved* October 15, 2015, https://www.acteonline.org/general.aspx?id=5748#.VK6dOCvF9Og

ACTE (2015c). *Related provisions*. *Retrieved* October 15, 2015 https://www.acteonline.org/IDEA/#.VjircKSFPIU

ACTE (2015d) *What is CTE? Retrieved* October 15, 2015 https://www.acteonline.org/cte/#.Ve79xqSFP4g

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Aitken, J. E., Fairley, J. P., & Carlson, J. K. (2012). *Communication Technology for Students in Special Education and Gifted Programs*. Hershey, PA. Information Science Reference.

Anderson, J. M. (2014). A qualitative inquiry into the two-year college experiences of students with autism spectrum disorder (Unpublished doctoral dissertation). University of Georgia, Athens, GA. Retrieved from https://getd.libs.uga.edu/pdfs/anderson_james_m_201408_phd.pdf

Anthony, A. B. (2011). Activity theory as a framework for investigating district-classroom system interactions and their influences on technology integration. *Journal of Research on Technology in Education*, *44*(4), 335-356.

Autism Speaks. (2015a). *Autism's Rising Prevalence: What Do the Numbers Mean*? Retrieved from https://www.autismspeaks.org/science/science-news/autism%E2%80%99s-rising-

prevalence-what-do-numbers-mean

Autism Speaks. (2015b). *Symptoms*. Retrieved from http://www.autismspeaks.org/what-autism/symptoms

Belson, S. I., Hartmann, D., & Sherman, J. (2013). Digital note taking: The use of electronic pens with students with specific learning disabilities. *Journal of Special Education Technology*, *28*(2), 13-24.

Bouck, E. C., Flanagan, S., Miller, B., & Bassette, L. (2012). Technology in action section-rethinking everyday technology as assistive technology to meet students' IEP goals. *Journal of Special Education Technology*, *27*(4), 47.

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design.* Cambridge, MA. & London, England: Harvard University Press.

Brunello, G. and L. Rocco (2015), "The effects of vocational education on adult skills and wages: What can we learn from PIAAC?", *OECD Social, Employment and Migration Working Papers*, No. 168, OECD Publishing, Paris.
doi: http://dx.doi.org/10.1787/5jrxfmjvw9bt-en

Burgess, S., & Cimera, R. E. (2014). Employment outcomes of transition-aged adults with autism spectrum disorders: A state of the state's report. *American Journal on Intellectual and Developmental Disabilities, 119*(1), 64-83. Retrieved from http://search.proquest.com/docview/1503298137?accountid=14872

Career and technical education. (2014).
(http://schools.wisd.org/users/0003/docs/WISD%202014-2015/WHS20152016CourseCatalogFinal2-9-15.pdf).

Casale-Giannola, D. (2012). Comparing inclusion in the secondary vocational and academic classrooms: Strengths, needs, and recommendations. *American Secondary Education*, *40*(2), 26-42.

Chappel, S. L., & Somers, B. C. (2010). Employing persons with autism spectrum disorders: A collaborative effort. *Journal of Vocational Rehabilitation*, *32*(2), 117-124.

Charmaz, Kathy. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage Publishing.

Cimera, R. E. (2012). The economics of supported employment: What new data tell us. *Journal of Vocational Rehabilitation*, *37*(2), 109-117.

Cimera, R. E., Burgess, S., & Wiley, A. (2013). Does providing transition services early enable students with to achieve better vocational outcomes as adults? *Research & Practice for Persons With Severe Disabilities*, *38*(2), 88-93.

Common Core. A State Standards Initiative (2014). Retrieved from http://www.corestandards.org/about-the-standards/development-process/#timeline-2014

Comprehensive Biennial report of Texas Public Schools. (2015). Retrieved from http://search.tea.state.tx.us/search?q=cache:NFhg3KYmdMJ:tea.texas.gov/acctres/Comp_Annual_Biennial_2014.pdf+number+special+education+students+waxahachie+highs+school&access=p&output=xml_no_dtd&client=default_frontend&proxystylesheet=default_frontend&site=default_collection&ie=UTF-8&oe=UTF-8

Costley, D., Clark, T., & Bruck, S. (2014). The autism spectrum disorder evaluative education model: A school-based method of assessing and selecting interventions for classroom use. *SAGE Open*, *4*(4), 2158244014556640. doi: 10.1177/2158244014556640

Cullum, P. M., & Ennis-Cole, D. (2014). Preparing adults with autism spectrum disorders for employment. *Online Journal for Workforce Education and Development*, *7*(1), 6.

Demarest, K. K., & Gehrt, V. C. (2015). Get college-and career-ready at a vo-tech high school. *Phi Delta Kappan*, *96*(6), 22-26. Sage

Demographics (2016) http://www.city-data.com/city/Dallas-Texas.html

Edyburn, D. L. (2013). Critical issues in advancing the special education technology evidence base. *Exceptional Children*, *80*(1), 7-24.

Fleming, A. R., & Fairweather, J. S. (2012). The role of postsecondary education in the path from high school to work for youth with disabilities. *Rehabilitation Counseling Bulletin*, *55*(2), 71-81. doi:10.1177/0034355211423303

Fleury, V. P., Hedges, S., Hume, K., Browder, D. M., Thompson, J. L., Fallin, K., & Vaughn, S. (2014). Addressing the academic needs of adolescents with autism spectrum disorder in secondary education. *Remedial and Special Education*, *35*(2), 68-79

Friedman, N. D., Warfield, M. E., & Parish, S. L. (2013). Transition to adulthood for individuals with autism spectrum disorder: current issues and future perspectives. *Neuropsychiatry*, *3*(2), 181-192.

Geurts, H. M., & Vissers, M. E. (2012). Elderly with autism: Executive functions and memory. *Journal of Autism and Developmental Disorders*, *42*(5), 665-675.

Gerhardt, P. F., & Lainer, I. (2011). Addressing the needs of adolescents and adults with autism: A crisis on the horizon. *Journal of Contemporary Psychotherapy*, *41*(1), 37-45.

Gerhardt, U. (Ed.). (1998). *German Sociology: TW Adorno, M. Horkheimer, G. Simmel, M. Weber, and Others* (Vol. 61). London, UK: A & C Black.

Gomez, C. (2015). Poor classroom behavior, conduct violations common for those with ASD, survey reveals. *Disability Compliance for Higher Education*, *20*(7), 1-4. doi:10.1002/dhe.20086

Hirschy, A. S., Bremer, C. D., & Castellano, M. (2011). Career and technical education (CTE) student success in community colleges a conceptual model. *Community College Review*, *39*(3), 296-318.

Humphrey, N., & Symes W. (2011). Inclusive education for pupils with autistic spectrum disorders in secondary mainstream schools: Teacher attitudes, experience and knowledge. *International Journal of Inclusive Education, 17:1*, 32-46, doi:10.1080/13603116.2011.580462.

Jameson, J. M., Thompson, V., Manuele, G., Smith, D., Egan, H., & Moore, T. (2012). Using an iTouch to teach core curriculum words and definitions: Efficacy and social validity. *Journal of Special Education Technology*, *27*(3), 41-54.

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with technology: Activity theory and interaction design*. Boston, MA: MIT Press.

Kelly, S. M., & Wolffe, K. E. (2012). Internet use by transition-aged youths with visual impairments in the United States: Assessing the impact of postsecondary predictors. *Journal of Visual Impairment & Blindness*, *106*(10), 597-608

Kelly, A., & Tincani, M. (2013). Collaborative training and practice among applied behavior analysts who support individuals with autism spectrum disorder. *Education and Training in Autism and Developmental Disabilities*, *48*(1), 120-131.

Kopetz, P. B., & Endowed, E. D. (2012). Autism worldwide: Prevalence, perceptions,

acceptance, action. *Journal of Social Sciences, 8*(2), 196-201. Retrieved from http://search.proquest.com/docview/1288356180?accountid=14872

Kurtz, Lee, G. K., & Carter, E. W. (2012). Preparing transition-age students with high-functioning autism spectrum disorders for meaningful work. *Psychology in the Schools*, *49*(10), 988-1000. doi:10.1002/pits.21651

Liu, G. Z., Wu, N. W., & Chen, Y. W. (2013). Identifying emerging trends for implementing learning technology in special education: A state-of-the-art review of selected articles published in 2008–2012. *Research in developmental disabilities*, *34*(10), 3618-3628.

Lowery High School dual enrollment (2016). (http://www.waxahachietx.com/news/20160312/getting-ahead-through-wisds-cte-dual-credit).

Lowey High School information (2014). www.publicschoolreview.com/.

Lowery High School lunch eligibility (2012) http://high schools.com/directory/tx/cities/lowery/lowery-high-school/484473005095/

Lowery CTE (2014). http://www.wisd.org/default.aspx?name=CATE_home

Wehman, P., Lau, S., Molinelli, A., Brooke, V., Thompson, K., Moore, C., & West, M. (2012). Supported employment for young adults with autism spectrum disorder: Preliminary data. *Research & Practice for Persons with Severe Disabilities*, *37*(3), 160-169.

Merriam, Sharan B. (2009). *Qualitative Research: A Guide to Design and Implementation*. San Francisco, CA: Jossey-Bass.

Migliore, A., Timmons, J., Butterworth, J., & Lugas, J. (2012). Predictors of employment and postsecondary education of youth with autism. *Rehabilitation Counseling Bulletin*, *55*(3),

176-184. doi:10.1177/0034355212438943

Mintz, J. (2013a). Can smartphones support inclusion for autism in mainstream? *Journal of Assistive Technologies*, *7*(4), 235-242.

Mintz, J. (2013). Additional key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with Autism Spectrum Disorders: Evaluation of the 2nd HANDS prototype. *Computers & Education*, *63*, 17-27.

NLTS. (2015). *Data tables*. Retrieved from http://www.nlts2.org/data_tables/index.html.

National Center for Special Education Research. (2009). *Study design & methodology*. Retrieved from http://www.nlts2.org/studymeth/index.html#sample

Neild, R. C., Boccanfuso, C., & Byrnes, V. (2013). *The academic impacts of career and technical schools: A case study of a large urban school district*. Center for Social Organization of School. Johns Hopkins University, Baltimore. Retrieved from http://hdl.voced.edu.au/10707/268738**.**

Nevill, R. E., & White, S. W. (2011). College students' openness toward autism spectrum disorders: Improving peer acceptance. *Journal of Autism and Developmental Disorders*, *41*(12), 1619-1628.

Newman, L.A. and Madaus, J. W. (2014). Reported accommodations and supports provided to secondary and postsecondary students with disabilities: National perspective. *Career Development and Transition for Exceptional Individuals*.2165143413518235

O'Malley, P., Lewis, M. E. B., & Donehower, C. (2013). Using tablet computers as instructional tools to increase task completion by students with autism. Retrieved from http://files.eric.ed.gov/fulltext/ED541157.pdf.

Palmentari, A., and Didden, R. (2012). Task engagement in young adults with high-functioning autism spectrum disorders: Generalization effects of behavioral skills training. *Research in Autism Spectrum Disorders, 6*(4), 1377-1388.

Parr, A. D., & Hunter, S. T. (2014). Enhancing work outcomes of employees with autism spectrum disorder through leadership: Leadership for employees with autism spectrum disorder. *Autism*, *18*(5), 545-554.

Perkins, E. A., & Berkman, K. A. (2012). Into the unknown: Aging with autism spectrum disorders. *American Journal on Intellectual and Developmental Disabilities*, *117*(6), 478-496.

Ploog, B., Scharf, A., Nelson, D., & Brooks, P. (2013). Use of computer-assisted technologies (CAT) to enhance social, communicative, and language development in children with autism spectrum disorders. *Journal of Autism & Developmental Disorders*, *43*(2), 301-322. doi:10.1007/s10803-012-1571-3

Priestley, M. (1998). Constructions and creations: Idealism, materialism and disability theory. *Disability & Society*, *13*(1), 75-94. doi:10.1080/09687599826920

Ramdoss, S., Machalicek, W., Rispoli, M., Mulloy, A., Lang, R., & O'Reilly, M. (2012). Computer-based interventions to improve social and emotional skills in individuals with autism spectrum disorders: A systematic review. *Developmental Neurorehabilitation*, *15*(2), 119-135. doi:10.3109/17518423.2011.65165

Reaching Higher, The Common Core State Standards Validation Committee. (2010). Retrieved from: http://www.corestandards.org/about-the-standards/development-process/#timeline-2014

Reactions to the March 2010 Draft Common Core State Standards: Highlights and Themes from the Public Feedback. (2010). Retrieved from http://www.corestandards.org/about-the-standards/development-process/#timeline-2014

Southwest Education Agency 2014-15 School Report Card Lowery High School. (2014). Retrieved from file:///C:/Users/sgoc2/AppData/Local/Microsoft/Windows/INetCache/IE/TLM1Z0U3/c070912002.pdf

Roux, A. M., Shattuck, P. T., Cooper, B. P., Anderson, K. A., Wagner, M., & Narendorf, S. C. (2013). Postsecondary employment experiences among young adults with an autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *52*(9), 931-939.

Rydzewska, E. (2012). Destination unknown? Transition to adulthood for people with autism spectrum disorders. *British Journal of Special Education*, *39*(2), 87-93.

Schall, C., Wehman, P., & McDonough, J. L. (2012). Transition from school to work for students with autism spectrum disorders: Understanding the process and achieving better outcomes. *Pediatric Clinics of North America*, *59*(1), 189-202.

Schmalzried, J. E., & Harvey, M. W. (2013). Perceptions of special education and career and technical education collaboration and communication. *Career Development and Transition for Exceptional Individuals*, doi: 10.1177/2165143412467666

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*, *129*(6), 1042–1049. doi:10.1542/peds.2011-2864. Retrieved from

http://pediatrics.aappublications.org/content/early/2012/05/09/peds.2011-2864.full.pdf

Shogren, K. A., & Plotner, A. J. (2012). Transition planning for students with intellectual disability, autism, or other disabilities: Data from the national longitudinal transition study-2. *Intellectual and Developmental Disabilities,* 50(1), 16-30.

Song, S. (2013). Developing a framework for examining the 'niche' for mobile-assisted seamless learning from an ecological perspective. *British Journal of Educational Technology*, *44*(5), E167-E170. doi:10.1111/bjet.12069

Southall, C. (2013). Use of technology to accommodate differences associated with autism spectrum disorder in the general curriculum and environment. *Journal of Special Education Technology*, 28 (1), 23-34.

State Performance Plan Indicator Targets Lowery School District. (2014). Retrieved from http://www.corestandards.org/about-the-standards/development-process/#timeline-2014

Student Handbook. (2016). Retrieved from http://www.wisd.org/default.aspx?name=PARENTS_Forms

Strickland D, Coles C, Southern L. (2013). JobTIPS: A transition to employment program for individuals with autism spectrum disorders. *Journal of Autism & Developmental Disorders*. October 2013;43(10):2472-2483.

Taylor, J. L., & Seltzer, M. M. (2011). Employment and post-secondary educational activities for young adults with autism spectrum disorders during the transition to adulthood. *Journal of Autism and Developmental Disorders*, *41*(5), 566-574

Taylor, J. L., McPheeters, M. L., Sathe, N. A., Dove, D., Veenstra-VanderWeele, J., & Warren, Z. (2012). A systematic review of vocational interventions for young adults with autism

spectrum disorders. *Pediatrics*, *130*(3), 531-538.

United States Department of Education. (2004). *Individuals with disabilities education act*. Retrieved from http://idea.ed.gov/download/statute.html

Washington State Office of Superintendent of Public Instruction. (2015). *Elementary and secondary education act*. Retrieved from http://www.k12.wa.us/Esea/

Wehman P, Schall C, Carr S, Targett P, West M, Cifu G. (2014) Transition from school to adulthood for youth with autism spectrum disorder: What we know and what we need to know. *Journal of Disability Policy Studies*, June 2014;25(1):30-40.

Wehman, P., Schall, C., McDonough, J., Molinelli, A., Riehle, E., Ham, W., & Thiss, W. R. (2012). Project SEARCH for youth with autism spectrum disorders: Increasing competitive employment on transition from high school. *Journal of Positive Behavior Interventions*. 36: 58-66

Wei, X., Yu, J., Shattuck, P., McCracken, M., & Blackorby, J. (2013). Science, technology, engineering, and mathematics (STEM) participation among college students with an autism spectrum disorder. *Journal of Autism & Developmental Disorders*, *43*(7), 1539-1546. doi:10.1007/s10803-012-1700-z

Wei, X., Christiano, E. R., Jennifer, W. Y., Blackorby, J., Shattuck, P., & Newman, L. A. (2014). Postsecondary pathways and persistence for STEM versus non-STEM majors: among college students with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *44*(5), 1159-1167.

White, G. W., Summers, J. A., Zhang, E., & Renault, V. (2014). Evaluating the effects of a self-advocacy training program for undergraduates with disabilities. *AHEAD Association On*,

27(3), 229.

Yin, R K. (2014). *Case Study Research: Design and Methods*, 5th edition. Thousand Oaks, CA: Sage Publishing.

Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal*, *40*(4), 807-840.

Zhao, Y., Lei, J., and Frank, K. A. (2006) The social life of technology: An ecological analysis of technology diffusion in schools. *Pedagogies: An International Journal*, (2). 135-149.

Appendix A: District Letter of Cooperation

Bradley Gogan
xxxx Anywhere circle
Anywhere USA xxxxx
bradley.gogan@waldenu.edu

April, 2016

Dear Bradley Gogan,

Based on my review of your research proposal, I give permission for you to conduct the study entitled *Impact of a High School Career and Technical Education Program on Students with Autism Spectrum Disorder* at high schools in the Lowery School District. As part of this study, I authorize you to interview two CTE teachers and two special education teachers who provide instruction for students diagnosed with ASD. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include providing an office conference room during non-instructional hours for the interviews. We reserve the right to withdraw from the study at any time if our circumstances change.

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 Institutional Review Board (IRB) at Walden University.

Sincerely,

Appendix B: School Letter of Cooperation

Bradley Gogan
xxxx Anywhere circle
Anywhere USA xxxxx

bradley.gogan@waldenu.edu

April, 2016

Dear Bradley Gogan,

Based on my review of your research proposal, I give permission for you to conduct the study entitled *Impact of a High School Career and Technical Education Program on Students with Autism Spectrum Disorder* at a high school in XXX school district. As part of this study, I authorize you to interview two CTE teachers and two special education teachers who provide instruction for students diagnosed with ASD. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include providing an office conference room during non-instructional hours for the interviews. We reserve the right to withdraw from the study at any time if our circumstances change.

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 Institutional Review Board (IRB) at Walden University.

Sincerely,

Appendix C: Invitational Letter for CTE and Special Education Teachers

April, 2016

Dear Teacher,

My name is Bradley Gogan and I am currently a doctoral student at Walden University, an accredited institution of higher learning. I have also worked as a CTE teacher at the high school level for 5 years.

I am inviting you to participate in this research study, which is titled Impact of a High School Career and Technical Education Program on Students with Autism Spectrum Disorder. You have been invited to participate in this study because you are either a CTE teacher or a special education teacher who provides instruction to students diagnosed with Autism Spectrum Disorder (ASD).

I have attached a consent form that you will need to sign if you are interested in participating in this study. The consent form explains the purpose of this study and the procedures that I will use to collect data.

If you are interested in participating in this study, please sign the consent form and return it to me in the self-addressed, stamped envelope as soon as you can. I will select the first two CTE teachers and the first two special education teachers who send me their consent forms.

If you have any questions about this request, please contact me at either bradley.gogan@waldenu.edu or xxx-xxx-xxxx.

Thank you for your consideration.

Sincerely,

Bradley Gogan
xxx Anywhere circle, Anywhere USA.
xxxxx

Appendix D: Consent Form for CTE and Special Education Teachers

You are invited to take part in a research study that will explore the impact of a CTE program on the preparedness of students diagnosed with ASD for educational and/or employment opportunities beyond high school. You are invited to participate in this study because you are either a CTE teacher or a special education teacher who has provided instruction to students diagnosed 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.

Bradley Gogan, a doctoral student at Walden University, will conduct this study.

Background Information:

The purpose of this study is to explore how a CTE program impacts the preparedness of students diagnosed with ASD for postsecondary educational and/or employment opportunities.

Procedures:

If you agree to participate in this study, you will be asked to:
Participate in a 30-minute audio recorded individual interview that will be conducted in a private office conference room at the high school during non-instructional hours.
Review the tentative findings of this study for their credibility, which should not take longer than 15 minutes.
Here are some sample questions:

How do you integrate technology into your instructional activities?

What do you believe about the role that technology plays in the lives of individuals with ASD?

Do you believe technology has improved learning for students with ASD? Why or why not?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision about whether or not you choose to participate in this study. No one at Walden University or in the school district or at this high 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 later. You may stop at any time. This study is not associated with the school you attended.

Risks and Benefits of Being in the Study:
Participating in this study involves some minor risks. For example, you might find some of the interview questions challenging to answer. However, participating in this study would not pose risk to your safety or wellbeing.

The potential benefits might be that you will develop a deeper understanding of how a CTE program impacts the educational and employment opportunities beyond high school for students diagnosed with ASD.

Payment:
No compensation will be provided for participation in this study.
Privacy:
Any information you provide will be kept confidential. The researcher will not use your personal information for any purposes outside of this research study. In addition, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by using a password-protected computer and a coded memory device kept in a locked safe. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher at XXX-XXX-XXXX or bradley.gogan@waldenu.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott who is the Walden University representative who can discuss this study with you. Her phone number is 612-312-1210.

Walden University's approval number for this study is **IRB will enter approval number here** and it expires on **IRB will enter expiration date.**

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 understand that I am agreeing to the terms described above. I shall keep a copy of this consent form for my records.

Date of consent _____

Participant's Signature _____

Researcher's Signature _____

Appendix E: Interview Protocol for Teachers

1. Please describe the CTE courses that you teach or the special education services that you provide.
2. Explain why you believe the CTE courses that you teach are important in preparing for postsecondary educational and/or employment opportunities.
3. How do you integrate technology into your instructional activities?
4. What do you believe about the role that technology plays in the lives of students identified with ASD?
5. Do you believe technology has improved learning for students identified with ASD? Why or why not?
6. How do you differentiate instruction for students identified with ASD in your classroom?
7. How do you provide instruction for students identified with ASD that helps prepare them for postsecondary educational and/or employment opportunities?

Appendix F: Invitational Letter for a School District Administrator

June, 2016

Dear Administrator,

My name is Bradley Gogan and I am currently a doctoral student at Walden University, an accredited institution of higher learning. I have also worked as a CTE teacher at the high school level for 5 years.

I am inviting you to participate in this research study, which is titled Impact of a High School Career and Technical Education Program on Students with Autism Spectrum Disorder. You have been invited to participate in this study because you are an administrator who guides the direction of education for students with Autism Spectrum Disorder (ASD)and in your district.

I have attached a consent form that you will need to sign if you are interested in participating in this study. The consent form explains the purpose of this study and the procedures that I will use to collect data.

If you are interested in participating in this study, please sign the consent form and return it to me in the self-addressed, stamped envelope as soon as you can. I will select the first administrator who sends me their consent form.

If you have any questions about this request, please contact me at either bradley.gogan@waldenu.edu or xxx-xxx-xxxx.

Thank you for your consideration.

Sincerely,

Bradley Gogan
xxx Anywhere circle, Anywhere USA.
xxxxx

Appendix G: Interview Protocol for Administrator

1. What areas of the CTE program need improvement to insure ASD students are successful?
2. How is the CTE program broadening appeal to entice ASD students to take CTE classes?
3. How can strategic alliances work with the CTE program to benefit ASD students?
4. How can the school district improve socialization skills sets among ASD students?
5. What are your roles working with CTE educators, and special needs educators who work with ASD populations?
6. What is the most difficult problem going forward considering the educational needs of ASD students?
7. If you could change anything in the CTE program to meet the needs of ASD students, what would you change, and why?