APPLIED BEHAVIOR ANALYSIS BASED INTERVENTIONS IN PUBLIC SCHOOLS: UNDERSTANDING FACTORS THAT HINDER ADOPTION, IMPLEMENTATION AND MAINTAINANCE

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Abstract

Today as many as 1.5 million American children, most of them school-aged, are believed to have some form of autism, with this number swelling daily. There is no known cure for autism. Innovative nontraditional curricular approaches like Applied Behavior Analysis (ABA) have been identified as the most effective evidence-based interventions for students with autism. Despite the rising number of children with ASD, there is a lack of effective ABA-based ASD programs in public education.

This study used the Diffusion of Innovation theory to explore the challenges that public school special education administrators encounter as they go about adopting, implementing and maintaining ABA-based treatment approaches in their schools. Five public school systems in four states in the northeastern United States that have already adopted ABA programs for their students with autism were examined in this study. Three questions guided the study: What are some of the barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt ABA-based autism programs in their schools? What are some of the challenges special education administrators face with the implementation of such programs? What are the challenges these administrators face in the confirmation and continued institutionalization of ABA-based autism programs?

This study employed a multiple case study design and utilized a *general inductive analysis* approach to analyze the findings. The results of this study highlight problem factors in four categories that work against the adoption and maintenance of ABA-based autism programs in public schools: factors within the innovation itself, resources factors, intended-user characteristics and inter-element factors. By highlighting the challenges of such an innovative

undertaking, findings of this research could inform policy makers, public education administrators and clinicians as they set up programs in their schools.

Implications for future practice that arise from this study include the need for increased funding for ABA-based autism programs, a call for more collaborative teacher and support staff training, the preparedness for special education administrators to implement ABA-based programs, and a revised role for Applied Behavior Analysis and autism researchers.

Keywords: autism, Applied Behavior Analysis, special education administrators, Diffusion of Innovation

DEDICATION

For my son,

Amani Sheldon Kamau

~

For my grandmother,

Mary Wanjiku Kiruri, the family matriarch who in a small Kenya village believed that all her grandchildren could find opportunity in the United States. Grandma, your wisdom and imagination launched a thousand stories.

~

And for Prudence “Prudy” S. Wetherell (posthumously)

I miss those chocolate bars that you supplied me with, they were just enough to get me through numerous late nights.

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This dissertation represents almost four years of life investment. It has been an intensive time of challenges, personal development, pain and now victory. While on this road, my young family fractured and finally broke. There was a job loss and its associated financial hardship, medical crisis, death, loads of stress and a break up. But what seemed insurmountable, is now drawing to a close. I am awestruck at the idea of being "done."

I am so relieved to be starting a new phase of life, where I can begin to heal and repair the wounds and fractures sustained on this road and, where possible, to build anew.

As I reflect on this path, I have many, many people to thank. More than can be named here. To start, I must extend appreciation to the faculty of Northeastern University, College of Professional Studies (CPS) who all had a hand in shaping my academic development over the years. To my committee members: Drs. Jennifer Qian, EdD, Gail Matthews-DeNatale, PhD and Mary Brady PhD. I owe special thanks for their dedication and expertise. It was a pleasure to work with you! My sincerest gratitude goes to my major professor, Dr. Qian. She has been both a tremendous resource and source of encouragement, always willing to give me the benefit of her wisdom and her editorial pen. I know this dissertation would have been so much less without her guidance. Thanks, Dr. Qian.

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laptop, he could tell something had changed. After the long session was done, Amani blessed me with countless hugs and kisses and let me know he loved me. I knew I had to do this for him.

College was amongst the first words in his vocabulary. But the biggest change was a night in March, 2012 when I came downstairs from my study room. My ex-wife announced that I had abandoned the family for my education. I wanted to scream that I was doing this for us, our son and his future but it did not come out that way. She left, that night, never to return. That is now in the past, but Ivy, this victory could not have been possible without you. When you came into my life, I was just finishing a Bachelor's degree. With your support, I made my way through my master's program, and then into the doctoral program. Thank you. I owe you a deep and non-repayable debt. You never complained about bathing Amani, or reading him bedtime stories when I was upstairs working on papers. You dropped me off and picked me up at the Providence train station whenever I had to go to Boston for class. You made me pineapple- upside- down-cake and brought it upstairs so many times, you made the cookies and sent our son's pictures to my family whenever they asked. I regret that you could not bear the pain of loneliness any more. Thank you for all your love and support. You taught me that joy can be found in the little things of our lives: the flower garden, the walks at the Thompson dam, afternoon naps and the hugs of a cute little boy. Wherever you are, the completed work is ours, as it could not have been done without you and your support.

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Chapter 1: Introduction

Problem of Practice

The United States is nearing a crisis in American public education today occasioned by the rising numbers of students with Autism Spectrum Disorders (ASD). Today as many as 1.5 million children, most of them school-aged, are believed to have some form of autism, with this number growing everyday (Autism Society of America, n.d.; Center for Disease Control and Prevention, 2012). Unfortunately, there is no known cure for autism (Autism Society of America, n.d.; Center for Disease Control and Prevention, 2012; Koegel, Koegel, Vernon, & Brookman-Frazee, 2010; National Research Council, 2001). Innovative nontraditional Applied Behavior Analysis (ABA) approaches, for example, Discrete-Trial Training (DTT), an exemplary ABA technique based on operant discrimination learning (Cooper, Heron, & Heward, 2007), and Pivotal Response Training (PRT), a less structured, more naturalistic method, have been identified as the most effective evidence-based interventions for students with ASD (Koegel, Koegel, Vernon, & Brookman-Frazee, 2010; National Research Council, 2001).

There is mounting evidence regarding the utility of such innovative ABA-based practices that serve as educational interventions for autism (Heward, 2003; National Research Council, 2001; Stahmer, 2007) and federal mandates which require educators to use evidence-based practices to improve academic and/or behavior outcomes. Some examples of these mandates include the Individuals with Disabilities Education Improvement Act (IDEA, 2004) and the No Child Left Behind Act (U.S. Department of Education, 2002). However, there has been reluctance by public school systems to adopt these ABA-based education interventions (Heward, 2003; National Research Council, 2001; Stahmer, Collings, & Palinkas, 2005; Stahmer, 2007).

Many public school systems continue to use techniques unsupported by research and when school systems have adopted these evidence-based approaches, they are not often implemented the way they are designed (Heward, 2003; National Research Council, 2001; Stahmer, Collings, & Palinkas, 2005; Stahmer, 2007). For example, at the invitation of the U.S. Department of Education's Office of Special Education Programs, the National Research Council (2001) formed the committee on Education Interventions for Children with ASD and charged the committee with the mission to study educational interventions in public school systems for children up to eight years of age. The findings of the committee decried the lack of evidence-based ASD intervention in public schools. The committee's findings noted that interventions used commonly for children with autism in public education, early intervention programs (e.g., music therapy, occupational therapy and Social Stories) have minimal, if any, research-based evidence of success, and others do not have a research base at all (National Research Council, 2001). The following year, the National Institute of Mental Health convened stakeholders to investigate the state of autism interventions in public schools. From 2002 to 2004 they informed necessary government agencies about the state of interventions for autism (Dingfelder & Mendel, 2011). The findings of this stakeholders group confirmed the findings of the National Research Council report (2001), emphasizing that methods used in education settings for ASD interventions do not parallel research (Schalock, Verdugo, & Gomez, 2011). Similar findings have come up from other studies across the country that confirm the same. For example, Stahmer and Collings (2005), in a study of 57 school districts in San Diego and Riverside counties of southern California, reported that providers of services for children with autism in those school districts stated that they used both evidence-based and non-evidence

based techniques. They also reported that they combined and modified these techniques based on the child, personal and external factors. The idea of merging techniques is contentious and under-researched (Stahmer & Aarons, 2009). Additionally, few providers had a clear understanding of evidence-based practice and all providers reported concerns about adequate training (Anderson, 2002; Anderson & Schreibman, 1999; Ingersoll, Schreibman, & Stahmer, 2001; Rogers, 1996; Sherer, 2002).

A study of 156 teachers in Georgia public schools who had students with ASD in their classrooms at the time of the study reported that less than 10% of strategies used with their students were grounded upon scientific-based research. Of the top five strategies used in the state of Georgia (assistive technology, cognitive behavior modification, gentle teaching, sensory integration, and Social Stories) none are scientifically based according to the author's findings. The results further revealed that treatment selection varied depending upon the grade level and type of classroom placement (special education, general education, or mixed) for students with ASD (Hess, Morrier, Heflin, & Ivey, 2008).

Given the rising number of children with ASD who need education, and the lack of effective ABA-based ASD programs in public education, there is an urgent need for researchers to explore what factors hamper the adoption of ABA-based ASD programs in public schools and the integration of these practices, both into the classrooms and into education decision-making and policy, at local, district and state levels (Rumsey, Vitiello, Cooper, & Hirtz, 2002). In an effort to achieve that goal, this study sought to evaluate challenge factors that were involved in the adoption and implementation of ABA-based ASD programs in five public school systems in four states in the northeastern United States that have already adopted ABA programs for their

students with autism. By highlighting the challenges of such an innovative undertaking, findings of this research could inform policy makers, public education administrators and clinicians as they set up programs in their schools.

Significance of the Problem

Educating children with ASD and other disabilities is the responsibility of public schools, effective from 1975, as part of the Education of All Handicapped Children Act, which is now known as IDEA (Murdick, Gartin, & Crabtree, 2002), public schools remain the primary apparatus by which the majority of children with ASD could receive highly specialized interventions until adulthood. To be able to provide such interventions, public schools must adopt ABA-based programs for ASD students at a rate that matches the rising numbers of children enrolling every year.

The current benchmarks set by the No Child Left Behind Act of 2001 (NCLB) and federal mandates, such as IDEA, also create urgency for the adoption of ABA-based treatment interventions. Under NCLB, every state is required to create assessments aligned to that state's academic standards. Further, all students, including those with disabilities, are required to take these assessments. Student performance results for each subgroup must reach the yearly benchmarks established by NCLB in order to achieve Adequate Yearly Progress (AYP). Schools not reaching these yearly benchmarks face serious consequences including withholding of funds (NCLB, 2001). Because the scores of students with ASD are also reported in the aggregate numbers, adopting innovative curricular methodologies will only help boost the schools' overall scores (National Research Council, 2001).

Under the Least Restrictive Environment clause of IDEA, federal law requires that students with disabilities be educated with their nondisabled peers, to the greatest appropriate extent. Students with ASD often have a lot of challenging behaviors that hamper the effective implementation of the least restrictive clause; however ABA-based interventions have been shown to be effective in reducing these problem behaviors to a level where children with ASD can be educated with their nondisabled peers, in either the general education classroom or a combination of both self-contained and general classrooms (Dawson, Jones, et al., 2012; Eapen, Rudi, & Walter, 2013; Grindel, Hastings, Saville et al., 2012; Sack-Min, 2008).

Furthermore, the financial toll on taxpayers when public schools fail to adopt ABA-based interventions for their students with ASD cannot be ignored. Under IDEA, children with autism are guaranteed a free and appropriate public education that allows them to learn as much as possible. However, when public schools do not use interventions with proven efficacy, courts can mandate costly private school alternatives (Yell & Drasgow, 2000). The estimated cost of educating a student with autism in a private placement can range from $22,500 to over $75,670 per year, with an expected course from two to six years (Chasson, Harris, & Neely, 2007; Jacob, Mulick, & Green, 1998). With the increasing diagnosis of autism, which the Autism Society of America estimates to reach four million school- age children in the next decade (Autism Society of America, n.d), the amount of money that public school systems will channel to private alternative schools is bound to grow exponentially (U.S. Government Accountability Office, 2005; Yell & Drasgow, 2000). This financial strain necessitates public schools to implement their own programs that are less expensive.

Given these factors discussed herein, the rising number of children with ASD enrolling in public education, the exponential costs of educating children with autism in private placements and its burden on taxpayers (Chasson, Harris, & Neely, 2007; Jacob, Mulick, & Green, 1998) and the need for schools to adopt Least Restrictive interventions for their students with disabilities (IDEA, 2004), the urgency for this line of research is evident.

There is, however, little research on the challenges that public school administrators face in implementing ABA-based ASD programs in public schools (Autism Society of America, n.d.; National Research Council, 2001; U.S. Department of Education, 2009). Emerging research suggests that factors such as public school administrators' lack of specific training on the needs of students with autism (Smith & Smith, 2006), financial restraints (Autism Speaks, 2012) and the lack of enough qualified ABA professionals, teachers, and support for paraprofessional staff are some of the challenges that hamper the adoption of ABA-based programs in public schools (Boe, Cook, & Sunderland, 2008). This research will be an addition to the little research available (Autism Society of America, n.d.; National Autism Center, 2009; National Research Council, 2001; U.S. Department of Education, 2009).

Research Questions and Hypothesis

Given the rising diagnosis of ASD, the need for ABA-based intervention programs and the lack of literature on the challenges that special education administrators encounter in adopting ABA-based programs for their ASD population, this study sought to understand the difficulties that special education administrators encounter as they go about adopting, implementing and maintaining ABA-based treatment approaches in their schools. Three broad questions guided this research:

(a) What are some of the barriers encountered by special education administrators as they persuade various parties in their schools to adopt ABA-based autism programs in their schools?

(b) What are some of the challenges special education administrators face with the implementation of such programs?

(c) What are the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs?

Towards achieving that goal, the researcher studied ABA-based ASD programs in five public school systems in the Northern United States that have already adopted ABA programs for their students with autism.

Theoretical Frameworks

Theoretical frameworks are a central component of research. They act as guideposts for the researcher by providing theoretical foundations. This allows the researcher to formulate the initial research problem, ask the precise research questions, select an appropriate population of study and assist in the interpretation of the data and conclusions reached (LeCompte & Preissle, 1993). This study used the Diffusion of Innovation (DOI) theory as a framework to explore the process, the challenges, and lessons learned (if any) by public school administrators as they put ABA-based interventions in place for their autism programs. It is imperative that other public school administrators trying to put in place ABA-based programs be cognizant of the problems that pioneering school administrators faced when trying to adopt and implement such innovations in their schools, so that these new schools leaders can avoid the same problems, if possible, or find ways of dealing with them in advance. This is important because Fullan (2001)

claims that the literature suggests that curriculum innovations in public schools are seldom completely successful.

The Diffusion of Innovation (DOI) Theory

The manners of adopting new innovations have been studied for over 30 years. One of the most prevalent adoption models is described by Everett Rogers in the seminal work, *Diffusion of Innovations*. The DOI (Rogers, 1962, 2003) provides a theoretical framework that describes how, why, and at what rate innovations spread among individuals and organizations. This theory also addresses factors that both facilitate and hinder the adoption of innovations. This study emphasized factors that hinder the adoption of ABA-based curricular innovations.

According to Rogers (1962, 2003), diffusion is the process by which an innovation is transferred through certain channels over time among members of a social system. A social system is defined as individuals who are in groups or structures that have different functions, characteristics, origin or status within an organization (Parsons, 1991). Diffusion, which is additionally considered a type of social change, is also defined as the process by which change occurs in the structure and function of a social system (Rogers, 1962, 2003).

An innovation is an idea, practice, or object that is perceived as new by an individual or other adopting social group (Rogers, 1962, 2003). ABA is considered an innovative teaching approach that is not used largely in schools. The major frameworks used in education today are based on the work of two noted theorists, Jean Piaget's theory of human development and John Dewey's development model (Heward, 2003; Stone 1996). These two theoretical frameworks are markedly different from the behavior analysis approach of ABA, making ABA a novel,

innovative technique in the American education system (Heward, 2003; National Research Council, 2001).

The DOI theory argues that the decision to accept, adopt and use innovative interventions is not an instant act but a process comprising of five main steps: the knowledge, the persuasion, the decision, the implementation and the confirmation (Rogers, 1962, 2003). Figure 1 below summarizes these five steps.

Figure 1. Summary of the Diffusion of Innovation (DOI)

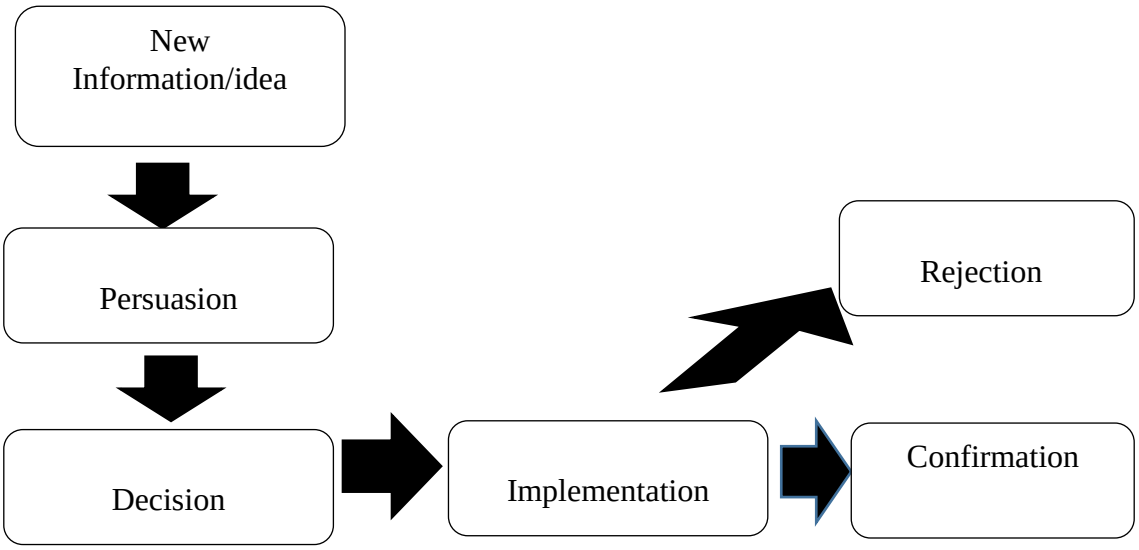

Figure 1. The five stages that comprise the diffusion of an innovation according to Rogers (1962, 2003). The DOI theory argues that the decision to accept, adopt and use innovative interventions is a process comprising of five main steps: the knowledge, the persuasion, the decision, the implementation and the confirmation.

The knowledge stage in the diffusion of innovation decision making process begins when the decision making unit of an organization is exposed to the existence of an innovation and

gains an understanding of how it functions (Rogers, 2003). In the knowledge stage, school districts are made aware of new programs and encouraged to adopt them (Rohrbach et al., 1993).

The persuasion stage takes place when those who are familiar with an innovation become psychologically involved with the innovation. These individuals actively seek information about the new idea, process this knowledge and then interpret it to form a general perception on the innovation. During this stage, the school administrators explain innovations to their staff. Subsequently, the staff (in this case special education teachers, paraprofessionals and other support staff) form attitudes toward the use of the innovation and make a commitment, or not, to initiating a program (Rohrbach et al., 1993).

Rogers (2003) notes that the knowledge of an innovation does not at all times lead to an adoption or rejection; there are many factors that come into play during persuasion which could hinder the adoption of an innovation. For example, organizational culture, the inherent uncertainties associated with an innovation, the discrepancy between the acquired knowledge on an innovation and attitudes toward the innovation among others. These dynamics, which could stall an innovation, are usually sorted out at the decision stage.

An innovation that goes past the decision stage then moves on to the implementation stage. The innovation is then put to use. At the time of implementation, school administrators, teachers and others deliver the program (Rohrbach et al., 1993). Rogers (2003) also notes that the decision to adopt an innovation is usually not the last step in the innovation-decision process. Long after the adoption of the innovation, organizations need to continue to re-evaluate their adopted innovations. In the case of schools, teachers and other program staff are encouraged to continue using an adopted innovation. At his stage the innovations go from implementation to

institutionalization. It is also here that, administrators and practitioners can make a pledge to discontinue or continue to use the innovative program (Rohrbach et al., 1993). As in other stages, a myriad of factors can hinder the long term maintenance of an innovation. Institutions that have seen an innovation come through all the steps of the innovation-decision process sometimes fail to maintain it and it is never implemented (Rohrbach et al., 1993; Rogers, 2003).

Given the utility of the DOI theory to study innovations in other fields of study, researchers have recognized the possible benefits of the application of this theory in educational research. In fact, Rogers (2003) noted that "an exciting potential contribution could be made by education research using the DOI because organizations are involved, in one way or another, in the adoption of most educational innovations. U.S. farmers and consumers mainly make optional innovation-decisions, but most school teachers and school administrators are involved in collective and/or authority innovation-decisions. Teachers, unlike farmers and consumers, work in organizations, and so organizational structures are inevitably involved in educational adoption decisions (p. 61)". Education researchers have taken the call by Rogers (2003) to use the DOI theory in education research. For example, in a study to revolutionize English language teaching practices in Japan, Henrichsen (1989) proposed and used the Diffusion of Innovation in Education Model (DIEM), in response to Rogers' (1995) call for a systemic perspective. The DIEM, which was a modification of the DOI (Rogers, 1962), considered both individual and socio-organizational variables that affect the impact of educational innovations. Henrichsen's (1989) study incorporated findings from various studies of diffusion in educational settings to formulate a three part process that examined the antecedent variables, process variables, and consequences that influence the diffusion of an educational innovation. Warford (1989), using

the DOI theory, conducted a study to investigate both individual and socio-organizational variables that affect the diffusion and adoption of the American Council on the Teaching of Foreign Languages (ACTFL) proficiency guidelines to Southeastern U.S. foreign language, teacher educators. This study also hopes to add to that body of DOI research in education.

The DOI Theory and ABA-based Interventions for ASD

The DOI theory provides a theoretical framework for this study because of its multifaceted approach to the adoption of innovations. It addresses the steps of the innovation-decision process, following an innovation from its reception to its institutionalization. It also devotes considerable effort to factors that can work against the intended innovation (Dow, Ruth, Whitehead, & Wright, 1984; Williams, 1975). Table 1, represents a summary of factors that hinder innovations. These inhibiting factors are grouped into four general categories: factors within the innovation itself, resources factors which are employed towards the adoption process, intended user characteristics and inter-element factors. These are factors "within the user system or between elements" (Henrichsen, 1989, p. 82). Since these inhibiting factors are so varied and important they will be discussed further in the literature section of this study. This study explored how these factors challenge the adoption and implementation of ABA-based autism programs in public schools.

Diffusion literature notes that considerable time should be given to factors that inhibit intended innovation. In fact some researchers note that planning over such inhibiting factors should take precedence over other aspects of planning because "these factors, if not well planned for, often appear in unexpected, new forms and foil even the best laid plan"(Henrichsen, 1989, p. 82). As mentioned elsewhere earlier in this study, it is important that public school

administrators planning to put in place ABA-based programs be aware of problem factors that could work against their intended idea, so they can avoid failure, which is a high tendency in curriculum-oriented innovations (Fullan, 2001). The DOI theory offers a perfect avenue to investigate possible barriers in each step of the diffusion process.

Table 1

Factors that Hinder Innovations

Factors within the Innovation Itself	Originality
	Complexity
	Explicitness
	Relative Advantage
	Trialability
	Observability
	Status
	Practicality
	Flexibility
	Primacy
	Form
Resources Factors	Capacity
	Structure
	Openness
	Harmony
Intended-User Characteristics	Geographic Location
	Centralization of Power and Administration
	Size of the Adopting Unit
	Communication Structure

	Group Orientation and
	Tolerance of Deviancy
	Openness
	Teacher Factors
	Leaner Factors
	Capacities
	Education Philosophy
	Examinations
	Compatibility
Inter-Element Factors	Linkage
	Reward
	Proximity
	Synergism

Note. The table summarizes factors that hinder innovations. These inhibiting factors are grouped into four general categories: factors within the innovation itself, resources factors which are employed towards the adoption process, intended user characteristics and inter-element factors according to Henrichsen (1989).

It is worth pointing out that while the DOI theory is a process consisting of five main steps (Rogers, 1962, 2003), considerably less effort is devoted to the knowledge and decision stages in education research. Rohrbach et al. (1993) argued that the decision to adopt innovative interventions in education is usually influenced by external factors like the education departments at local, state and national levels. Some external factors beyond the school influence the use of ABA-based interventions in public education. For example, in the case of ABA-based autism programs, legislative authority, such as IDEA, requires educators to use evidence-based practices to improve academic and behavior outcomes (Heward, 2003); Legislative acts adopted in 26 U.S. states now recognize and require health insurance companies

to cover yearly costs of ABA interventions for students with a diagnosis of autism until the age of 21 (Autism Speaks, 2013). Furthermore, these factors expose school administrators to an innovation's existence, and therefore reduce their role, once informed of the innovations, to that of initiating the adoption without the need to consult extensively on whether to adopt it or not (Rohrbach et al., 1993). However, while administrators may have the primary authority to adopt new programs, a complex array of factors may hinder the successful adoption, implementation and the confirmation of innovations (Dingfelder & Mandell, 2011; Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004; Rogers, 2003; Stahmer, 2007). Such factors include but not limited to school climate factors, teacher commitment (Holy, Tarter, & Bliss, 1990), school organizational climate (Hoy, Tarter, & Hot, 2006), teacher preparation in ABA practices, logistical decisions, and parent support and collaboration (Iovannone, Dunlap, Huber, & Kincaid, 2003; McKelvey, 2008; Smith & Smith, 2000).

As mentioned earlier, despite the rising number of children with ASD who need education, there is a lack of effective ABA-based ASD programs in public education. Public school systems continue to use techniques unsupported by research and in cases where school systems have adopted these evidence-based approaches, they are not often implemented the way they are designed (Stahmer, Collings, & Palinkas, 2005; Stahmer, 2007). This study used the DOI theory to explore what factors hinder the adoption of ABA-based practices in their schools as educational intervention for students with Autism Spectrum Disorders (ASD) hereafter referred to as autism.

Definition of Terms

While there is little expressly technical language used in this research study, it is

important that several important terms be defined.

1. Special education administrators refer to a group of professional people who work in a school system or individual schools and lead the special education team. The team often consists of administrators, instructional assistants, school psychologists, social workers, and Board Certified Behavior Analysts (BCBA) © in schools with ABA-based programs. The special education administration provides support for the teachers, students, and parents who are involved with special education programs. The administration team also monitors all the current special education programs, policies, and funding.
2. ABA is a treatment methodology pioneered by Dr. Ivar Lovaas, and is based on B. F. Skinner's theories of operant conditioning.
3. Autism is one of five disorders that fall under the umbrella of Pervasive Developmental Disorder (PDD). Autism is also referred to as early infantile autism, childhood autism or Kanner's autism. Most recently the term Autism Spectrum Disorders (ASD) is being used to refer to autism.
4. Diffusion of Innovation (DOI) is a theoretical framework that describes how, why and at what rate innovations spread among entities and organizations. Additionally, diffusion, according to Rogers (1962, 3003), is the process by which an innovation is transferred through certain channels over time among members of a social.

Chapter 2: Literature Review

As aforementioned in the previous chapter, despite growing evidence of the efficacy of innovative ABA-based practices as educational interventions for autism (Heward, 2003; National Research Council, 2001; Stahmer, 2007), there has been reluctance by public school systems to adopt these education interventions (Heward, 2003; National Research Council, 2001; Stahmer, Collings & Palinkas, 2005; Stahmer, 2007). Therefore, this chapter will review literature on the efficacy of ABA-based approaches in the treatment of ASD and factors that may hinder the adoption of ABA-based approaches as educational interventions from the little available research. Additionally this chapter will briefly review autism spectrum disorders in an effort to inform the reader.

Autism Spectrum Disorders

Autism is one of five disorders that fall under the umbrella of Pervasive Developmental Disorders (PDD). As illustrated in Figure 2, next page, the five sub-categories of PDD are Autistic Disorder, Asperger's Disorder, Childhood Disintegrative Disorder (CDD), Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS) and Rett's Disorder (Diagnostic and Statistical Manual of Mental Disorders, 2000; Exkorn, 2005). The most common types of PDDs are autism, PDD-NOS and Asperger's Disorder (Bruey, 2004).

Figure 2. Autism Spectrum Disorders

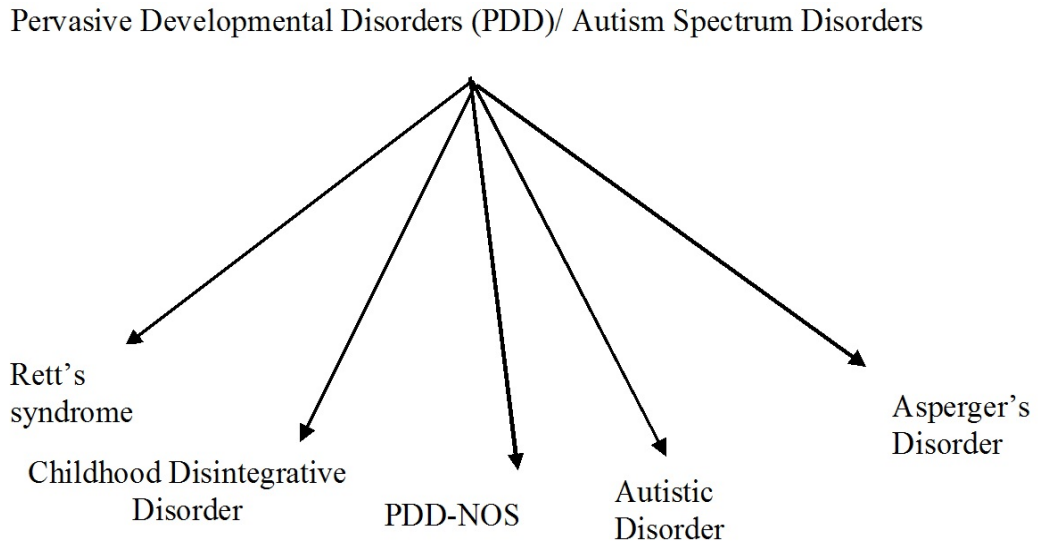

Figure 2. Autism is one of five disorders that fall under the umbrella of Pervasive Developmental Disorders (PDD) also known as Autism Spectrum Disorders. The five sub-categories of PDD are Autistic Disorder, Asperger's Disorder, Pervasive Development Disorders- Non Otherwise Specified, Childhood Disintegrative Disorder (CDD) and Rett's Syndrome.

These PDD disorders are all characterized by severe and pervasive deficits in several areas of development including social interactions and communication skills, as well as a presence of unique behaviors that are not typical in a normal child's development. Some of the odd behaviors exhibited by children with autism are repeated body movements including flapping their hands in the air, or rocking back and forth. Children with autism may also develop unusual attachments to objects and resist change in routines. Other than these unique behaviors and the lack of normal language development, children with autism do not manifest any distinct characteristics from typical developing children (Holmes 1997; Powers, 1989).

Autism appears before the age of three years, but varies in the severity of symptoms, age of onset, and the presence of various features, such as mental retardation and specific language

delay (Autism Society of America, n.d.; Center for Disease Control and Prevention, 2012; National Research Council, 2001). Boys are five times more likely to have autism than girls are, however girls with autism tend to exhibit more severe characteristics (Diagnostic and Statistical Manual of Mental Disorders, 2000).

In order for a child to receive a diagnosis of Autistic Disorder, specific criteria as outlined on the DSM-IV-TR must be met; but overall, a significant impairment in communication and social interaction must be present, as well as restricted repertoire of activities and interests. Mental retardation is commonly present, as is uneven development of cognitive skills. Behavioral symptoms are common, and they range from self-injurious behaviors to hyperactivity to severe temper tantrums. Some eating difficulties and sleep disorders are also commonly reported. Seizure disorders are also present in approximately 25% of children with the diagnosis (Brock et al., 2006; Ginker, 2007).

Recent reports suggest that the prevalence of ASD is significantly higher than previously reported. For example, in March 2013, the Centers for Disease Control (CDC) released a new survey that indicates that 1 in 50 school-age children have autism; this increasing trend for autism rates is now the norm in public schools across the country (Center for Disease Control and Prevention, 2013).

Current Treatment of Autism

As mentioned earlier, currently there is no known cure for ASD (Thompson, 2005). Steering through the ASD treatment maze can be an overwhelming task for both parents and professionals (Heflin & Simpson, 1998; Thompson, 2005). In addition, the variety of treatment

options offered, coupled with opposing views among professionals, has created significant confusion (Heflin & Simpson, 1998; Iovannone, Dunlap, Huber, & Kincaid, 2003).

Treatments comprise of psycho-pharmaceutical, to behavioral interventions, to a combination of treatments (Brock et al., 2006, Iovannone et al., 2003; National Institute of Mental Health, 2004), but research strongly suggests education intervention as the primary form of treatment for autism (Autism Society of America, n.d., National Research Council, 2001).

In an effort to establish a guideline that could be used to determine the effectiveness of a treatment method for ASD, the National Autism Center launched a study in 2005 that comprised of nationally recognized scholars and researchers on autism interventions. That study scrutinized and quantified the level of supporting interventions that target the main characteristics of ASD in children, adolescents, and young adults. Using computer and hand searches to review titles and abstracts, the researchers selected a total number of 775 studies that has been published showing the effectiveness of an intervention for children with ASD. Criteria were used to include (or exclude) articles for the study. For instance, interventions could be implemented by school systems, individuals in the study had a diagnosis of ASD, the articles had to have been published in a peer-reviewed journal, and the subjects in the study must have been below the age of 22 years old at the time the study was conducted.

Trained reviewers read and coded the identified articles, once all articles were coded, a Scientific Merit Rating Scale (SMRS) score was assigned that reflected the confidence that the experts could place on the specific article findings. After all articles had been assigned an SMRS score, the scores were aggregated to determine the strength of evidence (consistency, quality and quantity) supporting the treatments. The SMRS was a conceptual model for evaluating articles

with the Scientific Merit Rating Scale created by a team of experts in one study panel (National Autism Center, 2009).

The findings of this project produced a four-tier classification method that identified autism treatment interventions as established, emerging, unestablished, and ineffective or harmful (National Autism Center, 2009). This research remains the most comprehensive guide to interventions for ASD. An overwhelming majority of established interventions were based on analytic behavior principles (Autism Society of America, n.d., CDC, 2007).

Established treatments are interventions that have sufficient evidence to produce favorable outcomes for individuals on the autism spectrum. Emerging treatments are interventions that have produced success in some cases, yet firm conclusions have not been drawn. Unestablished treatments have little or no evidence about their treatment effectiveness for individuals with ASD while harmful treatments are those that were determined ineffective or harmful for individuals with ASD (National Autism Center, 2009).

Auditory integration training, facilitated communications, sensory diets and sensorimotor integration therapy were identified as unestablished treatments despite their popularity in public education (Dawson & Watling, 2000; Goldstein, 1999; National Autism Center, 2009). These are briefly discussed elsewhere in sections that follow. Social skills training, also widely used in public school, for an umbrella term that comprises of social skills groups, one-on-one social skills therapy, peer modeling and video modeling, was identified as an emerging treatment (Cooper, Heward, & Heron, 2007; National Autism Center, 2009). Educational interventions such as ABA-based approaches emerged as the most effective treatments (National Autism Center, 2009).

In auditory integration therapy, music is input through earphones with selected frequencies filtered out. It is hypothesized that such treatments enhance attention, arousal, language and social skills. However, studies have noted no differences in responses to auditory integration therapy in children who do not have autism or in control groups (Best & Miln, 1997; Gravel, 1994; Gillberg et al., 1997).

Facilitated communication is an alternative form of communication used by some individuals who have limited or no speech. With this technique, a facilitator physically supports the arm, hand or wrist of an individual with autism to help him or her use a computer keyboard or typewriter or to point to symbols or letters on a board (Biklen, 1993). The issue of contention in facilitated communication is whether the communication is under the authorship of the individual with autism, the facilitator, or the communicator (Shane, 1994).

Sensory integration involves taking information through the senses and organizing and integrating the information in the brain. Sensory integration therapy focuses on the basic senses: tactile (i.e., touch), auditory (i.e., hearing), and vestibular (i.e., sense of movement) and proprioceptive (i.e., body position). Therapy for sensory integration dysfunction is usually done by an occupational, physical, or speech therapist who provides sensory and motor activities often in the forms of games, exercises, and play. While this is a widespread form of intervention in public education, there is no consistent evidence that sensory-based treatments have specific effects; in many cases, the theories underlying such methodologies have not withstood careful consideration (Dawson & Watling, 2000; Goldstein, 1999).

The goal of social skills training is to help children with ASD make friends, establish relationships, and develop appropriate social interactions (Cooper, Heward, & Heron, 2007;

National Autism Center, 2009). Social skills training sessions are usually run by the school psychologist, speech therapist or a special education teacher. The social skills facilitator uses discussions, games, role-playing and activities to develop social understanding, teamwork and empathy. One technique used to enhance social skills is called Social Stories. These are short narratives that are used to teach children how to respond appropriately in typical situations (National Autism Center, 2009).

As previously stated, education is the primary form of treatment for autism, based on clinical evidence. ABA-based interventions such as behavior based techniques, positive reinforcement, individualized goals and programming, and establishing a rewarding environment consistently emerged as effective educational interventions for autism (CDC, 2007; Cooper, Heward & Heron, 2007; Francis, 2005; Heward, 2007; Humphries, 2003; National Alliance for Autism Research, 2005; National Autism Center, 2009; Thompson, 2005). Additionally, educational interventions are able to reduce some of the challenges associated with the disorder, thereby increasing the options in life for children with ASD (CDC, 2007; National Autism Center, 2009; National Research Council, 2001).

The CDC further recommends research-based treatment modalities that are intensive, systematic, and behavior analytic in orientation, with structured ways of teaching individual children with autism. Such programs should also have a specialized curriculum focus and a functional approach to dealing with problem behaviors (CDC, 2007; Iovannone et al., 2003). Behavioral and educationally based modalities met that standard (CDC, 2007, National Autism Center, 2009; National Research Council, 2001).

Currently the most widely known and accepted educational and behavioral interventions for ASD include applied behavior analysis (ABA), discrete trial training (DTT) and pivotal response training (PRT) (Cooper, Heron, Heward, 2007; Heward, 2003; Maurice, Green, & Foxx, 2001; National Autism Center, 2009; National Research Council, 2001; Thompson, 2005). The following section briefly describes each of these methodologies.

Applied Behavior Analysis (ABA)

ABA is defined as a set of concepts and principles dedicated to the understanding and improvement of human behavior (Bailey & Burch, 2006; Cooper, Heron, & Heward, 2007; Maurice, Green & Foxx, 2001). The goal of ABA as a teaching methodology is to use interventions based on the principles of learning theory to improve socially significant behaviors to a meaningful degree (Alberto & Troutman, 2008; Bailey & Burch, 2006; Bear, Wolf, & Risley, 1968, 1987; Buchanan & Weiss, 2006; Celiberti, Buchanan, Bleeker, Kreiss, & Rosenfeld, 2008; Greer & Ross, 2008). Examples of such socially significant skills include play skills, social, communication, and relationship-building skills, and everyday living skills like brushing teeth and tying shoe laces. ABA is also used to help decrease or eliminate aberrant behaviors, such as self-stimulation, self-injurious behaviors and other disruptive behaviors that are common among individuals with ASD (Bailey & Burch, 2006; Cooper, Heron, & Heward, 2007; Maurice, Green & Foxx, 2001).

ABA, as a treatment methodology, was pioneered by Dr. Ivar Lovaas, based on B. F. Skinner's theories of operant conditioning. In a seminal study published in 1987, Dr. Lovaas , found that 47% of children with ASD who had received early intensive ABA services, achieved normal functioning and were able to function in general education classes when they were re-

evaluated at six to seven years of age. Another 40% made substantial improvements but continued to need specialized intervention, and 10% made minimal gains and continued to need intensive ABA intervention (Cooper, Heron, & Heward, 2007; Maurice, Green, & Foxx, 2001). These findings have since been replicated in several other studies including Fenske, Zalenski, Krantz, and McClannahan (1985); Smith, Eikeseth, Klevstrand, and Lovaas (1997); Howard, Sparkman, Cohen, Green, & Stanislaw (2005).

ABA enjoys considerable support in the research literature and among ASD practitioners across the nation (Cooper, Heron, Heward, 2007; Heward, 2003; Maurice, Green & Foxx, 2001; National Autism Center, 2009; National Research Council, 2001; Thompson, 2005). Forty years of research also testify to the efficacy of time-limited, intensive ABA methods in reducing or eliminating specific behavior problems and in teaching novel skills to children and adults with autism or other developmental disorders (Bailey & Burch, 2006; National Research Council, 2001).

This current study is informed by such high-quality scientific studies in professional literature supporting the efficacy of ABA as the best practice in the field of autism intervention. While there are a lot of such studies, the following were reviewed for this study; Anderson, Avery, Dipietro, Edwards, & Christian, 1987; Eikeseth, Smith, Jah, & Eldevik, 2007; Harris & Handleman, 2000; Harris & Weiss, 2007; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Lovaas, 1987; Matson, Benavidez, Compton, Paclawasky, & Baglio, 1996; Maurice, Green & Foxx, 2001; National Research Council, 2001). The tables in Appendix D summarize a sample of the studies on the efficacy of ABA-based interventions that have been conducted in public schools.

ABA-Based Autism Programs in Public Education.

Despite the fact that educating children with ASD has been a public responsibility since 1975, with the Education for All Handicapped Children Act, now known as the Individuals with Disabilities Education Improvement Act (IDEA) (Murdrick, Gartin, & Crabtree, 2002), little research is available on the adoption and implementation of autism programs in public school settings (Baker-Ericzen, Stahmer, & Burns, 2007; Handleman & Harris, 2001; Hesmondhalgh, 2006; National Research Council, 2001).

In fact, in an effort to find literature that could explain what factors hinder the adoption of ABA-based programs in public schools, this author searched through electronic databases, including dissertation abstracts, EBSCO, ERIC, PsycINFO, and reference lists of relevant studies. Both narrowly focused searches (with the term "ABA in public education") and broader searches (combining the terms like "ABA-based autism interventions", "barriers" "public schools") were performed. Electronic databases searched ranged from 1990 through the present date. Dissertation abstracts were searched in an effort to incorporate as many unpublished findings as possible. Unfortunately, this researcher found only two relevant studies, both qualitative and conducted in the state of New Jersey: Neumann (2011) and Cook (2010). These two survey studies investigated only the attitude of special education administrators toward ABA-based programs for autism. Further the two authors of the available studies were contacted in efforts to identify other resources. There were no other studies available on factors that hinder the adoption of ABA-based programs in public schools. The majority of what is available in literature is hypothesized. Nonetheless, the necessity for effective ASD programs in public school settings has been echoed by the National Research Council (2001) and by others, including Autism Society of America, n.d.; Iovannone et al., (2003); Grisham, 2006 & Olley

(1999); Heward (2003); National Autism Center (2009). In fact, in July, 2006, the National Association of State Directors of Special Education (NASDSE), in collaboration with the U.S. Department of Education's Office of Special Education Programs (OSEP), conducted a survey of state education agencies (SEA) to ascertain what possible barriers inhibit the adoption of educational-based treatment modalities for students with disabilities including ASD, in public education. The survey protocol was distributed in July of 2006 to all states. By September 2006, a total of 46 state education agencies (SEAs) had responded. Results were analyzed by a qualitative methodology of coding and classifying common themes. The most common reasons mentioned in the survey were the shortage of educational staff that is experienced in working with special student populations, the perception in education that there is a lack of agreement among professionals about the most appropriate intervention methods, and the lack of funding for professional development and technical assistance to school districts (Muller, 2006). Furthermore, results of this survey showed an acknowledgement from the 46 state education agencies that responded that while students with a diagnosis of ASD are a growing population, they are presently underserved and inappropriately serviced (Muller, 2006). With the rising number of students diagnosed with ASD (CDC, 2013), public school administrators must respond (Twohig, 2000).

It has been almost two decades since the U.S. Department of Education introduced autism as an eligibility category for special education services. The department announced autism would be admissible for special education in the 1991-1992 school year, and yet little has changed. There is a need for more research aimed at bridging the research-to-practice gap in the adoption and implementation of effective educational interventions (Heward, 2003). This study

hopes to add to that body of research by investigating the influences that hinder the adoption and implementation of ABA-based programs in public education.

Factors That May Hinder the Adoption of ABA-Based Programs in Public Education.

Implementation is referred to as the "*bridge*" between a school program and its effect on the students (Dusenbury, Brannaigan, Falco, & Hansen, 2003). No matter how effective research shows a program is, it cannot produce its health or educational benefits until it is effectively adopted and implemented at the classroom level. However, as noted earlier, too often, promising interventions (ABA, in this case) fail. Education literature suggests that as many as half of all schools into which innovative, evidence-based programs are introduced fail to implement them (Buston, Wight, Hart, & Scott, 2002; Elliot & Mihalic, 2004; Fullan; Gingiss, Robert-gray, & Boerm, 2006; Gottfredson & Gottfreson, 2002). This study used the diffusion of innovation (DOI) theory as a framework to explore the factors that impede the adoption of ABA-based ASD programs in public schools. It is important that novice public school administrators trying to put in place ABA-based programs be aware of the problems pioneering school administrators faced when trying to adopt and implement such innovations in their schools, so that these new school leaders can avoid the same problems, if possible, or find ways of dealing with them in advance.

Table 1, in chapter 1 (p. 24), depicts a summary of factors that hinder innovations. These inhibiting factors are grouped into four general categories; factors within the innovation itself, resources factors that are employed towards the adoption process, intended-user characteristics and inter-element factors; these are factors "within the user system or between elements" (Henrichsen, 1989, p. 82). This study explored how these factors hinder the adoption and implementation of ABA-based autism programs in public schools.

Diffusion literature notes that substantial time should be given to factors that hinder an intended innovation; in fact, some researchers note that planning for such inhibiting factors should take precedence over other aspects of planning. Henrichson says, "these factors if not well planned for often appear unexpectedly in new forms and foil even the best laid plan" (Henrichsen, 1989, p. 82). As mentioned earlier in this study, it is imperative that public school administrators planning to put in place ABA-based programs be aware of factors that could work against their intended idea, so they can avoid the failure that occurs frequently in such curriculum-oriented innovations (Fullan, 2001). Innovations are rarely embraced on their merits; factors within the innovation itself, resources, factors that are employed toward the adoption process, intended-user characteristics and inter-element factors, are all crucial and could hinder the adoption of an innovation. Furthermore, to gain an understanding of why some innovations fail, and others succeed, there must be studies on the factors that cause resistance to change (Henrichsen, 1989; Miles, 1964; Rogers, 2003).

Recall that little research exists on the adoption and implementation of autism programs in public school settings (Baker-Ericzen, Stahmer, & Burns, 2007; Handleman & Harris, 2001; Hesmondhalgh, 2006; National Research Council, 2001). The tables in appendix G, summarize factors that hinder adoption of innovations according to the DOI theory (Dow, Ruth, Whitehead, & Wright, 1984; Evaans, 1968; Rogers, 2003; Warford, 2005; Williams, 1975), this are on the left column and on the right column are factors hypothesized in literature, and from the two available studies that hinder the adoption of ABA-based interventions in public schools. These factors were also used to develop the questions for the interview.

Characteristic Factors Within the Innovations Itself

Certain characteristics of the innovation itself are essential to the adoption or rejection of the innovation. The way these innovation-self characteristics are perceived by the intended adopters of an innovation cannot be underestimated (Rogers & Shoemaker, 1971). These innovation-self characteristics include the innovation's originality, complexity, explicitness, relative advantage, trialability, observability, practicality, and flexibility/adaptability.

Originality describes the degree to which an innovation is similar or distinctive to procedures or models already available. *Complexity* is the degree to which an innovation is alleged as difficult to understand and use. *Explicitness* refers to the clarity with which a new idea is described (Henrichsen, 1989; Rogers, 2003). *Relative advantage* is the degree to which a new idea is perceived to be an improvement from the previous idea (Henrichsen, 1989). *Trialability* is the degree to which an individual or group may have the opportunity to try the new idea in an experimental manner without making a commitment (Rogers, 2003). *Observability* is the visible benefits of an innovation to potential users. Finally, *flexibility* and *adaptability* are concerned with whether an innovation is flexible enough to adapt to fit a particular situation (Henrichsen, 1989).

Ideas that have a high degree of *originality* may result in a low degree of *compatibility*. This is a problem that can have devastating effects on an innovation (Rogers, 2003). Regrettably, for ABA practitioners, a majority of the frameworks used in education today are based on the work of two noted theorists, Jean Piaget and John Dewey (Heward, 2003; Stone 1996). These two models are distinctly different from the behavior analytic approach of ABA. Consequently, this makes ABA-based approaches highly original and unfamiliar to teachers, paraprofessionals, and other support staff who are expected to implement them (National Research Council, 2001).

ABA-based approaches, unlike traditional teaching approaches, are also perceived to be more difficult, which makes them more disadvantageous (National Autism Center, 2009).

Characteristics of the Resources System Factors

The availability, or the lack thereof, of resources to promote an innovation understandably affects the course, success, or failure of adoption and implementation of an innovation (Dow, Whitehead, & Wright, 1984; Henrichsen, 1989; Rogers, 2003). Resource factors include capacity, structure, openness, and harmony.

Capacity refers to the capability of those endorsing an innovation to marshal the necessary resources required to promote an innovation (Rogers, 2003). Education administrators must take into account their organizational capacity when planning the adoption of an ABA program (Boardman et al. 2005). The resource and staffing requirements to implement ABA-based autism interventions are intensive. For example, as mentioned earlier, the estimated average costs for discrete trial training range from $22,500 to $75,670 per year, per child with an expected course from two to six years (Chasson et al., 2007). Obviously, this is costly for most schools. In addition to the cost of the new program per se, the adoption of ABA change demands effort, time, and resources. Even if administrators are confident about a new program, they must still assess whether it poses a sufficient relative advantage to rationalize these costs (National Research Council, 2001). The lack of these resources could significantly hinder the adoption of ABA-based programs in schools (National Autism Center, 2009).

Structure refers to the available channels to effectively communicate the message about an innovation across to the intended user (Rogers, 2003) and the presence of a meaningful division of labor and coordination efforts (Henrichsen, 1989). For an innovation to become

established, there needs to be a management structure in place that allows the innovation to operate in a coherent and organized manner. This means that everyone involved in promoting the innovation across the school community has a clear role (Henrichsen, 1989). Additionally, there should be clear and appropriate communication channels to effectively get the message to the intended user (Rogers, 2003). Fullan (2003) argues that clear communication in a school system is not only necessary for relaying information between the various agents of a school system but could also be useful in bringing in the support needed for the adoption of education innovations from parents and senior administrators.

The *openness* factor refers to the inclination of an innovative idea to be influenced by an adopter's needs. One of the key lessons from education research is that innovations are often unsuccessful when they are perceived as not being in line with or open to the cultural values and beliefs of schools, when innovations are seen as imposed by forces outside the educational institution, or when there is a reliance upon external resources (including people) to enable those changes to happen (Zhao, Pugh, Sheldon, & Byers, 2002). *Openness* is therefore the willingness of an innovation to be open and be influenced by the user needs and aspirations (Henrichsen, 1989). An *open* innovation has the ability and readiness to make use of a wide range of external sources when new knowledge is needed, such knowledge may even stem from customers and users (von Hippel, 2005).

H*armony* as a factor refers to the harmonious relations between the different people playing diverse roles in the innovation (Henrichsen, 1989). Harmonious relations among the different people promoting an innovation is a crucial factor in the diffusion and adoption. However, while this is crucial, planners/managers of innovations often pay no attention to social

relations problems until they cripple the adoption of an idea (Fullan, 2003). For innovations to work, the school principals or innovation leaders have to realize they cannot act alone, as part of their responsibility includes maintaining *harmony* between all parties involved in the innovation by enabling teamwork and communication (Nachmias et al., 2004).

Intended-user Characteristics

Various characteristics of an organization can be powerful hindrances to the success of an innovation. Some of the factors include geographic location, centralization of power and administration, size of the adopting unit, communication structure, group orientation and tolerance of deviancy. In educational, innovations intended-user characteristics also include teacher factors, learner factors, teachers' and students' capacities to perform in new ways, prevailing education philosophy in a school, and the place of examinations in the school system (Henrichsen, 1989).

Geographic location factors in the diffusion and implementation literature refer to geographic barriers to change. In most cases, these include obstacles, such as slow transportation of materials to support the innovation (Henrichsen, 1989). Large school districts may face this as a hindrance as they build ABA programs across multiple schools (National Autism Center, 2009).

A great variable that affects implementation of new ideas is the *administrative nature* of an organization. Administrations can be authoritarian or participatory. When the control is exercised by a central authoritarian body, top-level administrators have to be sympathetic to the objectives of the innovation/implementation process. When they are not, their opposition constitutes a serious barrier. For example, Phelps (1972) and Tye (1972) both assert that the

principal, as a leader, as well as an administrator, is a key figure in the area of education innovation. Phelps (1972) further maintains that the principal has a responsibility to recognize areas that require action, evaluate the progression of action, assume the general supervision of an innovation to ensure that the necessary means for its implementation are available, and constantly assess the progress of the innovation.

Innovation adoption literature also identifies school administrators as crucial entities in the adoption of innovations (Fullan, 1998; Sarason, 1993). Projects that received the principal's support were more likely to succeed, since the principal's involvement indicated that the project was being taken seriously. The involvement of the school principal and other administrators also helps in recruiting both material and psychological support for a new project (Berman & McLaughlin, 1977; Marsh, 2001). In addition, the principal or the administrative leader involved in the project supplies the vision, elucidates the goals of the innovation during adoption and monitors resource allocation (Rosenholtz, 1989).

In the adoption-implementation process, *size* matters; the greater the number of individuals involved in the adoption process, the more difficult it is to create change (Rogers, 2003). It is generally believed that bureaucratic inertia increases with the size of the organization, resulting in less innovative activity. Additionally, the bigger an adopting unit, the bigger the number of people involved in decision making, which, as a result, slows the innovations rate of adoption. On the other hand, a small firm is supposedly more flexible and can respond more quickly to external forces (Damanpour, 1992). Large *size* schools also have distinct disadvantages when implementing new systems because more resources are required; for

example, more staff and more money, to pay the costs of operations, compared to schools hosting small populations (Machin, 2006).

Another social system variable that reformers must pay attention to is the nature of the *communication system* within the adopting unit (Rogers, 2003). Effective communication is a vital element for the adoption of change (Fullan, 2010). A better school climate exists in schools in which there is effective communication between the school principals and their teachers. Research on school climate and innovations suggest a relationship between effective communication channels and nurturing of secure and innovative schools (Halawah, n.d). While improving communication is everyone's responsibility, the school principal should have the greatest accountability, according to research. Phelps (1972) and Greenhalgh et al. (2005) insist that one of the roles of an educational administrator is to provide efficient avenues to manage communication and to resolve intergroup conflicts, in addition to acting as the facilitating link between parties involved in the innovation.

The intended user's willingness to seek and receive new information from outside sources is an indispensable quality. As Havelock (1978) explains, "closed systems" and "closed minds," are by definition, incapable of taking important ideas from outside. *Openness,* in this sense, therefore refers to the willingness of a group of people or an organization to take risks and to make an effort to adopt innovations to their own situation. This variable should be considered in the early stages of planning an innovation, because when intended users are wary of change, this becomes a barrier to the adoption and eventual implementation of an idea (Henrichsen, 1989). Most often school systems that adopt ABA systems depend on outside consultants, and

special education staff in the school must be willing to embrace them (National Research Council, 2009).

In most cases of education innovation, change at the classroom level is implemented by teachers. Since changes in behavior require both commitment and capacity, *teacher factors* (e.g., teachers' commitment and attitudes about an innovation) are critical in the implementation of innovations. The lack of commitment to an innovation and, most importantly, the capabilities of teachers to implement innovations, are critical to adapting change (Henrichsen, 1989). Negative attitudes of teachers were found to be essential barriers in the implementation of curriculum improvements, while positive attitudes constituted an important predictive index in adopting innovations (Thomas, 2003). According to Avramidis et al. (2000), "teachers' attitudes may act to facilitate or constrain the implementation of policies … the success of innovative and challenging programs must surely depend upon the cooperation and commitment of those most directly involved" (p. 278). McDonald and Rudduck (1973) posit that it is essential for promoters of education innovations to understand the world of the teacher. Rohrbach et al. (2005) also notes that while education administrators have the authority to adopt new programs, frontline staff determine whether and how they are implemented. Rohrbach et al. (2005) further state that special education teachers and other support staff who implement autism interventions can be thought of as street-level bureaucrats; when they are unable or unwilling to implement ABA interventions as intended this can affect attainment. Teachers should be given *adequate training* on all relevant aspects of the innovation, the language of the innovation should be familiar or understandable to them and innovators should ensure that teachers do not feel guilty or inadequate when reporting failure in aspects of a new program (Thomas, 2003).

Another fundamental factor in school-systems reforms that affects the diffusion-adoption equation is the *prevailing educational philosophy*. If an innovation is not in harmony with a schools education philosophy, it has very little chance of success (Henrichsen, 1989). A school's philosophy on inclusion of students with disabilities, together with the general student population is critical to the adoption of ABA-based programs (National Autism Center, 2009).

The interactions of exams and innovations are usually overlooked (Henrichsen, 1989). Given the large role of high-stakes exams and assessments in the American education system, *examinations* however, can act as an impediment to the introduction of innovative practices in education and to the development of social and behavioral skills that are critical for innovation. This is especially true if these innovations fall out of the scope of existing assessments (Looney, 2009). For example, the current benchmarks set by the No Child Left Behind Act of 2001 (NCLB) require states to implement assessment systems in reading and math (Yell, Drasgow, & Lowrey, 2005), while the mission of ABA-based approaches is to maximize the child's functioning, which may not relate to the outcomes expected by the NCLB (National Research Council, 2001).

Inter-element Factors

A number of factors exist *between*, rather than *within*, the elements involved in the diffusion and implementation of innovations. Five critical inter-element factors that could hinder innovation are compatibility, linkage, reward, proximity and synergism (Henrichsen, 1989).

Compatibility is the degree to which the innovation conforms to the already prevailing standards and values. The DOI theory argues that innovations that are not compatible with the values, views, past history or current needs rarely get adopted. Rogers (1995) notes that "...the

innovation may be ‘new wine’ but it is poured into ‘old bottles’ [which translates to the clients’ existing perceptions] (p. 241).” Fullan (2003), likewise notes that educational innovations that are not compatible with the attitudes and values held by individual users face resistance to adoption. Given that ABA’s philosophy is somewhat different from the current existing teaching methods, taking into account the developmental vs. behavioral analytic comparison mentioned earlier, this could hinder the adoption of ABA (National Autism Center, 2009).

Linkage reflects the number of interpersonal or intergroup connections (i.e., links) that exist in a given situation. Generally, the fewer links in a group, and consequently the weaker these linkages are, the more probable an innovation will fail (Henrichsen, 1989). In educational reform campaigns, support networks, such as professional learning communities, and professional journals, play an important role in facilitating the links necessary to sell an innovative educational idea (Richards & Rodgers, 1982).

Rewards refers to the frequency, propinquity, amount, and structuring of positive reinforcements in a system. These rewards can take various forms. For example, profitability for commercial systems; recognition by colleagues, or creating something that works among others (Henrichsen, 1989). Unfortunately, in many school systems, the rewards for implementing an innovation are few if they exist at all. In fact it is common for innovation decisions and adopters to be negatively reinforced. Personal costs of adopting an innovation are also frequently high on teachers. Such costs include the energy, time and stress involved in learning new skills. Moreover, teachers are, in most cases expected to go through this learning process at their own personal expense (Henrichsen, 1989; National Research Council, 2001).

Proximity refers to the "nearness in time, place and context" of the resource and user systems (Henrichsen, 1989). Burmeister and Colletis-Wahl (1997) argue that convenience in space creates a potential for human interactions when implementing innovation, but distance between the parties involved hinders interactions or make them difficult which slows down the innovative process. It is therefore sufficient to argue that parties to an innovation, who have close *proximity* to the resources needed to adopt an innovation are more likely to use the resources (Henrichsen, 1989). Leaders of an innovation must therefore make special efforts to overcome *proximity* barriers to increase the likelihood of success, especially in large adopting organizations (Henrichsen, 1989; Havelock, 1978).

The term *synergism* means working together. Synergism refers to the "number, variety, occurrence and tenacity of forces that can be mobilized to produce a knowledge utilization effect" (Henrichsen, 1989, p. 37). This is particularly important for autism programs, given the personnel requirements in terms of numbers and expertise needed to deliver the high-intensity, individualized interventions and multi-disciplinary staff necessary to match the children's needs (Swiezy, Stuart, & Korzekwa, 2008).

Literature Review Conclusion

The purpose of this literature review was to develop a better understanding of factors that can hinder the adoption of ABA-based programs for students with ASD in public schools. Explored from the DOI framework, these factors fall into four categories; factors within ABA as an innovative education approach, resource factors that are employed toward the adoption of ABA-based interventions, factors that are specific to the implementers of ABA systems, like

teachers and paraprofessionals, and finally, inter-element factors. These general interaction factors are critical to implementation.

The intent of this literature review was to lay the groundwork for this study, which will contribute to the research concerning the barriers to developing ABA-based programs in public schools. The need for such programs is great (Baker-Ericz'en, Stahmer, & Burns, 2007; Handleman & Harris, 2001; Hesmondhalgh, 2006; National Research Council, 2001). As aforementioned, there are only two studies that are related to this topic, both of which were conducted in the state of New Jersey for graduate dissertations. To that end, researchers must identify what factors hinder the adoption of such programs and equip special education administrators with that information.

Chapter 3: Research Methods

This chapter contains a detailed description of the research design, sampling strategy, data collection and analysis, threats to validity and reliability, and measures to protect human subjects.

Research Questions

This study sought to explore the challenges that special education administrators in public schools encounter as they go about adopting, implementing and maintaining ABA-based treatment approaches in their schools. Three broad questions guided this research. Based on the purpose of the study, conceptual framework, and qualitative methodology of this study, the three questions were:

(a) What are some of the barriers encountered by the special education administrators as they persuade various parties in their schools to adopt ABA-based autism programs?

(b) What are some of the challenges special education administrators face with the implementation of such programs?

(c) What are the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs?

Research Design and Tradition

To explore the aforementioned research questions, this study employed a multiple case study design (Yin, 2003) and utilized a general inductive analysis approach (Thomas, 2006) to analyze the findings.

Like other traditions within the qualitative research paradigm, case studies are used primarily when researchers wish to obtain an in-depth understanding of a somewhat small

number of individuals, problems, or circumstances (Patton, 1990). A case study is a research method that emphasizes understanding the subtleties of single settings (Yin, 1994), while multiple case studies are a variation of the case-study that include two or more observations of the same occurrence. This variant facilitates replication, in other words, using multiple cases to independently confirm evolving constructs and propositions. It also enables extension, that is, employing multiple cases reveals complementary facets of the phenomenon of study. Additionally, while it is also probable to generalize from single cases (in some analytic way), multiple case studies can reinforce or broaden such generalizations (similar to the advantages of multiple experiments) (Yin, 1998).

Case studies (either single or multiple case studies) give special attention to the phenomenon being studied by completeness in observation, reconstruction, and analysis of the cases under study. Case studies are also done in an approach that integrates the views of the "subjects" in the case under study (Feagin, Orum, & Sjoberg, 1990; Zonabend, 1992).

A qualitative, multiple case design fit the problem of this study for several reasons that include, but not limited to:

(a) The multiple case studies design lets the researcher explore the phenomena under study through the use of a replication strategy. Yin (1994) compares the use of the replication strategy to conducting a number of separate experiments on related topics. Replication is carried out in two stages; an exact replication stage, in which cases are selected to obtain similar results, and a theoretical replication stage, in which cases are selected to explore and confirm or object to patterns identified in the initial cases. According to this model, if all or most of the cases provide comparable results, there can be substantial support for

the development of an original theory that describes the phenomena (Eisenhardt, 1989).This study allowed the researcher to replicate the research strategy between the different schools in the sample. Additionally, if the research was to find similar barriers of adoption and implementation of autism programs in the different schools, this would go a long way in the development of a hypothesis that could explain this phenomenon.

(b) In the multiple-case studies design, there are no determinate rules about how many cases are required to fulfil the requirements of the replication strategy (Yin, 1994). Yin goes on to say that, since the multiple-case studies approach does not solely depend on the type of representative sampling logic used in survey research, "the typical criteria regarding sample size are irrelevant" (p. 50). The sample participants should be selected clearly to encompass instances in which the phenomena under study are likely to be found. This approach to sample design, which is consistent with the approach of homogeneous sampling, in which the desired outcome is the account of some particular subgroup in depth (Patton, 1990) is consistent with this study. So far, little research is available on the barriers of adoption and implementation of autism programs in public school settings (Baker-Ericzen, Stahmer, & Burns, 2007; Handleman & Harris, 2001; Hesmondhalgh, 2006; National Research Council, 2001). The use of a homogenous sampling will enable the researcher to reach the specific sample (i.e. special education administrators in schools that have already implemented ABA-based programs).

(c) Additionally, the multiple-case studies design provides an arduous approach for collecting and analyzing data. For example, the replication strategy allows the researcher to identify possible patterns in the data, and to explore them by returning to the field for

additional data. The thorough application of these techniques ensures that explanations for the phenomena under study developed from the data are corroborated during the course of the research process. This repetitive process of data collection, analysis, comparison, and revision during the entire study is referred to as the "constant-comparative" method (Strauss & Corbin, 1998).

For this study, the sample was a pool of special education administrators from schools that have implemented ABA-based interventions for their autism populations. This sample was chosen because it is better placed to provide the "rich details and insights into participants' experiences as they interact with their world" (Merriam, 2002; Stake, 1978). This study will capitalize on such experiences to explore the challenges special education administrators face as they work toward the adoption of ABA-based programs in their schools.

The research questions that guided the study were intended to have special educators reflect on their experiences at each stage of the diffusion-adoption model (Maxwell, 2005; Seidman, 2006).

Toward achieving that goal, the researcher studied ABA-based ASD programs in five public school systems in New England that have already adopted ABA programs for their students with autism. Each sample site was a case study by itself. Each of the sites chosen for this study has an ABA-based autism program for their students that has been operating for over three years.

Participants at each site were interviewed individually at their own site; interviews were a combination of semi-structured and open-ended questions based on literature and aligned with the theoretical framework. Additionally, other relevant documents, such as program instruction

manuals developed for the ABA-program, and other ABA-program tools, were included to further triangulate the data collection process.

Data, in the form of transcribed interviews, field notes, and relevant documents were analyzed manually using a general inductive approach for analyzing qualitative data (Merriam, 2009). Because this study did not have a large amount of data, manual coding was used.

To derive themes (if any), obtain concepts or make interpretive models from the data from this study as previously mentioned a general inductive analysis (Merriam, 2009), was employed. Thomas (2006) refers to this design as a "general inductive approach" (p. 237), while Merriam (2002) refers to this form of research as a *basic interpretive study* (p. 4). According to Thomas (2009), "the general inductive approach [is] easy to use, does not require an in-depth understanding of an expert approach, and produces findings that justifiably address evaluation objectives and questions...[this approach] provides a suitable and efficient way of analyzing qualitative data for these purposes" (p. 246). It was, thus, an ideal approach for this study. Furthermore Merriam (2002) notes that an interpretive qualitative approach is also appropriate when researchers are interested in knowing how people interact with and experience their social worlds and the meaning these interactions and experiences have for them.

Site and Participants

Purposeful selection, also referred to as purposeful sampling (Creswell, 2007; Maxwell, 2005; Merriam, 2009), was employed to secure participants for this study. In this sampling strategy, people and settings are purposely chosen to provide information that cannot be collected as well from other selections (Maxwell, 2005). According to Creswell (2007), this strategy is useful for assuring a quality sample.

The interviewed participants were special education administrators from each of the schools in the sample. Special education administrators are responsible for the adoption and implementation of innovations in their departments; as such they are most appropriate to interview for such a study. Most public schools have an administrative hierarchy with the director of special education at the top and several special education assistants depending on the special education students census. The roles and responsibilities of these special education administrators are similar. They are responsible for the adoption, implementation, and maintenance of curricular changes in the department with specific assignments as deemed necessary by the head of the department (the special education director).

Data Collection

As part of the interview protocol for this study, the researcher took approximately ten minutes before each interview to explain step by step the informed consent form (Appendix B). Prior to the scheduled interview, the researcher had emailed the informed consent forms, which explained the details of the study, what the study entails, and the interview guide to participants. This process enabled the participants to review this material and be prepared to ask questions for clarity. The primary goal of this study was to explore what factors the special education administrators in this study could identify as hindrances to the diffusion and implementation of ABA-based programs for children with autism in their schools.

Informed consent was obtained from the subjects of the study: the special education administrators and their assistants. Participants were interviewed individually; interviews were a combination of semi-structured and open-ended questions. The semi-structured part of the interview comprised questions from a topic guide (Appendix C). These questions were based on

literature and aligned with the theoretical framework. The open - ended questions invited the interviewees to tell the story of their experiences in the adoption and implementation of ABA programs in their schools.

The first minutes of the interview were used to go over the informed consent form. Interviews were conducted at a time and place that was suitable and comfortable for each participant. Interviews were digitally audio-recorded and transcribed immediately after each interview by the researcher.

Each interview began with the researcher ensuring the comfort level of the participant by asking questions about the participants and how they were doing. The full list of interview questions (Appendix E) was carefully developed based on Butin's (2010) and Merriam's (2009) guides to qualitative interviewing. Participants were asked several impartially phrased, open-ended interview questions, each one designed to approach its related research question from a different perspective and stimulate deep, elaborative responses as opposed to "yes" or "no" answers (Butin, 2010). Additional questions and prompts were used as appropriate, depending on participant responses. Prior to the study, the questions were reviewed by a special education administrator, who was not a participant to the study, and neither a board certified behavior analyst. The two had been involved in implementing ABA-based programs in several schools in the past. The two experts were critical in rectifying the questions for researchers' bias and as a member checker to assist in ensuring the trustworthiness of the study (Lincoln & Guba, 1985; Maxwell, 2005).

During the interviews, the researcher took extensive notes. This process was carefully and thoughtfully explained to the participants at the onset of the interview. Notes taken during

interviews recorded observable behaviors not communicable via transcriptions (e.g., facial expressions, gestures, visible emotions). Reflective memos were also written after each interview to document the researcher's overall thoughts and impressions; these memos included an audit trail (Lincoln & Guba, 1985). An audit trail is a journal or series of memos noting the research process as it is happening; such audit trails include reflections, questions, and conclusions the researcher makes in response to ideas or issues in the course of the study (Merriam, 2009). The eventual goal of these interview sessions was to have "meaningful and 'deep' responses that take the shape of narratives... [and] data 'thick' enough to scrutinize" (Butin, 2010, p. 97).

The participants were also informed that they have a right to decide to stop and continue with the interview at a later date, discontinue at a later date or to discontinue the process altogether.

The concept of interpretivism previously mentioned (Guba & Lincoln, 1985, 1994) played a significant role in this naturalistic qualitative study. According to Golafshani (2003), "An open-ended perspective in interpretivism adheres with the notion of data triangulation by allowing participants in a research study to assist the researcher in the research question as well as with the data collection" (p. 604). This study engaged numerous methods such as interviews and recordings which lead to more valid, reliable and diverse construction of realities. It was anticipated that by using open-ended questions, the researcher would enable participants to go beyond the questions posed in the semi-structured interviews and all their contributions add to the depth of data gained.

Other relevant documents, such as program instruction manuals developed for the ABA program, initial emails that the special education administrators wished to share and any

information on the demographics, ABA program tools and specifics found on the schools websites were included to further triangulate the data collection process. Specific reviewed documents are mentioned in the findings chapter (chapter 4). Merriam (2002) argues that a document can be a major source of data collection in qualitative research (p. 162). Triangulation is when a researcher collects "information using a variety of sources and methods" (Maxwell, 2005, p. 92). By collecting data through interviews, review of emails or other ABA-program documents, this study employed triangulation. This triangulation facilitated a broader view of the phenomena of the study and ensured that findings are not limited by one data source.

Data Storage

A flash drive containing audio recordings of interviews and raw transcribed data was stored in a lockable file cabinet until transcripts were verified for accuracy; data was also stored on a password-protected computer that is only accessible by the researcher.

Data Analysis

Data, in the form of transcribed interviews, field notes, and important documents was analyzed by hand using a general inductive approach for analyzing qualitative data (Merriam, 2009). The general inductive approach was used for analyzing the data in order to reveal a deeper meaning in factors that hinder the adoption-maintenance of ABA-based autism programs.

The result of the analysis was the development of categories based on themes that the researcher sought to identify as the most significant based on the researcher's interpretation (Merriam, 2002). These themes further relate back to the diffusion of innovation framework and the research questions.

According to Thomas (2006), the procedure for inductive analysis of data begins with the preparation of raw data files. During this process, also known as data cleaning, the researcher formats the raw data in a common format (for example, font size, margins, questions or interviewer comments are highlighted). The researcher then makes a back-up of each raw data file at this stage. This stage is often followed by the close reading of the data text in detail until the researcher is conversant with its content and gains an understanding of the events and themes emergent in the text.

Once the evaluator identifies and defines the categories or themes, coding can begin. It is worth noting that in inductive coding, categories are usually created from actual phrases or meanings in specific text segments. Several procedures for creating categories may be used, e.g., manual or qualitative analysis software can be used to speed up the coding process when there are large amounts of text data (Durkin, 1997).

Because this study did not have a large amount of data, manual coding was used for data analysis. Data analysis is a process of examining, analyzing, and interpreting data in order to draw meaning, increase understanding, and develop knowledge (Strauss & Corbin, 1998). Data analysis is an iterate procedure in qualitative research (Creswell, 2007; Hatch, 2002; Merriam, 2009; Saldaña, 2012; Thomas, 2006). Using the general inductive analysis approach (Merriam, 2009; Thomas, 2006; Saldaña, 2012; Strauss & Corbin, 1998), the researcher's engaging into the details of data to look for patterns, develop codes to assign to categories, and place emphasis on the outcome of themes identified as most significant based on the researcher's interpretations and their alignment with the research questions and conceptual framework (Merriam, 2006; Thomas,

2006; Saldaña, 2012). Table 1 illustrates the iterative process of data analysis employed for this study.

Table 2

Inductive Analysis Coding Process

Initial closely read the raw transcripts multiple times until I am familiar with its contents	Break the raw transcribed data into discrete individual parts or segments/units	Assign codes to each individual segment/unit; re-examined to stabilize codes to create categories and codebook	Re-examine coded categories to reduce overlapping and to synthesize categories	Produce themes that are most important and beneficial to study
	Constant Open Coding	Comparison	Axial Coding	
Multiple pages of transcribed data from interviews	Multiple of segments/units	Numerous categories +20	15 – 20 categories	5 - 6 themes

Note. This table adapted from Burkhardt (2012), Corbin and Strauss (1998), Creswell (2008), Merriam (2009), Saldaña (2012) and Thomas (2006) illustrates the Inductive Analysis Coding Process used in this study.

Strauss and Corbin (1998) and Saldaña (2012) suggest a two-cycle methodology to coding; open and axial coding. The first cycle of coding, known as open-coding or initial coding, involves breaking down the raw transcribed data into distinct parts or splitting data into individual units for closer examination (Maxwell, 2005; Merriam, 2009; Saldaña, 2012; Strauss & Corbin, 1998). Data are broken down into meaningful units by identifying crucial phrases, short phrases and paragraphs (Hatch, 2002; Merriam, 2009; Saldaña, 2012). Codes are then assigned to the units; codes are stabilized and are recorded in a codebook in order to index and standardize the meanings. The second cycle (and subsequent cycles) of coding is known as axial

coding (Saldaña, 2012; Strauss & Corbin, 1998), which ultimately leads to categories of thematic and theoretical findings of the study. It is more interpretative than the open coding (Hatch, 2002) and creates synthesized categories (Saldaña, 2012; Strauss & Corbin, 1998).

In this study, the researcher began by closely reading the raw transcripts numerous times until becoming completely acquainted with the contents (Hatch, 2002). In these readings the researcher looked for and noted meaningful words, paragraphs, and phrases through a line-by-line analysis (Saldaña, 2012). Using a line-by-line analysis, data was split into individual segments and parts (Merriam, 2009; Saldaña, 2012; Strauss & Corbin, 1998). Codes were then assigned to the individual units identified using in vivo and descriptive coding. These meaningful individual units became categories (Maxwell, 2005) through the continuous analysis.

In vivo and descriptive coding was used to establish substantive categories (Maxwell, 2005) as opposed to organizational categories. Some groupings may be more general in nature and others more specific (Maxwell, 2005). Organizational categories are broad areas or issues that researchers establish prior to their interviews or observations and are easily anticipated (Maxwell, 2005). In contrast, substantive categories are often inductively developed through the open coding of the data (Maxwell, 2005). Inductively developed means researchers gather data and build concepts and theories, rather than testing hypotheses, as in deductive analysis (Merriam, 2009). They are descriptive in that they are "descriptions of participants' concepts and beliefs, and stay close to the data categorized and do not imply an abstract theory" (Maxwell, 2005, p. 97). In vivo coding, using interviewees' pseudonyms, honor respondents' voices by using their words or short phrases and quotes verbatim, and to enhance and deepen the understanding of their culture and worldviews, which are often marginalized (Saldaña, 2012).

The researcher quotes the participants as necessary for the audience to understand what factors hinder the adoption of ABA-based autism programs in public schools.

Additionally, descriptive coding was used to summarize in words and short phrases the individual parts in which the researcher was not directly quoting the respondents (Saldaña, 2012). The goal of descriptive coding is to assist the intended audience in seeing what the researcher sees or hears in the data collected (Saldaña, 2012).

Understanding that the initial cycle of coding often results in fragmented codes and conceptual connections, the coded units were reexamined and recoded to stabilize the codes (Saldaña, 2012). Throughout data analysis, there was a constant evaluation of data (Merriam, 2009) looking for patterns; those that are similar or different, this was followed by recoding along the way and putting group patterns together based on those similarities and differences to make them substantive categories. Codes were recorded in a codebook to index and standardize their meanings (Strauss & Corbin, 1998); this led to a categorized inventory of the content of data and grounds for the next cycle of coding to further the data analysis to findings (Saldaña, 2012).

A reflective memo on what the researcher learned along the way was also kept at each cycle of the data analysis. The goal of these reflective memos was to assist the researcher to capture ideas and patterns that may have emerged along the way. This reflective memo also created an audit trail that was useful in the findings (Merriam, 2009).

In the second cycle of coding, codes from the first cycle were analyzed to create theoretical categories by looking for recurring regularities in the data that have common properties (Merriam, 2009). Coded data was regrouped and reanalyzed by constantly comparing,

reorganizing, or refocusing the codes into categories to prioritize, integrate, synthesize, abstract and conceptualize those categories to thematic/theoretical findings (Saldaña, 2012). This involved pattern/theoretical coding (Maxwell, 2005; Saldaña, 2012); this coding was used to establish explanatory or inferential codes that identify emergent themes or assertions by condensing the coded data into a more meaningful unit of analysis as specific categories or subcategories using a few words that explain the study (Saldaña, 2012; Strauss & Corbin, 1998). Using the iterative process, the researcher read the transcripts closely after each interview and coded them. They were continually compared throughout the data analysis process. Thus, the data were frequently compared and analyzed from the initial cycle to the second cycle until themes emerged. The result of the coding was the creation of a small number of summary categories, which captured the key aspects of the themes identified in the coded raw data as important and beneficial to this study (Corbin & Strauss, 1998; Lincoln & Guba, 1985; Merriam, 2009; Thomas, 2006; Saldaña, 2012). The identified themes relate back to the research questions and conceptual framework. These overarching themes were used as main headings to organize findings and more specific themes as subheadings (Saldaña, 2012) in the report of findings in this study.

Of course, even with the most intensive data collection and analysis, the findings of a study will serve no purpose if it is lacking in validity/trustworthiness. The next section addresses most common trustworthy/validity concerns.

Trustworthiness

The trustworthiness of a study can be determined by a study's internal and external validity. For a qualitative study to be regarded as valid, the quality of data must be trustworthy

and the information transferable (Yin, 2009). Furthermore, Golafshani (2003) argues that "distinct from the qualitative paradigm, the terms reliability and validity are generally referred to in a qualitative study as credibility and trustworthiness of the study." Additionally, Lincoln and Guba (1985) used the terms credibility, and transferability to describe trustworthiness in inductive analysis of traditional types of research. Strategies used to enhance the study's credibility, transferability, and trustworthiness of the study follow.

Mertens and McLaughlin (1995) explained *the credibility test* with the following example. "In qualitative research, the credibility test asks if there is correspondence between the way the respondents actually perceive social constructs and the way research portrays their viewpoints" (p. 53).

Internal Validity

Internal validity is the process in which the researchers ensure that findings are congruent with reality and what the researcher intended to research (Creswell, 2008; Gay et al., 2009; Lincoln & Guba, 1985). Creswell (2008) further notes that in qualitative research, the researcher determines the accuracy or credibility of his or her findings through strategies such as member checking and triangulation.

This study utilized several data collection methods including interviews, document reviews, and the reflective journal mentioned earlier, in order to provide an adequate audit trail. The use of several data collection methods used in this study is referred to as triangulation. According to Maxwell (2005), "triangulation reduces the risk that a study's conclusions will reflect only the systematic biases or limitations of a specific source or method, and allows the researcher to gain a broader and more secure understanding of the uses the researcher is

investigating" (p. 94).

To further maintain credibility, member checking, which Lincoln and Guba point to as "the most critical technique for establishing credibility" (p. 314), was utilized in the study to solicit participants' views of the researcher's findings and interpretations. Member checking involves the process of the researcher asking one or more participants in the study to check the accuracy of the data collected from the participants (Creswell, 2008).

Additionally, an executive summary of the research findings was shared with participants to corroborate the study conclusions. Comments received from the member checking process were reviewed and incorporated into the study results. The researcher used the help of a retired special education administrator and an individual certified in applied behavior analysis to assist with the development of the interview questions, act as a peer reviewer and assist with the member checking. Creswell (2008) explains that this person is "someone who keeps the research honest; asks hard questions about methods, meanings, and interpretations; and also provides the researcher with the opportunity for catharsis by sympathetically listening to the researcher's feelings" (p. 202). The researcher met with the pair on several occasions to gain insight during the study.

External Validity

Another element in the establishment of a study's trustworthiness is a study's external validity. External validity is concerned with the degree to which the study's findings can be generalized or applied to other institutions' situations, which is generalizability in quantitative research (Creswell, 2008; Gay et al., 2009; Lincoln & Guba, 1985; Williams, 2000). While generalizability is not intended in qualitative research, it does occur (Gay et al., 2009; Williams,

2000). The aim of qualitative research is not the application of research findings to settings and contexts different from the ones in which they were obtained, nor generalization of the findings among various populations. It is to present unique interpretations of events (Gay et al., 2009; Merriam, 2009).

External validity can be achieved through transferability (Merriam, 2009). Although no tests were administrated in this study, generalizability employed the term transferability as noted by Locke, Silverman and Spirduso (2010) and Golafshani (2003); the researcher anticipates that the information revealed from the study would benefit novice special education administrators starting up ABA-based programs in the future. External validity can also be achieved through contributions, because each study is unique. Something can be learned through accumulation of knowledge from all studies (Merriam, 2009).

Additionally, in an effort to certify trustworthiness in internal and external validity, the researcher discloses any bias brought to the study, through open and honest self-reflection. This should resonate with the audience because it lets them know that the researcher's experience in the study's area and in qualitative research is shaped by his own gender, culture, history, and socioeconomic origin as well as the researchers training in ABA (Creswell, 2009).

Positionality Statement

It is worth noting that the researcher's beliefs may play a significant role in how the study progresses, and how the researcher interprets the data. This notion that the conclusions reached by a researcher can be influenced by their culture, customs, perspectives, social standing, occupation, race, gender and background is referred to as positionality (Briscoe, 2005; Calton Parsons, 2008; Fennell & Arnot, 2008).

The qualitative researcher in this study was the main instrument in the study; that is, the researcher interacted with participants, and documented, construed, analyzed, and described the subject matter (Creswell, 2007; Merriam, 2009; Seidman, 2006). Because the researcher is a human instrument, researcher bias, personal thoughts, feelings, opinions, and tastes are realities that may present a concern. The researcher is a Board Certified Behavior Analyst (BCBA) ©. BCBAs© are responsible for adopting and operating effective quality in ABA-based programs for children with autism. While the majority of the researcher's work has been in a private clinical setting, the researcher in this study has consulted in public school systems and noticed some system deficits. The researcher is therefore emotionally invested in the study. In order to minimize researcher bias, he phrased interview questions as neutrally as possible and was mindful of his own body language, tone, and facial expressions during interviews so as not to lead interviewees. The use of the inductive approach to data analysis also allowed themes to emerge from data using the participants' words as opposed to testing themes created by the researcher beforehand.

The schools picked for this study have not consulted with the researcher previously. The researcher therefore had no prior experience of ABA-based programs in these schools. He introduced himself as a researcher from Northeastern University who is working on his doctoral thesis. Additionally, the researcher made it clear that his role in this study was that of a doctoral researcher, not a BCBA©.

Protection of Human Subjects

In order to protect the human subjects involved in this research study, proper precautions were taken to protect the identity of the participants. The researcher completed the Protecting

Human Research Participants training through the National Institute of Health (NIH) Office of Extramural Research (see Appendix A). The researcher also filed an application with the schools where the research took place as well as through Northeastern University.

There were no physical risks to participants. Since there was no coding of participants' personal information, complete anonymity is to be ascertained. Additionally, the researcher ensured that the participants were comfortable and fully aware of the steps of the study before they become involved. Interviews provided for the comfort of the participants and if they were not comfortable answering any particular question, they did not have to answer it. There were no immediate, direct benefits for participation in the study.

Conclusion

The focus of this research was five public school systems in Northern United States that have already adopted ABA programs for their students with autism. The primary goal of this study was to explore the factors that the special education administrators in this study could identify as hindrances to the diffusion and implementation of ABA-based programs for children with autism in their schools.

A qualitative research methodology was deemed appropriate for this study. Interviews and recordings, were used to collect data; additionally, other relevant documents such as program materials, emails, and information found on the schools' websites were included to further triangulate the data collection process.

Data, in the form of transcribed interviews, field notes, and relevant documents was analyzed manually using a general inductive approach for analyzing qualitative data to generate themes which further relate back to the conceptual framework .

Chapter 4: Presentation of Findings

This study was conducted to explore the challenges that special education administrators in public schools encounter as they go about adopting, implementing, and maintaining ABA-based treatment approaches in their schools. Special education administrators who have implemented ABA-based autism programs in their schools participated in the interview process in order to share their perspectives and experiences with the researcher. The purpose of this chapter is to present the findings of the data analysis process. This chapter is organized into several sections, beginning with a restatement of the study research questions, followed by a description of the data collection and results of the study.

Research Questions

The following questions guided this case study.

(d) What are some of the barriers encountered by the special education administrators as they persuade various parties in their schools to adopt ABA-based autism programs?

(e) What are some of the challenges special education administrators face with the implementation of such programs?

(f) What are the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs?

Data Collection and Results

Eleven participants were interviewed for this study. The participants have all been involved in the implementation of ABA-based autism program in schools in New England and one in Pennsylvania. Ten of the participants were females; one was a male. All participants have graduate degrees; additionally, some of the participants have certification in applied behavior

analysis. Interviews for this study were conducted in late December of 2013 just before the beginning of the Christmas holiday season and continued after the holiday's season up to mid-January 2014.

Table 3, gives a summary of the participant characteristics. Throughout the study, the researcher refers to the participants as Mr. and Ms. and pseudonyms that were letter to their first names only. This reflects how the participants were addressed in their programs.

Table 3

Participant Characteristics

Participant	Age	Race	Years in public education	Qualifications
Mr. B	35	W	8	Graduate Degree, ABA certifications
Ms. A	38	B	12	Graduate Degree, school psychology training
Ms. T	45	W	20	Graduate Degree
Ms. O	56	W	25	Graduate Degree, School administrator certification
Mr. J	34	W	10	Graduate Degree, taking ABA certification classes
Ms. P	48	W	20	Graduate Degree, ABA certifications
Ms. D	48	W	9+	Graduate Degree
Ms. N	39	W	14	Graduate Degree, ABA certifications
Ms. M	37	W	8	Graduate Degree
Ms. H	40	W	4	Graduate Degree, ABA certifications
Ms. B	41	W	8	Graduate Degree

Note. The table gives a summary of the participant characteristics. The following codes have been used; W = White, B = Black, ABA = Applied Behavior Analysis.

Participants Contact

All 15 potential participants were forwarded an introductory email (Appendix B). The researcher's contact information was also included in the introductory email. In total, ten participants responded via email and five responded by phone. The researcher responded via email to confirm suggested interview times. Four potential participants did not participate. One special education administrator did not give a reason why he and his assistants could not participate and just stated in a call "we regret we will not be able to grant you interviews at this time" while the second participant wrote in an email, "this is not the right timing given the testing and preparations for the holidays and New Year." The researcher offered to reschedule the interviews to a later date but did not hear back from that school system. Dates of emails, responses, scheduled interviews, and participant names were tracked in a dissertation journal by the researcher.

Interviews

Each interview was conducted by face to face interaction with the participant. The researcher met with the participant in a familiar, comfortable format agreed by both the researcher and the participant. The participant was formally asked for permission to digitally record the interview. All participants gave permission.

Prior to the interview, the researcher sent the interview questions to the participants so that they could review the questions and be prepared. Once the interviews began, questions moved from very basic introductory questions about the participants to complex questions in the

interview protocol (see appendix E). The researcher generally followed the predetermined questions for the interview, yet deviations were utilized as appropriate, and some questions led to detours into related topics of interest. The researcher followed a pattern similar to what Smith, Flowers, and Larkin (2009) describe as the regularity of the interaction of an interview, "At the beginning of the interview, there will be condensed meanings, descriptions and understandings, but as the interview progresses, and the participant(s) warm up to the exercise and relax(es) into it, there is a likely to be a move from the descriptive to the affective, from the general to the specific, from the superficial to the disclosing" (p. 68). Moving into more disclosing or somewhat more probing questions allowed the researcher to go more deeply into what the participants were saying, which subsequently enabled the researcher to gain a deeper understanding of their experiences.

Throughout the interviews, the researcher posed explanation questions; additionally, some participants needed a bit more clarification or re-wording on some questions posed. The goal of the data collection was to capture and learn from the experiences of these special education administrators. Upon completion of the interview, the researcher wrote some reflective notes and later wrote verbatim transcripts.

Specific Methods

Data collection was an iterative process of five stages, as follows:

1. Open-ended and semi-structured interviews. The semi-structured questions were based on literature and framed along the theoretical framework. The open ended questions invited the participants to tell the story of their experiences in the adoption and implementation of ABA programs in their schools. Interview questions can be found in Appendix E.

2. Interviews were digitally recorded. Additionally, the researcher took supplemental notes during the interviews.
3. Documents. Participants were asked to provide samples of any reflective journals or other reflective materials concerning their ABA programs, if there were any. Only four participants were able to provide a total of five documents. They were examined after categories were generated as a method of category confirmation. These documents included general ABA training manuals and schedules, one participant had a folder with notes and papers she kept as records of program implementation and another had minutes from a school board meeting showing discussions over funding an ABA program. They were later returned to their owners.
4. Coding. After each interview, the researcher listened to the digital interviews, noting the key statements from the participants. The researcher thereafter broke down these key statements into distinct codes based on their similarities and differences.
5. Follow-up participant session. Each participant received a copy of his or her transcript immediately upon completion of transcription. Participants were invited to engage in a follow-up conversation, either by phone or email, to ascertain their response to and verification of the data as represented. The date each transcribed interview was emailed was noted in the dissertation journal. None of the participants elected to engage in a follow up conversation; all were satisfied with their transcripts.

Coding

One of the first steps of qualitative data analysis is coding. Coding breaks down collected data to create groups or instances that have common properties or theoretical similarities (Coffey

& Atkinson, 1996). Open coding was employed in this study. Open coding involves breaking down the data into distinct parts and scrutinizing them for variances and similarities (Strauss & Corbin, 1990). This primary coding can be accomplished by marking transcripts and documents with code words, colors, and other designations to reduce the data (Coffey & Atkinson, 1996). The researcher used a line-by-line analysis (Strauss & Corbin, 1990). The codes were derived directly from the data in this study, termed in vivo (Coffey & Atkinson, 1996), or descriptors of the images and meanings the data evoke (Charmaz, 2000).

After each interview, the researcher listened to the digital recording, noting the key statements from the participants in the table and format in Appendix F. This initial coding was accomplished by marking transcripts and documents with code words and colors (Coffey & Atkinson, 1996). During this transcription, the researcher also noted emerging themes.

Reporting the Findings

The findings for the study are summarized in Table 4 and presented by sections ordered by the research questions they answer. These sections are:

(a) The barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt ABA-based autism programs.

(b) Challenges that special education administrators face with the implementation of such programs.

(c) The challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs.

The barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt an aba-based autism programs.

Special education administrators encountered four major barriers in the initial stages of adopting ABA-based autism programs in their schools.

- The attitudes and the perceptions of educators, board of education members, parents and other state holders in the public school systems on applied behavior analysis.
- The educators' (teachers and teaching assistants) fear of change from the known familiar to a new curricular method.
- Feeling of unjustified evaluation and invasion of professional and personal space.
- The politics and philosophy of American education (specifically inclusion and non-inclusion).

The attitudes and perceptions of educators, other state holders in the public school systems on what is applied behavior analysis

Several participants mentioned that behavior techniques used in ABA-based intervention have often been associated with animal experiments and other research performed by behaviorists decades ago, most of which used punishment, and seclusion as primary components, therefore, the mention of ABA methods to teachers or other public school educators often carries a negative connotation associated with the past. One participant mentioned that a board of education member was adamant that ABA practitioners advocated shock therapy. This board of education member had a newspaper clipping of a controversial pseudo- ABA-based program in Massachusetts that had been in the news because of its use of mild skin shock therapy. One participant said, "It takes a lot of educating teachers, paraprofessionals and other service providers in the school on what ABA-based interventions are and what the program will look like to overcome this hurdle."

The educators' (teachers and teaching assistants) fear of change from the known familiar to a new curricular method

A constant theme among participants was the "fear of change," which is very common. Participants said that from their experience, many teachers and service providers resist implementing behavioral techniques that are new to them; one participant noted that, "From my experience, it is also often more difficult and time-consuming to desert one's habitual teaching methods and learn to employ new methods, even when one's habitual methods have been proven to be ineffective." Additionally, most educators are also skeptical about the need for clinical intervention models in schools. Most participants stated that teachers often feel significant pressure to emphasize academics. "After all, they are educators, and as a result, they feel that students' behavioral needs are a lower priority in their order of things, and if anything, such interventions should be delegated to school psychologists and social workers who have the clinical training."

Feeling of unjustified evaluation and invasion of professional and personal space

Currently in the United States, most public schools are under much scrutiny regarding students' poor performance on standardized tests. Evaluations for such performances, which are frequently used to determine, among other things, teachers' performances and why their students are not meeting their performance goals, are often administered by external organizations or contractors not intimately linked to the school and possibly not even with the school district. As a result, some participants mentioned that teachers are uncomfortable with unfamiliar individuals in their classrooms. Often, teachers and other support staff perceive the presence of the largely out-of-district consultants hired to lead the adoption and the maintenance of ABA-based

programs with the same skepticism as the testing staff, and often appear indifferent to their evaluations and interventions. Almost all participants interviewed mentioned that in the initial stages of adopting the ABA-based programs, they relied on the involvement of out-of-district consultants in the form of BCBAs© and other clinical consultants. Participants expressed that most often special education staff felt the involvement of these out-of-district personnel was yet another invasion of their professional space. Participants mentioned that often after clarifying the role of these out-of-district consultants, most staff became more accepting of them and their feedback.

The politics and philosophy of American education (specifically inclusion and non-inclusion)

One big challenge that special education administrators face when making a case for ABA-based autism programs is etched in the American philosophy of inclusion or non-inclusion. Participants mentioned that often general education teachers have conflicting views about the inclusion of students with disabilities in their mainstream classrooms. Given that children with autism come with severity of disabilities, many general education teachers and teachers who provide instruction in the specialized areas (music, art, world languages, and physical education) do not have confidence in their ability to teach this population effectively while at the same time teaching a large group of typically developing students These teachers and service providers often expressed concerns about having students with autism and related emotional behavioral disorders in the general education setting because of the children's behavioral outbursts and lack of social skills, as well as adjustments that would need to be made to the curriculum. Participants seemed to concur that the attitude of general education teachers

toward students with autism dramatically affects the success of ABA program introduction and implementation. One participant said that a majority of teachers and service providers are not fully receptive to inclusion because they lack the knowledge skills expertise to differentiate instruction or know what kind of support to provide to the children with disabilities; often because this is not part of their training. With training and familiarity, the administrator noted that these teachers "eventually come around."

Challenges special education administrators face with the implementation of such programs, the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs

This study found the themes that were prevalent as challenges affecting implementation of ABA-based programs were similar to the challenges that special educators face in the institutionalization of ABA-based curriculum interventions in their schools. As such, the two sections have been combined. The most visible themes were

(a) The theoretical/philosophical discrepancy between the ABA-behavior analytic models and the training of, provided to most educators

(b) Budget and cost considerations

(c) High staff turnover and the shortage of qualified staff

(d) Training and retraining needs

(e) The lack of a standardized curriculum or support manuals

(f) The involvement of parent (s)

(g) The lack of ABA-based curriculum methods advisory/support boards

(h) The communication, cooperation/collaboration challenge

(i) Cultural challenges

(j) Administrative and logistical challenges

The theoretical/philosophical discrepancy between the ABA-behavior analytic models and the training most educators have

Most participants said that because many teachers are trained using the biological model in which learning is intrinsically motivated, asking such teachers to start giving rewards, which they often call "bribes," to motivate performance just does not appeal to them. "Few teachers I know believe in using extrinsic motivators as incentives," one participant stated. This hinders the effective implementation of ABA curriculum methods.

Another participant stated that "Teachers tend to think about students' behaviors in terms of psychoanalytic, developmental, or physiological explanations." This is quite conservative compared to the behavior analytic model. "Some educators might not agree with or believe in a technique or theory in which they feel that they are the sole person in control of changing students' behaviors.

Additionally, one participant noted that "some teachers believe that changing students' behaviors should be the role of the parents rather than the teachers." Several participants also mentioned that many teachers focus on using punitive strategies like taking away privileges, or giving extra work to manage student behavior rather than positive behavior interventions. These consequences- only based strategies go against ABA-based practices which causes conflicts in the adoption of ABA-based curriculum interventions.

Budget and cost considerations

The “cost” theme emerged over and over again. All participants mentioned the cost in terms of providing extra classes, more specialized personnel, and the cost of training among other costs mentioned.

Autism affects individuals in seemingly different ways, most often children with autism have a wide variety of other neurological disorders such as epilepsy, cerebral palsy, attention deficit disorder, sensory processing disorder, and visual or hearing impairments. Students with autism also demonstrate significant deficits in perception, language, learning, and adaptive behavior. They function below their age levels in most areas. In an educational setting, some individuals exhibit aggressive behavior or self-harm. These problem behaviors, the participants stressed, call for more resources such as special education classrooms, extra nurses to handle medical emergencies, and other extra resources.

One participant mentioned that in her school she had to construct a padded time-out room for intensive aggressive students. This was uncommon, very expensive, and required the approval of the state education secretary’s office. Additionally, in order to adequately address the academic needs of children with autism, there is need for a high staff-to-student ratio. Almost all participants stressed that public schools like the rest of the businesses, have been affected by the economic slowdowns of modern times, especially because public schools run on taxes from the very same public that is not doing well economically.

High staff turnover and lack of enough qualified ABA professionals

This study found that many public schools experience a high turnover of special education staff members. A common thread among the participants was that the numbers were even higher for staff in their autism programs both for special education teachers and other support

professionals. This affected program implementation and institutionalization. For example, it means that training gains made over the years are often eroded when experienced staff leave their program and more time has to be invested to bring the new hires to a competent performance level. Most participants also mentioned that often they have no control over what paraprofessional staff will be returning to their work at the beginning of every year because this is largely determined by approved budgets, other institutional needs, and the availability of better job opportunities.

Some participants attributed the high staff turnover among special education teachers in ABA-based autism programs to the "personal cost" of having children with autism under their care. A participant who was once a special education teacher in an ABA-based program lamented that she felt that unlike general education teachers; she had two jobs to do. "From 8:30 a.m. to 2:30p.m , she was responsible for educating the students in the class, and at 2:30pm, when everyone else was getting ready to leave, she was starting her second job, writing IEPs and doing all the required special education paperwork."

The individualized education program **(**IEP) is a legal document that outlines the agreement between the parents or legal guardians of special education students and the school district in terms of the services and type of education the student will receive. Writing, developing, and implementing an IEP is a critical, yet often time consuming and stressful requirement of special education teachers. The feeling that they have an extra load on their plate when they move to ABA-based programs obviously contributes to a higher turnover, which again jeopardizes the smooth implementation of ABA-based programs.

Note that special education teachers in ABA-based program are also required to play the role of classroom supervisors to ensure that everyone, especially the paraprofessionals, are following the expectations and completing the requirements of their teaching program, and given that some of these paraprofessionals were not adequately prepared, it means the special education teachers have to put extra effort helping the paraprofessional. “This can be exhausting, and it eventually takes toll even on the most experienced and dedicated special educator,” one participant said.

There was also the common theme, mentioned by participants, of the shortage of qualified ABA-trained staff and practitioners. At the initial stages of implementing ABA-based programs, almost all participants consult with BCBAs©, both in building the basic program structures and in staff training. However, there are so few of them, their fees are high, and they do not want to commit to long-term commitments with school districts. Some participants solved this challenge by creating tuition and other reimbursements for in-district staff that took classes in ABA-related disciplines in an effort to support qualified staff for their programs.

The challenges of training and retraining

Another common theme that came up in the interviews was the challenge of training for ABA-based programs. Specifically, participants mentioned the need for more training at all levels in the program (including teachers, paraprofessionals, and specialists). Most participants felt that most often special education colleges are not adequately preparing their graduates to carry out ABA-based curriculum interventions. The remaining participants explicitly stated that it was the paraprofessionals who needed more training in managing student behaviors and developing lesson plans. One contributor stated that at the start of the autism program at his

school, paraprofessionals were required to receive training before they entered the classroom, but now paraprofessionals begin their jobs in the classroom without any training and receive hardly any formalized training once they start due to the high costs of such training. This lack of adequate training, participants agreed, was detrimental to the full adoption of the ABA programs.

Because teachers and support staff carry the bulk of successfully implementing ABA-based programs, participants were in agreement that it was necessary to provide ongoing in-service training to teachers and, when possible, to involve teachers in the research process in meaningful ways. Several participants felt that, simply attending a yearly continuing education lecture is unlikely to be sufficient, given the rigor required in implementation ABA-interventions. Most of the participants agreed that despite the difficulties, training ABA professionals, this was a "necessary evil," as one participant put it.

Another question that emerged frequently was when to do the training. To train special education teachers, substitutes must be found so that special education teachers or their general education counterparts can attend training. This same problem was shared by paraprofessionals, but the bigger issue was that they are often not compensated for training outside of their regular work schedules. "The ability to train teachers without disruption of classes, especially during testing season, and training the paraprofessionals during their scheduled work hours without putting due pressure on student coverage, is one for the geniuses," one participant said.

The lack of a standardized curriculum or support manuals

Another common challenge mentioned by the participants in this study was the lack of a standardized ABA curriculum or support manual. Most curriculum interventions in education have well-written practice manuals for the teachers that specify both the content to be taught (the

curriculum) and the teaching techniques to be used. This provides an efficient "package" for the educators to implement. ABA lacks such a practice manual, which results in the laborious and time-consuming practice of assembling teaching plans for each of the individual educational plans (IEP) objectives a child might have. Several participants felt that the availability of a support manual would ensure more consistency among the different ABA-based programs and even become a reference point for special educators.

The involved parent (s)

The role of parents came up as a common theme; all participants mentioned parents at some point during the interviews. There was a consensus among the participants that the involvement of parents is critical for successful ABA-based programs; for example, one administrator mentioned that parents, whose children have autism, can be a very important group in lobbying education boards and local legislators when it comes to funding, but this can also be a challenge. One participant mentioned that "the internet in particular has given parents power. They can research the most up-to-date interventions for autism and demand them. For example, we started using laptops in our school system as communication devices for our autism population after parents frequently asked for them."

"But the role of parents can be both 'a blessing and a curse,'" as one administrator put it. "Sometimes," one participant said, "parents demand options that cost money, some of which is not always in their budgets; at other times parents demand interventions that are not practical for public school settings." There are also parents of non-disabled kids who are quite opposed to autism programs in public schools. One participant mentioned a parent who recently got enraged that her daughter should not be in the same classroom with a child who "disrupts class,

screeches, and sometimes is aggressive." This was in reference to a child with autism in an integrated classroom. While other administrators did not have similar experiences, they pointed out cases they know where that has happened.

The lack of ABA-based curriculum methods advisory/support boards

Another challenge of implementing ABA-based programs is the lack of district or state Autism/ABA advisory committees, whose tasks, according to one administrator, would be "to develop recommendations for public school administrators regarding the development of a Pre-K through Grade 12 continuum of quality services to support school success for autistic students." Such advisory groups "can also reach out to the parents of children with autism, so that they can foster district/parent communication."

The communication, cooperation/collaboration challenge

The challenge of fostering effective communication and cooperation was a constant theme of the participants. Both terms were mentioned in the context of how difficult it is to cooperate and communicate with so many specialists involved. As mentioned earlier, children with autism present with multiple other disorders. This calls for different specialists such as speech and language therapists, occupational therapists, nutritionists, social group coordinators, schools counselors, board certified behavior analysts (BCBA©), among others. Each of this specialists come with a different methodological approach, but they are all required to work as a team to implement IEP goals that they all develop together for the ABA-based curricular interventions to work. "Getting this team to work together with all their egos is every administrator's nightmare," as one participant put it.

Cultural challenges

Participants in culturally diverse public schools expressed that ABA-based interventions lack cultural considerations in autism intervention. One administrator noted that "a lot of my minority parents are very apprehensive to ABA interventions; some of them even refuse home-based interventions we offer." Another participant noted that "even in places where schools have to give services for free, parental participation is highly recommended; after all, parents are part of the IEP process but most often minority parents refuse to participate." This administrator gave examples of cases in which she has had to use the Department of Children and Youth Services personnel to get parents' consent for evaluations to qualify their children for ABA-based services. The participant added that this step, though done in the best interest of the child, alienated the parents further. "But at least the child is getting the help they require," the participant added.

Another participant added that "the ABA jargon is difficult for English speakers. Imagine trying to break it down to non-English speaking parents without making them feel inadequate?"

A participant said, "How to establish trust with parents of diverse cultural backgrounds, finding ways of developing cultural awareness, cultural sensitivity and respect among school district staff and consultants in the ABA-programs and the diverse families they serve in order to better address the needs of these parents and get their support are challenges. I have not mastered that yet." This summed up the cultural challenges so well.

Administrative and logistical challenges

Two major themes emerged related to the administrative and logistic challenges of implementing and institutionalizing ABA-based program. These were the expanded role of special education administrators and the supervision of paraprofessional staff.

Participants expressed that the adoption of ABA-based programs in their schools meant that their roles as administrators also changed. Special education administrators are traditionally not clinicians, but with an ABA program in place, the role of these administrators changed to involve providing clinical oversight to the ABA programs, coordinating program services, training staff and parents, providing on-going clinical support besides managing other management logistics that come with ABA-based program. Asked how this could be solved given that special education administrators have a lot more to do in their day-to-day work, one participant mentioned that in her school district, the school psychologists have been given extra training and are gradually becoming the individuals to carry out some of these responsibilities. School psychologists have the necessary combination of knowledge within psychology and education to provide clinical support, and with additional training and experience can provide the necessary administrative support. This will take the load off school administrators.

Participants mentioned that with the implementation of ABA-based programs, the supervision of paraprofessionals became an urgent concern because special education teachers in the ABA-programs needed increased assistance with the implementation of specific ABA-based techniques; for example, running specific behavior protocols, data collection, baseline tabulation, etc. This became a pressing issue because the teachers had not received formalized instruction in the training and supervision of paraprofessionals for these specific tasks; in addition, the teachers lacked the history of providing this type of more active supervision. One participant called it the "para nightmare." Participants mentioned that this problem meant that the special education administrators had to take this on as an extra load. Three participants hired someone within the

school system to supervise the paraprofessionals. These supervisors went by different names, including ABA therapist, autism specialist, and ABA support assistant.

Table 4

Overview of Findings

Research Question(s)	Findings
1. What are some of the barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt-ABA-based autism programs in their schools?	• Attitudes and perceptions of educators, board of education members, parents, and other state holders in the public school systems on applied behavior analysis • Fear of change • Feeling of unjustified evaluation and invasion of professional and personal space • Politics and philosophy of American education (specifically inclusion and non-inclusion)
2. What are some of the challenges special education administrators face with the implementation of such programs?	• The lack of a standardized curriculum or support manuals • The involved parent (s) • The lack of ABA-based curriculum methods and advisory/support boards • Communication and cooperation/collaboration • Cultural challenges • Administrative and logistical challenges

3. What are the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs?	• The theoretical/philosophical discrepancy between the ABA-behavior analytic models and the training most educators have • Budget and Cost Considerations • High Staff turnover and shortage of qualified staff • Training and retraining needs

Note: This table summarizes the findings of the study parallel to the three research questions considered.

Chapter 5: Summary, Conclusions and Recommendations

This chapter includes three sections; section one presents the problem of practice that was the crux of this qualitative research project; section two presents the principal findings, followed by the deductions that are bases of these findings, and section three discusses the limitations of the study, recommendations for current practice and possible future research.

Statement of Problem

Despite growing evidence of the efficacy of innovative ABA-based practices as educational interventions for autism (Heward, 2003; National Research Council, 2001; Stahmer, 2007), there has been reluctance by public school systems to adopt these education interventions (Heward, 2003; National Research Council, 2001; Stahmer, Collings & Palinkas, 2005; Stahmer, 2007). This is also despite the growing number of children with autism in public schools. The incidence of children aged 6-21 diagnosed with autism has increased by more than 500% in the last decade alone, from under 20,000 in 1993, to 120,000 in 2002, to the present figure of 1 in every 50 school age children (CDC, 2013).

The focus of this research was that of special education administrators in select schools in northern United States that have adopted ABA-based autism programs in their school districts. This study sought to understand the difficulties that special education administrators encounter as they go about adopting, implementing, and maintaining ABA-based treatment approaches in their schools. Three broad questions guided this research:

(a) What are some of the barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt of ABA-based autism programs in their schools?

(b) What are some of the challenges special education administrators face with the implementation of such programs?

(c) What are the challenges these administrators face in confirmation and continued institutionalization of ABA-based autism programs?

Chapter 4 largely addressed the findings of these three research questions. Chapter 5 expands on the findings of this study from the perceptive of the theory used in this study. This study used the Diffusion of Innovation (DOI) theory (Rogers, 1962, 2003) as a framework to explore the challenges encountered by public school administrators as they put in place ABA-based interventions for their autism programs. The DOI theory provided a theoretical framework to this study because of its multifaceted approach to the adoption of innovations.

The DOI theory addresses the steps of the innovation-decision process, following an innovation from its reception to its institutionalization, and devotes considerable effort to factors that can work against the intended innovation (Dow, Ruth, Whitehead, & Wright, 1984; Evaans, 1968; Williams, 1975). Rogers (2003) notes that the knowledge of an innovation does not always lead to an adoption or rejection; there are many factors that come into play that could hinder the adoption of an innovation. Four general categories represent these inhibiting factors: factors within the innovation itself, resource factors that are employed towards the adoption process, intended-user characteristics, and inter-element factors.

The findings of this study addressed the three issues it sought to explore: the barriers encountered by the special education administrators as they persuaded various parties in their schools to adopt ABA-based autism programs in their schools, difficulties faced by special education administrators when implementing such programs, and finally, the challenges these

administrators face in confirmation and continued institutionalization of ABA-based autism programs. Factors that emerged from this study fell within the four general categories proposed by the DOI theory: factors within the innovation itself, characteristics of the resources system factors, intended-user characteristics and inter-element factors.

Factors Within the Innovation Itself

Findings of this study showed the following factors within ABA as a curriculum intervention that hinder its adoption, implementation, and maintenance; complexity, explicitness, and relative advantage. Complexity is the degree to which an innovation is alleged to be difficult to understand and use while relative advantage is the degree to which a new idea is perceived to be an improvement from the idea before it (Henrichsen, 1989). Explicitness refers to the clarity with which a new idea is described to intended users.

A constant theme that emerged from interviews conducted for this study is that special education teachers, general educators, and support staff perceive ABA-based interventions as complex, “data-driven, “ overwhelming, and overly cumbersome. This makes it difficult for special education administrators to persuade their staff to accept it. Even when educators do employ the use of ABA-based interventions, this study found that a majority of educators and support staff still perceives these interventions as complex.

There seemed to be a consensus among administrators that ABA-based interventions are not explicit. According to most of the study participants, there is a large research to practice gap in ABA; as such ABA, even when used in curriculum, contains a lot of technical jargon, for example, discriminative stimulus, motivational operators, evocative motivation operators, among others. This concentration of technical language makes it difficult for special education

administrators to reach support staff such as classroom aides, most of whom have less than a two-year college education.

Characteristics of the Resources System Factors

The availability of a resource to promote an innovation affects the course, success or failure of adoption, and implementation of an innovation (Dow, Whitehead, & Wright, 1984; Henrichsen, 1989; Rogers, 2003). This study found the ability to build the capacity and structures for ABA-based programs and to foster harmony among the many parties involved in the implementations of such programs as the primary resource factors that hinder the adoption, implementation, and maintenance of ABA-based interventions.

Capacity refers to the capability of those promoting an innovation to rally the necessary resources required to promote an innovation (Rogers, 2003). There was a constant theme that the resources and staffing needed to implement ABA-based autism interventions are intensive. In addition to the cost of the new program, the adoption of ABA change demands effort, time, and resources. Participants mentioned that building capacities for the ABA-based programs in financially strapped public schools systems is one of the major challenges of such programs.

Harmony refers to the harmonious relations among the people playing different roles in the innovation (Henrichsen, 1989). Fullan (2003) argues that planners and managers of implementation often ignore the social relations problems until they cripple the adoption of an idea. A general theme from the findings was that children with autism present with multiple disorders, which necessitates different specialists such as speech and language therapists, occupational therapists, nutritionists, social group coordinators, school counselors, and board certified behavior analysts (BCBA©s) among others. From this arises the problem of a

harmonious cooperation and collaboration. The challenges of fostering such harmony with so many specialists involved can be a "nightmare," one participant said.

Intended-user Characteristics

Several characteristics of an organization can be hindrances for the success of an innovation. The DOI mentioned that the following intended-user factors are possible challenges to the implementation of educational innovation, geographic location, centralization of power and administration, size of the adopting unit, communication structure, group orientation, and tolerance of deviancy, teacher factors, learner factors, teachers' and students' capacities to perform in new ways, prevailing education philosophy in a school, and the place of examinations in the school system (Henrichsen, 1989). The findings of this study reported the following factors: centralization of power and administration, size of the adopting unit, communication structure, group orientation and tolerance of deviancy, teacher factors, prevailing education philosophy in a school and the place of examinations in the school system.

Centralization Administration and the Size of Adopting Unit

Participants expressed that the adoption of ABA-based programs in their schools meant that their roles as administrators also changed. Special education administrators are traditionally not clinicians, but with an ABA program in place, the role of these administrators changed to involve providing clinical oversight to the ABA programs, coordinating program services, training staff and parents, providing ongoing clinical support besides other management logistics that come with ABA-based program. This challenge became greater as the number of individuals involved in the ABA-based program increased.

Prevailing Education Philosophy in a School and the Place of Exams

The prevalent education philosophy in a school system and the roles of exams were emergent themes in this study's findings. Participants expressed that one of their biggest challenges when making a case for ABA based autism programs is etched in the American philosophy of inclusion or non- inclusion. Inclusion is the practice of educating children with disabilities in general education classrooms alongside their classmates who do not have disabilities, with necessary supports provided (Salend & Duhaney, 1999). Participants pointed out that general education teachers often have contradictory views about the inclusion of students with disabilities in their mainstream classrooms. Many general education teachers and teachers who provide instruction in the specialized areas (music, art, world languages, and physical education) do not believe they are able to teach these populations effectively while simultaneously teaching a large group of typically developing students. This is of course not always the case. Rather it is informed by the philosophical background of these educators, and has an effect on the adoption of ABA-based programs.

The role of exams was also a theme in the findings of this study. Under current federal mandates, every state is required to create assessments aligned to that state's academic standards. Further, all students, including those with disabilities, are required to take these assessments. Students' achievement results for each subgroup must reach the yearly benchmarks established by these federal mandates, and schools not reaching these benchmarks face serious consequences including withholding of funds (see NCLB, 2001). Because the scores of students with autism are also reported in the cumulative numbers, some teachers and administrators within the school districts, according to participants in this study, feel that having students with autism and related disabilities will harm the schools' standings in these standardized exams.

Teacher Factors

Education innovative research claims that the role of teachers in adopting innovations is critical (Avramidis, Bayliss & Burden, 20002; Henrichsen, 1989; McDonald & Rudduck, 1973; Thomas, 2003). Findings of this study also confirmed that teacher factors; for example, how well the teachers are willing to perform in new ways, teachers' commitment to the ABA-based curriculum, and teachers' attitudes to other parties involved in the implementation of new curricular systems can act as barriers to innovation. Participants stressed that while they champion the innovations, teachers implement change at the classroom level. Since changes in behavior require both commitment and capacity. Teachers are also largely responsible for monitoring and reporting the success and failure of ABA programs. The lack of commitment to an innovation or unwillingness to implement ABA interventions as intended can affect implementation.

Inter-element Factors

Finally, four factors that exist "between" rather than "within" the elements involved in the diffusion and implementation of innovations were identified in the findings of this study as factors that hinder the innovation and adoption of ABA-based autism programs in public education. These were compatibility, linkage, rewards and synergism.

Compatibility. This refers to the degree to which the innovation conforms to the already existing standards and values of an institution (Henrichsen, 1989). Participants of the study mentioned that ABA-based curriculum interventions are often perceived as not compatible with the attitudes and values held by most teachers and support staff in the public schools, which leads to the resistance to adoption. This is because ABA-based philosophy is somewhat different from the

current existing teaching methods; recall the developmental vs. behavior analytic comparison mentioned earlier.

Linkage. This reflects the degree of interpersonal or intergroup links that exists in a given situation. In educational reform campaigns, support networks such as professional learning communities and professional journals play a significant role in facilitating the links necessary to sail an innovative educational idea (Richards & Rodgers, 1982). Participants of the study mentioned that because of the lack of district or state autism/ABA advisory committees, or such support organizations within the ABA and autism community to support teachers. This lack of such linkages affects the adoption of ABA-based interventions in public schools.

Rewards. Rewards in DOI literature refers to the frequency, closeness, amount and structuring of positive reinforcements in a system. These rewards can take various forms, for example acknowledgment by colleagues or creating something that works with others (Henrichsen, 1989). Participants in the study said it was unfortunate that in many school systems, the rewards for carrying out an innovation are few, if they exist at all. Participants further added that in fact the personal costs of adopting ABA-based interventions are frequently high in terms of extra work, time, and the energy special educators have to expend in running such programs.

Synergism. The challenge of fostering effective communication and cooperation was a constant theme from the participants. Cooperation and collaboration were mentioned in the context of how difficult it is to cooperate and communicate with so many specialists involved. Children with autism often present with multiple other disorders. This demands that different specialists such as speech and language therapists, occupational therapists, nutritionists, social group coordinators, school counselors, board certified behavior analysts (BCBA©s) work together.

Participants mentioned that coordination of all these parties to form a coherent working group was difficult.

The term synergism in DOI plainly means working together. It also refers to the "number, variability, frequency and persistence of forces that can be mobilized to produce a knowledge utilization effect (Enriches, 1989). This study found that the ability of educators to work together as a team can be challenging. Figure 4 below gives a summary of the findings of this study parallel to the DOI theory.

Table 5

Findings of the study parallel to the DOI theory

Factors that hinder the diffusion of an innovation as per The Diffusion of Innovation (DOI) theory (Rogers, 2003), adapted from Henrichsen (1989)		Themes from the study Findings
Factors within the Innovation Itself	Originality Complexity Explicitness Relative Advantage Trialability Observability Status Practicality Flexibility Primacy	Complexity Relative Advantage
Resources factors	Capacity Structure Openness Harmony	Capacity Structure
Intended-User Characteristics	Geographic Location Centralization of	Teacher Factors Centralization of Power and Administration

	Power and Administration Size of the Adopting Unit Communication Structure Group Orientation and Tolerance of Deviancy Openness Teacher Factors Leaner Factors Capacities Education Philosophy Examinations	Communication Structure Education Philosophy Examinations
Inter-Element factors	Compatibility Linkage Reward Proximity Synergism	Compatibility Synergism Linkage

Note. The above is a summary of the findings of this study on factors that hinder the diffusion of an innovation as per the DOI theory (Rogers, 2003). The factors that hinder the diffusion of an innovation have been adapted from Henrichsen (1989).

Limitations of the Study

While procedures were put in place to ensure the validity of this research project, the study was not immune to possible limitations. These included the timing of the study, given that data collection was limited to about four weeks, which coincided with the Christmas, and New Year holiday season, and could be considered a limitation to the study. Perhaps there could have been different results if the study had been conducted at the beginning of a new school year, or in

the middle of a school year when administrators are settled and not in a rush to close for the holidays.

Implications for Education Practice

Based on the findings of this study, which is the first available study to use the *Diffusion of Innovation theory (DOI)* (Rogers, 1962, 2003) framework to explore barriers that special education administrators in public schools encounter in the process of adopting and maintaining ABA-based autism programs in their schools, there are clearly numerous barriers that need to be addressed. The following four recommendations for changes in education practice to foster the efforts of public school administrators in their efforts to adopt, implement and maintain such innovative curricular interventions. The four recommendations are increased funding for ABA-based autism programs, collaborative teacher and support staff training, the preparedness to implement on the part of special education administrators, and a revised role for applied behavior analysis and autism researchers.

The need for increased funding. DOI research (Rogers, 1962, 2003) argues that if an innovation starts out with a budget and if the allocation of resources is both satisfactory and continuing, it is more likely to be embraced. However, an emergent theme from the findings of this research was the inadequate funding of ABA/ autism programs, which has resulted in an untenable situation in many schools. However educating children with autism and/ or other disabilities has been the responsibility of public schools effective from 1975 as part of the Education for All Handicapped Children Act, now known as the IDEA (Murdick, Gartin, & Crabtree, 2002), and public schools remain the primary apparatus by which the majority of children with autism will receive highly specialized interventions until adulthood. With the rising

number of students diagnosed with autism (CDC, 2013), public school administrators, parents, tax payers, and all other parties involved in the funding of autism programs must respond (Twohig, 2000). Funding for autism/ABA programs must rise to a rate that matches the rising number of children coming to public education every year. Jacobson, Mulick, and Green (1998) studied the cost-effectiveness of ABA programs using statistics from Pennsylvania in a cost-benefit model. The study found an average savings between $187,000 to $203,000 per child for ages 3-22 years and $656,000 to $1,082,000 per person for ages 3-55 years (Jacobson, Mulick, & Green). It is therefore prudent to conclude that while the up-front costs required to fund ABA-based programs for kids with autism is large, it pales in comparison to the savings realized over a lifetime by the same taxpayers and other public education funding sources.

Added teacher and paraprofessional training. Despite the accumulating evidence of the effectiveness of ABA-based curricular interventions for children with autism, this study's participants were almost all in consensus on the need for more training for teacher and other support staff assigned to the ABA-based programs. Most participants suggested that aides and instructional assistants who spend the most time working directly with working with children with autism are underqualified and undertrained for their positions.

Participants also mentioned that these trainings are both costly and time-consuming. However, recent research points to non-conventional training methods that make it possible to conduct effective training at a cost less than most traditional methods. For example, distance methods such as desktop videoconferencing can be an effective method for training staff. Short-lived, focused, and intensive weeklong programs in the summer have also been shown to be effective in improving teacher skills across a wide range of areas (Lerman, Tetreault, Hovanetz,

Strobel, & Garro, 2007). In addition, short practices can be utilized in which the trainees are given direct feedback and video-feedback sessions regarding application of intervention techniques.

Additionally, given the urgency for personnel fluent in ABA curricular methods, public schools could collaborate with local universities and colleges to provide their staff with autism specific training. Special education departments could also work with these colleges and universities to design ABA curricular specific training so that individuals applying for school jobs are already equipped with expert training for this population when they begin (Scheuermann, Webber, Boutot, & Goodwin, 2003). In fact, some states (e.g., California) now have legislation requiring that teachers working with children with severe disabilities have some specialized autism-specific training.

The author of this study was a student of such a work/university autism specific training at a private school in which he previously worked. Such training will not only increase the efficacy of program staff but it will also facilitate in altering the perceptions of school staff on the value of ABA-based curricular interventions; recall from previous chapters that one challenge of implementing ABA-based programs was the negative attitudes and perceptions of educators regarding ABA. Successful adoption and implementation of ABA-based approaches is partly dependent on the extent to which teachers and school personnel are prepared to implement and research these curricular interventions. Pre-program training and continuous training during the adoption-maintenance process is likely to defuse this challenge.

A call for applied behavior analysis and autism researchers. This study found a big research-practice gap in autism/ABA-based curriculum practices in public education. While ABA/autism

intervention researchers have made huge advances in the understanding of the best ways to intervene with children with autism as is evident in research (Heward, 2003; National Research Council, 2001; Stahmer, 2007), this knowledge has yet to affect many of the children who need it most. By making the diffusion of efficacious interventions a research priority, there will be an increase in the likelihood that every child with autism benefits from the best intervention models that research has to offer.

Autism and ABA intervention researchers must cultivate conditions that will facilitate the successful diffusion of such efficient curricular interventions to public schools. This can be achieved by several efforts that include ABA/autism organizations like the Association of Professional Behavior Analysts (APBA)©, the Behavior Analyst Certification Board , Autism Society of America, and leading ABA research universities partnering with special education administrators to facilitate the successful adoption, implementation, and maintenance of interventions that have already been developed. In addition, the development of new interventions that meet the students' needs, and the needs of the teachers and other practitioners to ensure that the interventions meet the present needs and capabilities of schools, thereby increasing the likelihood of successful diffusion.

Autism and ABA researchers can also assist schools and teachers to adapt to new circumstances, environments, and educational climates and spearhead such curricular innovations by forming a network of support structures. The DOI theory used in this study supports the notion that the adoption of innovations by individuals is powerfully influenced by the structure and quality of their social networks. Unfortunately, this research revealed that there are not any ABA and autism and teacher affiliated support groups. Of course, this needs a

remedy to promote the adoption and diffusion of ABA-based curricular interventions in public education. Autism/ABA researchers and their affiliate organizations have a responsibility to facilitate such networks.

Additionally, participants in this study mentioned that a common challenge in the implementation of ABA-based curriculum interventions in school settings was the lack of a standardized ABA curriculum or support manual. Most curriculum interventions in education have well-written practice manuals for the teachers and other support staff that specify both the content to be taught (the curriculum) and the teaching procedures to be used. This provides an efficient "package" for the educators to implement. ABA lacks such a practice manual, which results in the laborious and time-consuming practice of assembling teaching plans derived from empirically supported practices for each of the individual educational plans (IEP) objectives a child might have. Several participants felt that the availability of such a support manual would ensure more consistency among the different ABA-based programs and even become a reference point for special educators. Autism/ABA researchers must take a lead role in developing such a curricular support manuals.

The preparedness to implement on the part of special education administrators. With the rising number of students diagnosed with ASD (CDC, 2013), more children with autism disorders will be seeking enrollment in public schools. This will lead to a higher demand for innovative curriculum - based interventions like ABA. Fullan (2001) notes that even with the best intentions, there is a high tendency of failure for such curriculum-oriented innovations. Innovations, as the DOI theory argues, is not an instantaneous act but a process of steps (the knowledge, the persuasion, the decision, the implementation and the confirmation) (Rogers,

1962; 2003). It is recommended that administrators who decide on implementing ABA-based curriculum interventions begin by building capacity at each level of these implementation stages. A constant subtle theme that this research showed was the complete lack of preparation by special education administrators.

While those interviewed here have put in place programs that are functional, most of them were not fully prepared at the onset of their programs. In fact, almost all of them got their ABA training while in the process of running the programs or after they became in charge of such programs. Additionally, the administrators pointed out to the researcher how much they and their staff felt stretched by the additional time and effort they had to put in, and the struggle to train and get professionals to work, train and stay in these programs. They also mentioned the funding battles with boards of education. This shows a complete lack of preparedness on the part of the administrators who experienced one or several other issues that cropped up during the study.

Before beginning an ABA-based program, administrators should do a thorough needs assessment of their intended programs. This should involve understanding the process and the possible needs and barriers at each stage of adoption. This needs assessment should also include the input of qualified professionals, input from families, and even from potential students themselves. This assessment should consider all aspects of the programs and the entire school system that will affect them. Such assessments should also consider possible barriers to these programs, for example, program acceptability, the organizational climate to implement such changes, differences and similarities that exist between the present and proposed curriculum changes, among challenge factors addressed elsewhere in this study.

Out of these assessments should come specifically defined, observable, and measurable expected outcomes. This may involve specific duties and responsibilities of each team member up to and including those responsible for funding. Once individual or team roles are defined, the administrators should develop written plans of implementing the new curricular interventions that define the specific roles and responsibilities of both the team and the professionals responsible. Also, they should consider immediate and long-term roles and goals. While most of the programs in this study had established expectations somewhere, they were in individual job descriptions and job expectations and were not defined precisely in one place.

Future Directions

During the course of this study, the researcher confirmed from participants the research-practice gap in autism/ABA based programs in public education that is mentioned in literature. This lag between the development of Autism/ABA research and the adoption of ABA-based interventions into classroom context mandates a need for research to address this. Additionally, to successfully implement efficacious ABA-based interventions, one must consider the context explicitly throughout all phases of research. The DOI theory used for this study provides a strong framework in setting the agenda for ABA-based autism intervention research. In fact, Rogers (2003) noted the potential benefits of a systemic approach in educational research using the DOI theory. He wrote, "an exciting potential contribution could be made in education research by using the DOI, because organizations are involved, in one way or another, in the adoption of most educational innovations … most school teachers and school administrators are … inevitably involved in educational adoption decisions…" (p. 61). This opportunity is still open for future researchers to embrace.

Longitudinal studies both for the children in the ABA-based autism programs and for the programs themselves should also be undertaken. Given the emergence of ABA-based interventions in public education and a plethora of ongoing research dictates program implementation as an active dynamic process, not a static, finite one. This presents a rich field for future research.

The resource and staffing requirements to implement most ABA-based autism interventions are intensive. In addition to the cost of the ABA-based programs, the change itself demands effort, time, and resources. Further research is needed to assess (or determine) if the cost of adopting new ABA-based autism programs is really worth the relative long-term advantage available in the model mentioned elsewhere in this study (Chasson, et al., 2007; Jacobson, et al., 1998; Motiwala, et al., 2006). Researchers must give public school administrators findings to justify the adoption or rejection of ABA-based programs. Participants in this study mentioned that championing the adoption of ABA-based programs is challenging when they do not have a cost-benefit analysis. When justifying the costs of adopting innovative programs, administrators also take into account whether the new programs will be cost-effective in the long run. Further research will inform such decisions.

Final Words

In conclusion, there are many challenges faced by public school administrators in their effort to implement ABA-based programs in their schools. A lot of work needs to be done to ensure that all the children with autism who enroll in public schools are getting the best education experience possible. Much has been learned from this study in relation to challenges that special education administrators face when they begin to put in place such innovative

curricular innovations. However, despite the challenges this study found, the existence of programs that were part of this study is proof that this type of program can be implemented under the auspices of a public education system.

It is now up to the educators of public schools, parents, local education officials, and board of education members among other players in the public school decision implementation web to hear the voice of reason and create positive change for students with autism spectrum disorders. All students deserve the best interventions supported by scientific research. This research shed light on some challenges. We all owe our future generations a chance. We cannot fail them, even the child with the most severe autism. Not at this point!

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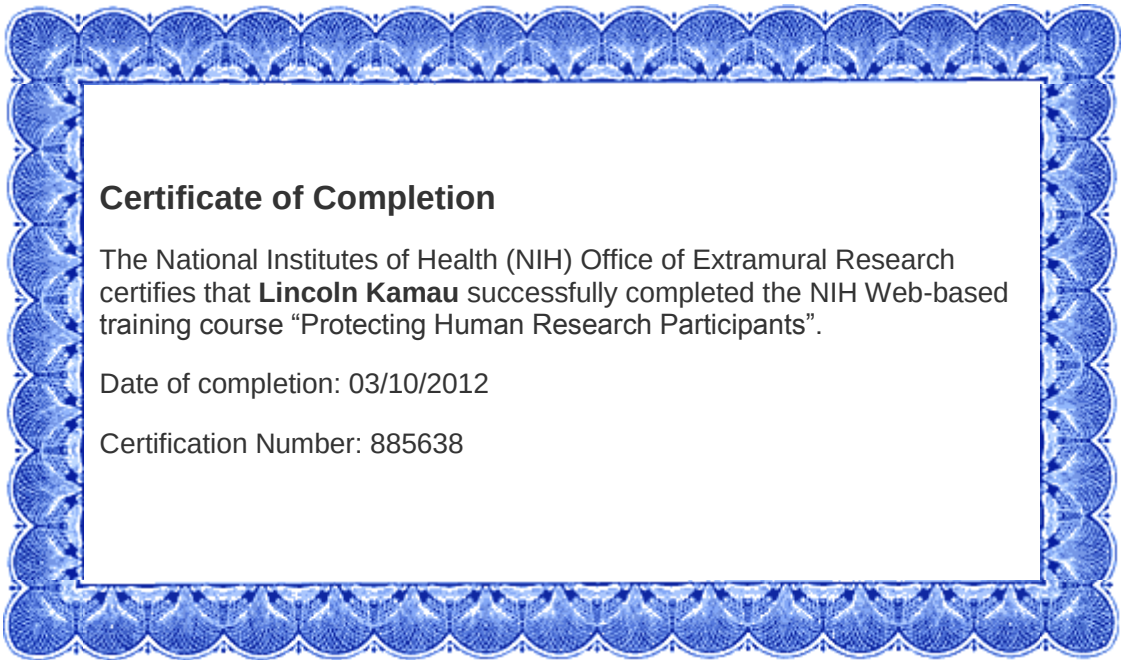
Appendix A: “Protecting Human Research Participants” certificate



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Lincoln Kamau** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 03/10/2012

Certification Number: 885638

Appendix B: Request for Consent

Northeastern University, College of Professional Studies, Department of Education
Name of Investigators: Lincoln Kamau, Doctoral Student, Dr. Jennifer Qian, Principal Investigator
Title of Project: Applied Behavior Analysis in Public Schools; Understanding factors that affect the successful adoption, implementation, and maintenance of programming.

Request for Consent to Participate in a Research Study

June 8, 2013

Dear potential participants,

I am preparing to begin my doctoral research project. The goal of this study is to explore the difficulties you encountered in your schools as you go about adopting, implementing, and maintaining ABA-based treatment approaches for children with Autism Spectrum Disorders (ASD).

I invite you to participate in this research process and seek your consent to interview you and to review documents (if any) related to the adoption and implementation of your ABA-based program.

As part of the informed consent process, there are several points I would like to explain:

- There is no compensation offered for participation.
- I do not foresee participation in the project posing any risks for you.
- There are no direct benefits to you for participating in the study. However, your answers may help us to learn more about setting up and running the ABA-based program.
- Your participation in the research project is entirely voluntary. You can refuse to answer any question and may withdraw at any time. Your decision to participate or not will have no effect on you.
- I will offer you the opportunity to review the transcript of study interviews and to request that any of your contributions be withheld from analysis.
- I will protect your wellbeing by ensuring that any challenges and obstacles that are discussed during the interview are not framed as individual failures.
- All digital recordings will be deleted and destroyed following transcription and analysis.

Specifically, I am seeking your consent for the following:

- **Documentation:** I would like your permission to analyze any documents related to your ABA program that you may deem appropriate to inform my inquiry.

- **Interviews:** I plan to conduct a comprehensive interview with each participant, which I will record and transcribe. I imagine these interviews will take 60-90 minutes. My goals for the interviews are to explore in detail how you arrived at adopting the ABA program, challenges you encountered and how you have addressed them.

Finally, your review of my interpretations of project data, particularly as it represents your personal perspective, is critical to the validity of my research. I will actively seek your review of findings and conclusions and ask for your verification of my interpretations. I will do my best to limit the time required of you, but your corroboration of my findings will be valuable.

Please let me know if you have any questions or concerns about participating in this research. You may contact me at kamau.l@ husky.neu.edu or (774) 303 -7435. You can also contact Dr. Yufeng Qian, the Principal Investigator at Je.Qian@neu.edu or (305) 781-9466.

If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, Email: irb@neu.edu. You may call anonymously if you wish.

Please indicate your consent by signing below.

_____ _____

Signature of person agreeing to take part **Date**

_____

Printed name of person above

_____ _____

Signature of person who explained the study to participant above and obtained consent **Date**

_____

Printed name of person above

Appendix C: Semi-structured Interview Questions table

Factors within the innovation itself; Originality Complexity of an innovation Relative advantage Trialability Observability Practicality Form.	Time, effort or money employed in developing the skills and understanding how ABA will be implemented. Innovations ease of use. Complexity of an innovation.	In your opinion, how did the efforts put towards implementing ABA affect its adoption? Were there any issues on the ease or difficult of using ABA as a teaching methodology?
Resource factors; Capacity Structure Openness Harmony	The capability of those promoting an innovation to marshal the necessary resources required to promote an innovation.	How did you go about securing finances for the ABA program and how did that affect the implementation of the program?
Intended user characteristics; Geographic location Centralization of power and administration Size of the adopting unit Communication structure Teacher factors Learner factors Education philosophy in a school	The prevailing education philosophy in a school or the place of examinations in the school system.	Were there any conflicts between ABA's based behavior analytic philosophy and the education philosophy at your school during the adoption of ABA? In your opinion, are there specific teacher factors that you could attribute to the success of your program?

Inter-element factors; Compatibility Linkage Reward Proximity	Personal costs of adopting an innovation.	Do you have any other thoughts about the personal costs of adoption of ABA (if any)?

Appendix D

Selected controlled and single-subject studies of Applied Behavior Analysis (ABA) as an intervention for ASD

Callahan, K., & Henson, R. K. (2008). Social Validation of Evidence-Based Practices in Autism by Parents, Teachers, And Administrators. *Journal of Developmental Disorders*, 38, 678-692.	
Research Paradigm	Quantitative
Sampling Strategies & Size	Survey packets were sent via U.S. mail to a total of 324 parents, special education teachers, and administrators located in North Central Texas.
Research Site	School districts in North Central Texas.
Methods	Participants filled out a survey that had 99 questions. Survey questions 1-84 required respondents to rate specific autism intervention components on a scale of one to seven. Question 85-98 addressed demographic factors, while question 99 was an open-ended question inviting the respondents to write comments about the survey and/or essential components of high- quality school-based programs for autism.
Findings	The results of the social validity survey indicated a strong, consistent support for program components that supported individual programming for students with autism, programs that used empirically-based strategies and programs that focused on long-term outcomes.
Limitations	The limitations of this study include the possibility that the survey respondents were not representative of the overall target population.
Stahmer, A. C., & Aarons, G. (2009). Attitudes Toward Adoption of Evidence-Based Practices: A comparison of Autism Early Intervention Providers and Children's Mental Health *Providers. Journal of Psychological Services,* 6(3), 223-234.	
Research Paradigm	Quantitative
Sampling Strategies & Size	Participants were 71 early Intervention personnel working in both in-home and center-based settings with children with Autism Spectrum Disorders (ASD) in San Diego and Riverside Counties in California and were not licensed mental health providers. In order to participate, a provider needed to have at least one child with ASD in the program.
Research Site	San Diego County (consisting of 32 school districts) and Riverside County (27 school districts) in southern California

Methods	Participants filled out the Attitudes Toward Evidence-Based Practice Scale (EBPAS) survey.
Findings	Results indicated that early intervention providers of services for children with ASD reported significantly move favorable attitudes toward adopting evidence-based practice than did mental health providers.
Hess, K. L., Morrier, M. J., Heflin, L. J. & Ivey, M. L. (2008). Autism treatment survey: Services received by children with autism spectrum disorders in public school classrooms. *Journal of Autism and Development Disorders, 38*, 961-971.	
Research Paradigm	Quantitative
Sampling Strategies & Size	Participants were 156 teachers in Georgia public schools who had students with ASD in their classrooms at the time of the study. An email describing the survey and providing the necessary access information was sent to special education directors and autism consultants/specialists in all school districts in the state of Georgia.
Research Site	Georgia's public schools
Methods	Participants responded to an online survey, the Autism Treatment Survey (ATS) that consisted of a comprehensive list of interventions frequently used by teachers of children with ASD in educational practice. The study's authors then analyzed this data.
Findings	The results of this study suggest that fewer than 10% of strategies used with students with ASD in Georgia public schools are based upon scientific based practice. Of the top five strategies utilized in the state of Georgia (gentle teaching, sensory integration, cognitive behavior modification, assistive technology and Social Stories) none are scientifically based according to the authors' findings. The results further reveal that treatment selection varied depending upon the grade level and type of classroom placement (special education, general education or mixed) for students with ASD.
Limitations	Because this was a web - based survey, the researchers had no way to control or influence the respondent's interpretation of questions. There was also no way to verify the accuracy of the teacher's reports to determine if the teachers used the strategies they mentioned.
Coffey, M. K., & Obringer, J. S. (2004). A case study on autism: School accommodations and Inclusive Settings. *Education*, *124*(4), 634-639.	
Research Paradigm	Qualitative

Sampling Strategies & Size	Semi-structured interviews were conducted with a mother and father raising their two children with autism. The older child was a 14 year old male attending 8th grade while the younger child was 11 year old female attending the 4th grade.
Research Site	Family home in a small university town in Southern United States.
Theoretical Framework	None
Methods	Semi-structured interviews were administered by the study investigators. The interviews covered ~~such~~ issues such as genetic disposition, family planning, psychosocial stressors and social interactions, along with an extensive group of questions of education and service delivery. The interviews were then transcribed and reviewed by the investigators to insure accuracy and to determine any emerging themes.
Findings	The case study findings indicated that the parents of the two children agreed on a majority of issues about the challenges and concerns of raising children with autism. They clearly pointed out that their major area of concern was education for their children.
Limitations	Three limitations were noted in this study. First, the investigation involved only a single family and the issues they faced. Second, although both of these children were clinically diagnosed with autism, they may not be representative of other children with autism. Finally, this study investigated only a limited number of factors associated with raising children with autism.
Sampling Strategies & Size	Semi-structured interviews were conducted with a mother and father raising their two children with autism. The older child was a 14 year old male attending 8th grade while the younger child was 11 year old female attending the 4th grade.
Research Site	Family home in a small university town in Southern United States.
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Green, A. V., Pituch, K. A., Itchon, J., Choi, A., O'Reilly, M., & Sigafoos, J. (2006). Internet survey of treatments used by parents of children with autism. *Research in Developmental Disabilities*, *27*, 70-84.	
Research Paradigm	Quantitative
Sampling Strategies & Size	A total of 552 parents of children with autism received an internet survey with a comprehensive list of treatment options.
Research Site	Because it was administered on the web, respondents were from different geographical locations, e.g. United States (n= 434), Canada (n=73), Australia (n=25). Other respondents were from Afghanistan, Albania, Algeria, Denmark, Egypt, Iceland, India, Israel, Malaysia, South Africa, and the United Kingdom.
Theoretical Framework	None
Methods	Parents in the survey were asked to indicate whether (a) they were currently using any of the treatments in each question, (b) had used the treatment in the past, but were not currently using the treatments, or (c) had never used the treatments. Additional space was provided for parents to add additional treatments and make comments.
Findings	On average, parents reported using seven different treatments. The number of treatments used varied as a function of the child's age and type of severity of disability within the autism spectrum. Speech therapy was the most commonly reported intervention followed by visual schedules, sensory integration, and applied behavior analysis.
Limitations	The authors point out that the sample in this study may not have been representative. Once launched into the internet, internet surveys require that respondents have internet access, which restricts participation to only internet literate parents.
Schwartz, I. S., Sandall, S. R., Garfinkle, A. N., & Bauer, J. (1998). Outcomes for children with autism: Three case studies. *Topics in Early Childhood Special Education*, *18*(3), 132-143.	

Research Paradigm	Qualitative
Sampling Strategies & Size	Three children with autism who received educational services in public school affiliated early childhood program during their preschool and kindergarten years and have had positive outcomes. Teachers were asked to nominate the students and the principal corroborated the nominations. Nominees were narrowed down to 3.
Research Site	This research was conducted at the Alice H. Hayden Early Childhood Center (AHECC) at the Experimental Education Unit of the University of Washington (UW), in Seattle.
Methods	Data was collected by a review of a combination of documents and archival records of the students. Parents were also requested to provide additional information about the children's placements. The children's assessments were also reviewed. These assessments included standardized tests, teacher reports, descriptive accounts of the children's functioning, etc.
Findings	The study was able to illustrate the potential of educating children with autism in public school affiliated programs.
Limitations	Because there were only 3 students, the findings of the study many not generalize. The findings were also based on retrospective summary data rather than systematic data on the children's behavior.
Dymond, S. K., Gilson, C. L., & Myran, S. P. (2007). Services for children with autism spectrum disorders: What needs to change? *Journal of Disability Policy Studies*, 18(3), 133-154.	
Research Paradigm	Mixed Methods
Sampling Strategies & Size	Participants of this study were 783 parents of children birth to age 22 with a medical diagnosis of ASD in the state of Virginia. These met the criteria out of 3,500 paper surveys that were distributed to schools in Virginia.
Research Site	State of Virginia
Methods	Participants answered open-ended survey questions that were analyzed both through qualitative and quantitative methods. The questions addressed issues of improving the quality, quantity, accessibility and availability of services for children with Autism Spectrum Disorders.
Findings	The findings for this study suggest the need for increased individualization of and accessibility to services for children with Autism Spectrum Disorders.

Limitations	Because the sample for this study was limited to parents of children with ASD in Virginia the findings of the study cannot be generalized to other states. The number of parents who participated in the study is small: 783 out of the 3500 surveys that went out. This sample may also not be representative.
Hurlbutt, K. S. (2011). Experiences of parents who homeschooled their children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *26*(4), 239-249.	
Research Paradigm	Qualitative
Sampling Strategies & Size	To recruit the participants, the author contacted local schools and the State Department of Education in the Midwestern U.S. and outside agencies who work with homeschooled children. The agencies were asked to contact parents who homeschooled their children with ASD to solicit interest in participation in the study. Through this purposeful random sampling, 10 parents responded to the solicitation.
Research Site	Research was conducted at places chosen by the participants.
Theoretical Framework	None
Methods	Participating parents received a description of the study along with consent forms and a copy of the interview questions beforehand. They then set up a time and place to meet for the interview. The parents were given the opportunity to ask specific questions before the initial interview via phone or email. Initial interviews started with informal conversation for the purpose of getting to know each other, developing rapport and for obtaining personal and background information. After this was accomplished, the actual interviews begun. All interviews were audiotaped for subsequent review. After each interview session, the recorded information was reviewed and transcribed, and the author made notes on recurring ideas and thoughts. Patterns and codes were identified by isolating topics/comments/issues, counting the number of times they occurred and consistency throughout the data. Data were analyzed using open-coding procedure. After data were coded, concepts were identified and then named.
Findings	The study found that the 10 parents who homeschooled their children with ASD believe they had found a treatment plan that works, and their perception has been that the school has been either (a) not willing and or (b) unable to provide effective programming. The study also found that homeschooling goals and interventions varied across the families.

Limitations	Because this study was confined to 10 parents who responded to the author's solicitation, the information received from the participants was based only on their perceptions of their individual experiences with their children and schooling. Therefore the results of this study may not be representative of all parents who homeschooled their children with ASD.
Eikeseth, S., Klintwall, L., Jahr, E., & Karlsson, P. (2011). Outcome for children with autism receiving early and intensive behavioral intervention in mainstream preschool and kindergarten settings, *Research in Autism Spectrum Disorders, 6*, 829-835.	
Research Paradigm	Quantitative
Sampling Strategies & Size	Participants were children diagnosed with autism enrolled at Banyan Center between March 2008 and May 2010, who had not received Early and Intensive Behavior Intervention (EIBI). There were 35 participants (6 girls). Their diagnosis was set by an independent agency prior to referral to the center/study. There was a comparison group of 24 children (4 girls).
Research Site	Treatment for all children in both groups was carried out in the children's local preschools or kindergartens, which were publicly funded mainstream schools. The children had specifically designed rooms for treatment at the kindergartens, but training was not limited to those rooms. For the children in the experimental group, additional treatment was carried out at their homes.
Theoretical Framework	None
Methods	Treatment of the children in the treatment group consisted of using several Applied Behavior Analysis (ABA) procedures to teach new skills and to reduce interfering behavior. While the treatment for the comparison group is described as eclectic-special education teaching, in which the special education teacher and the teacher assistant employed a number of special education procedures and methods to teach communication, play, social, and self-help skills to reduce aberrant behaviors. Numerous scales were used to assess the children's progress pre- and post- intervention, and a quasi-experimental group design was employed to assess between-group differences.
Findings	After one year of treatment children in the EIBI group scored significantly higher on all scales of adaptive behavior. Moreover, children in this group showed significant improvements in adaptive behaviors, maladaptive behaviors and autism symptoms after one year of treatment.
Limitations	Limitations of the study include the lack of independent assessment of children receiving EIBI and the lack of random

	assignment of participants to treatment groups.
Jaffe, E. (2010). A case study: Use of applied behavior analysis with an autistic adolescent. Retrieved from Psychology Dissertations. (Paper 156).	
Research Paradigm	Qualitative
Sampling Strategies & Size	One 12- year old male adolescent with autism.
Research Site	Data and program implementation were done at the student's home.
Methods	The purpose of this case study was to examine the effectiveness of evidence-based social skills intervention on children with autism. The case study presents data on a child with autism while he was observed in unfamiliar settings. The study assessed whether interventions taught in a structured, academic setting could improve the child's ability to initiate spontaneous greetings in unfamiliar settings. Structured observations were conducted to examine if the single skill taught in the school could generalize. The study was guided by the following research questions; (a) Is applied behavior analysis teaching effective in increasing six specific behaviors involved in the occurrence of spontaneous social greetings in an adolescent child diagnosed with autism during social encounters in public places? (b) Would all of the six social greeting behaviors that were targeted show the same level of response in an adolescent diagnosed with autism? And Can an adolescent diagnosed with autism who is taught to engage in the six social greeting behaviors make the transition from prompting to self-initiation of social greeting behaviors over a ten week period?
Findings	The data examined in the study indicated that the student was able to demonstrate spontaneous social greetings consistently with others unfamiliar to him. He learned the skill and was able to show significant improvements by the tenth week of the study.
Limitations	The author caution that while the student in this study was able to demonstrate clear improvements, a study involving a number of students is necessary to demonstrate generalizability.
Research Paradigm	Qualitative

Sampling Strategies & Size	One 12- year old male adolescent with autism.
Eikeseth, S., Tristram, S., Jahr, E., & Eldevik, S. (2007). Outcome for Children with Autism who Began Intensive Behavioral Treatment Between Ages 4 and 7: A Comparison Controlled Study. *Behavior Modification,* 31(3), 264-278.	
Research Paradigm	Quantitative
Sampling Strategies & Size	The behavior treatment group (n=13, 8 boys) was compared to an eclectic treatment group (n=12, 11 boys). Mean age was 8 years 2 months.
Research Site	The study took place in public kindergartens and elementary schools for typically developing children.
Methods	Participants were either assigned to a behavioral (ABA) treatment group or one that employed eclectic treatments. There was a 1 year assessment and follow up for each group. Results were generated by comparing pre- and post-treatment measures.
Findings	Subjects who were in the behavior treatment group showed larger increases in IQ and adaptive functioning than did the eclectic group. The behavior treatment group also displayed fewer aberrant behaviors and social problems at follow up. These results suggest that behavior treatments/interventions were effective for students with autism in the study.
Research Paradigm	Quantitative

Appendix E: Interview Protocol

Interview Guide

Factors within the Innovation Itself

1. In your experience, did you find ABA approaches relatively easier than other traditional approaches you have used for students with ASD or more complex?

2. Where were the special education teachers, paraprofessionals and other support staff on this?

3. How would you describe the professional relations between the different professionals in the autism team (the speech and language pathologists, occupational therapists, physical therapists etc.)? Were there any opposing views on interventions and if any, what impact did they have on devolving the autism program?

4. There is a lot of data taking in ABA programs. What was your experience with this?

Resource Factors

1. I hear all the time "school budgets are tight." How did that affect your program?

2. What was your experience getting qualified staff, and how much of a difference did that make in your programs?

3. Does your district currently send staff to off-site professional development seminars or you just brought in external presenters to provide professional development?

4. From your experience, what resource factors do you think could hinder the adoption of ABA programs? For example, the availability of classroom space, the hiring paying for extra teachers and professionals etc.

5. In your opinion do you think that the local political climate and local education policies were of any hindrance to your autism program, and if they did, in what ways?

Intended-User Characteristics

1. Can you thing of some strengths or weakness of an education leader like yourself that could hinder the adoption of an autism program?

2. How accepting are special educators to ABA practices? Please talk about any resistance if any?

3. Would you say the fear of the unknown played any role? ABA comes with a lot of perceptions or misconceptions. (Should I call them?)

4. Did you identify any perceptions or misconceptions that hindered the adoption of ABA, and would you mind naming some?

5. How do the demands of standardized testing affect ABA program?

6. In your opinion, does the size of the school district and the number of students served have any bearing on the adoption of ABA practices, and in what ways?

7. How familiar were your special educators and paraprofessionals with ABA?

8. It is obvious that the reason schools like yours go the extra mile to set up ABA programs are because of the students you serve. In your experience, are there any student factors that could hinder the implementation of such a program? For example, the severity of symptoms, students' socioeconomic factors, single family, family support etc.

9. I hear that "communication is everything" in almost all aspects of life. How would the lack of communication or too much communication (if there is such a thing) hinder the implementation of ABA in a school?

10. Another big word that flies a lot in special education is "inclusion." How would this hinder the adoption of ABA practices, and did you experience this?

11. Would you mind commenting on your school's philosophy as far as inclusion is concerned?

Inter-element Factors

1. In your experience, were there any personal costs associated with the adoption of ABA in your schools for you personally and, of course, your staff?

2. Schools are very diverse places these days. I would say it's a reflection of our society. Did you experience any cultural challenges?

3. I have heard in a lot of job orientations that "attitude is everything." What is your experience on this, and in what ways can faculty attitude hinder the use of ABA-based strategies?

4. What is the role of parents in all this?

General

1. In your experience, what, if any, other factors do you think would hinder the implementation of ABA in public schools?

2. Adopting ABA is such a task, and you are really an exceptional school. What other advice would you give to special education leaders trying to set up programs in their schools?

Appendix F: Sample Data and Methodology of Data Coding used in this Study

Responder	Summary of interviews from transcripts	Emergent Theme(s)
Ms. M (12.19.2013)	….Probably not as ABA does not align with the general education curriculum (which is modified for those in special education depending on the severity of their disability) proving it challenging to determine if what students are learning is based on their skill sets from materials taught or regurgitated information from the analyst ….Absolutely if BCBA© organizations could prove using scientifically based evidence that students who received such supports in services would perform well on their benchmarks and potentially state standards (considering severity once again). …I think the biggest issue is that the time it takes to implement a good ABA program in a school for one child is simply time consuming for teachers. …If there were no cause for alarm that parents would take school districts to court, they may allow BCBA's into the classroom who are also certified special education teachers as they could generalize trainings to all children and not one child. Cases like these cost school districts too much money and unless it benefits all children, they're not willing to spend that kind of money. … it's not cost effective because you must have someone certified in ABA to implement the program in K-12 and who would pay for the training.	ABA philosophy not aligned to general education curriculum Testing for achievement Professional organization support Time commitment Risk of lawsuits Cost Cost Need special training for staff

	…some individuals do not follow the ABA way of thinking because it's perceived to be a very "robotic" way of getting children to learn and interact. I personally prefer the Lovaas method after attending several workshops on ABA.	ABA perception within the teaching community.
	……., I know for a fact that many of the related services personnel you mentioned have exposure to ABA but are not trained in the approach like individuals within clinical settings.	Lack of enough training for ABA methodology for school staff
	….I really don't believe it's a misconception about ABA but more of whether or not it really works. As I said before for many individuals in schools including myself, the technique is very robotic in nature and it's very challenging to determine if the child is actually learning a skill set that is transferable into other settings without constantly having to practice the "drill and repeat" method. I also know that if there were a misconception it would be that ABA is for clinical settings and require clinical professionals to implement. Hence the approach is more from a medical model and not a school model. Therefore it would be hard to incorporate such practices within schools on a regular basis.	"The drill" and "repeat" methodology of ABA. ABA as a clinical rather than educational intervention
	… . BCBAs or ABA professionals are allowed to conduct observations on behalf of parents or as a part of a due process settlement and provide some recommendations to support students in the classroom; I have seen this on a few occasions in two of the four districts I worked in. What I will tell you is that it really all depends on one's location that drives this. I know when I interned in FL in the late 90's for my school psych program, it was the "in thing" for school	Locality/geographical area. Current fad Cost

	psychologists to either be a CABA or CBA. There were two individuals within the department who were BCBA and they were assigned schools that had high autism programs. By having these individuals already working within the department, they district was required to give them a small stipend but not have to hire out for more support staff. …as I said before it's all about funding and lawsuits. It's simply not worth the lawsuits especially if you end up with a provider who is incompetent in the implementation of the program or is difficult to get along with when considering school based personnel. Another issue would be how to measure growth and progress in relation to student mastery of the core curriculum. Districts are held accountable for students' success and failures regardless of whether or not they have a disability. How does a school district account for… student's progress both on standardized measures and IEP benchmarks? … Hence the need not to implement such programs.	Acceptable philosophy Standardized testing concerns.
Mr. B (12.27.2013)	…to start off one difficulty is the perception of what ABA is…just the term "data-driven" is overwhelming… of course there is data taking in ABA but not enough to scare anyone… I use the phrase "ABA is complicated common sense…anyone can get it" …there is also the history of most staff with other interventions and methods… some so removed from any evidence base. …resources is a big one… we do not have enough time to do anything extra…you are lucky I got time for this interview. ABA calls for hiring or sending teachers and	Lack of understanding of ABA Misconceptions of ABA Staff history of other interventions unlike ABA Resources –Time Resources –hiring new

	paraprofessionals for seminars and training…you have to squeeze that money from somewhere. Extra personnel and other supplies…	professional staff, trainings, supplies
	…getting teachers and other ABA personnel to get to proficiency of implementation is time consuming and frustrating…you do not know how many times I have attended training with my staff only to walk out for bus duty and see the same staff doing the same things we said no to…	Resources –time consuming to get proficient
	…ABA also requires continuous training, precise measurements, specific tools; we do not have enough time to do this, or even the finances to hire the right people to do this. You have to do with what you have…	Need for specialized tools and training
	…schools are full of politics. Teachers, paraprofessionals, parents, speech and language therapists, Occupational therapists…everyone has an opinion as to why or why not to use ABA methods. Some are out of genuine concerns; others are just unplaced fears, or just plain ignorance. Bringing these voices together…good luck!...there are parents too, and their advocates..	Building a consensus Fear of the unknown Ignorance of ABA interventions Parents and other education state holders
	…the size of the school does not matter a lot. At least in my opinion. There seems to be the same problems…I have worked in the same role in a school with over 20,000 students about 15% special education needing ABA services… worked in schools with less than half of previous population and I faced the same problems only to a lesser degree…	Size of school does not matter
	…parents and consistency…. ABA interventions need a home carry over… all school work needs a carryover. That is why	Parental involvement. The

	we give homework. You can imagine how difficult this is for parents to implement ABA interventions at home. Every small school for some students means we have to start at square one again. …did I also mention that one reason I left the first school where I started an ABA based program was the suspense created by the school board. They could allocate money for an ABA program in one year and then not do the same or cut the allocation the next year…you know what this does to the morale and work put by everyone... …there needs to be a state or national support center for ABA/autism programs somewhere… to guide educators. They even got a turkey hotline for your Thanksgiving turkey…	role of parents and students families. School boards/school committee support. Allocation of money Morale Professional body/organization to support ABA curriculum interventions
Ms. T (12.28.2013	…ABA is not like most other curriculum interventions, it often sounds like something the counseling and guidance should be doing; this is among the first problems…bringing staff to a realization that ABA is not Freudian psychology; they do not have to do IQ tests… …talking about time…where do we come up with such kind of time…we do not have even time to finish state requirements… …talk about a fad that a lot of people do not understand…I have had parents say they want ABA for their kids…had special educators recommend Aba interventions but when I dig further and ask them what specific interventions, no idea…they do	Misunderstanding of what ABA is Time Lack of ABA understanding

	not have a clue. …ABA is now been given away as the only game in town, but we do not have guidelines from the ABA communities. Some deserving students get only 45 minutes of one-on-one ABA support, others who need a social group session get the whole day. It is all very confusing even for us as administrators… this often makes ABA look like astrology.	Professional guidance/need professional support
	..Our Teacher assistants who carry the buck of implementing ABA programs are not well trained. Most of them get only 8 hours of training, it is difficult to schedule training for these assistants because there are only so many hours of training in their contracts. Some of them even do not have contracts. They are more like floaters who work with different students on the spectrum daily. If they were well trained this could be the tipping point. They could possibly generalize to all students…but we do not have that training time.	Insufficient training Lack of enough time
	Our professional days are packed with other training things… getting the initial training is challenging by itself, yet for a functional programs we also need continuous training. Time, money, lack of training personnel is always at the back of my mind. … It is sad but teachers are coming from colleges with no training or prior experience with autism or ABA. I remember the beginning of last school year. A very kind and smart teacher. She was moved to the moderate needs	Time, money, lack of training personnel, need

	classroom. At about mid-day there was a call for help from her classroom. There was a minor aggression from one of the students. After the situation was done I pulled her aside to see how her day was going. She was all hysterical telling me how she felt out of place. She has a Master's degree. Did student teaching with students with development needs but not in an autism classroom…this happens a lot. Schools of education are sending half-baked graduates our way. …did I mention that with resources so thin and stretched out, getting special educators and their assistants supervised constantly to ensure what they are doing is very difficult…you are aware with the training needs of Discrete Trial Training, you know that one training is not enough. Even seasoned practitioners make mistakes…you can imagine how many varied procedures are in my schools.	Lack of enough training No enough supervisors, not enough trainers,

Appendix G: Factors in literature that hinder the adoption of ABA-based interventions in public schools.

Factors	Related Research
Factors within the Innovation Itself Originality Explicitness Relative Advantage Trialability Observability Practicality Flexibility	Opposing views among professionals has created significant confusion (Heflin & Simpson, 1998; Iovannone, Dunlap, Huber, & Kincaid, 2003). Complex data taking/assessment system (National Autism Center, 2009) ABA approaches are more difficult than traditional approaches (National Research Council, 2001).
Resources factors Capacity Structure Openness Harmony	Shortage of qualified staff (Boe, 2006; Boe, Cook, & Sunderland, 2008; Fullan, 2001; Nachmias et al., 2004). Lack of support networks (Richards & Rodgers, 1982). Cost of training of ABA personnel (National Research Council, 2001) Not enough available classroom space (American Federation of Teachers, 2008) Political climate and local policies (National Autism Center, 2009). Organization capacity, cost, time and effort to put in place ABA system (Boardman et al., 2005; Chasson et al. 2007; National Autism Center, 2009).

Intended-User Characteristics Geographic Location Centralization of Power and Administration Size of the Adopting Unit Communication Structure Openness Teacher Factors Learner Factors Capacities Education Philosophy Examinations	Theoretical discrepancy and philosophy (Heward, 2003). School administrator factors (Fullan, 1998; Fullan, 2001; Marsh, 2001; National Research Council, 2001; Welsh, 2000). Lack of communication (Fullan, 2010; Martins & Terblanche, 2003; Welsh, 2002). Special education directors know little about ABA (Harris & Weiss, 2007; Heward, 2003; Kearney, 2008). Teachers' resistance, lack of adequate rewarding and appreciation, fear of the unknown (Fullan, 2001; Rohrbach et al., 2005; Thomas, 2003). Demands of NCLA assessments (National Research Council, 2001; Yell et al, 2005). Size of school district (National Autism Center, 2009).
Inter-element factors Compatibility Linkage Reward Proximity Synergism	Attitudes and values (National Autism Center, 2009). Personal costs of adopting an innovation (Henrichsen, 1989; National Autism Center, 2009). Cultural challenges (National Autism Center, 2009) Parent factors (National Autism Center, 2009) Compatibility with the attitudes held by individual users (Fullan, 2003) The challenges of using multi-disciplinary staff (National Autism Center, 2009)

	Opposing views among professionals (Heflin & Simpson, 1998; Iovannone, Dunlap, Huber, & Kincaid, 2003)

Appendix H: IRB Application and Approval

Northeastern

NOTIFICATION OF IRB ACTION

Date: December 3, 2013	IRB #: CPS13-10-17
Principal Investigator(s):	Yufeng 'Jennifer' Qian Lincoln Z. Kamau
Department:	Doctor of Education Program College of Professional Studies
Address:	20 Belvidere Northeastern University
Title of Project:	Applied Behavior Analysis Based Interventions in Public Schools: Understanding Factors that Affect Success Adoption, Implementation and Maintenance
Participating Sites:	School District Superintendent's Permission Letters on file ***School Site Principal's Permission Letter - forthcoming***
DHHS Review Category:	Expedited #6, #7
Informed Consents:	One (1) signed consent form
Monitoring Interval:	12 months

Human Subject Research Protection
960 Renaissance Park
360 Huntington Avenue
Boston, MA 02115

617.373.7570
f 617.373.4595
northeastern.edu/hsrp

APPROVAL EXPIRATION DATE: DECEMBER 2, 2014

Investigator's Responsibilities:

1. The informed consent form bearing the IRB approval stamp must be used when recruiting participants into the study.
2. The investigator must notify IRB **immediately** of unexpected adverse reactions, or new information that may alter our perception of the benefit-risk ratio.
3. Study procedures and files are subject to audit any time.
4. Any modifications of the protocol or the informed consent as the study progresses must be reviewed and approved by this committee **prior to being instituted.**
5. Continuing Review Approval for the proposal should be requested at least one month prior to the expiration date above.
6. This approval applies to the protection of human subjects only. It does not apply to any other university approvals that may be necessary.

C. Randall Colvin

C. Randall Colvin, Ph.D., Chair
Northeastern University Institutional Review Board

Nan C. Regina, Director
Human Subject Research Protection

Appendix B: Request for Consent

Northeastern University, College of Professional Studies, Department of Education

Name of Investigators: Lincoln Kamau, Doctoral Student, Dr. Jennifer Qian, Principal Investigator

Title of Project: Applied Behavior Analysis in Public Schools; Understanding factors that affect the successful adoption, implementation and maintenance of programming.

Request for Consent to Participate in a Research Study

Dear potential participants,

I am preparing to begin my doctoral research project. The goal of this study is to explore the difficulties you encountered in your schools as you go about go about adopting, implementing and maintaining ABA-based treatment approaches for children with Autism Spectrum Disorders (ASDs).

I invite you to participate in this research process and seek your consent to interview you and to review documents (if any) related to the adoption and implementation of your ABA-based program.

As part of the informed consent process, there are several points I would like to explain:

- There is no compensation offered for participation.
- I do not foresee participation in the project posing any risks for you.
- There are no direct benefits to you for participating in the study. However, your answers may help us to learn more about setting up and running the ABA-based program.
- Your participation in the research project is entirely voluntary. You can refuse to answer any question and may withdraw at any time. Your decision to participate or not will have no effect on you.
- I will offer you the opportunity to review the transcript of study interviews and to request that any of your contributions be withheld from analysis.
- I will protect your wellbeing by ensuring that any challenges and obstacles that are discussed during the interview are not framed as individual failures.
- All digital recordings will be deleted and destroyed following transcription and analysis

Specifically, I am seeking your consent for the following:

- **Documentation:** I would like your permission to analyze any de-identified documents related to your ABA program that you may deem appropriate to inform my inquiry.

- **Interviews:** I plan to conduct a comprehensive interview with each participant, which I will record and transcribe. I imagine these interviews will take 60-90 minutes. My goals for the interviews are to explore in detail how you arrived at adopting the ABA program, challenges you encountered and how you have addressed them.

Finally, your review of my interpretations of project data, particularly as it represents your personal perspective, is critical to the validity of my research. I will actively seek your review of findings and conclusions and ask for your verification of my interpretations. I will do my best to limit the time required of you, but your corroboration of my findings will be valuable.

Please let me know if you have any questions or concerns about participating in this research. You may contact me at kamau.l@husky.neu.edu or (774) 303 -7435. You can also contact Dr. Yufeng Qian, the Principal Investigator at Je.Qian@neu.edu or (305) 781-9466.

If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, Email: irb@neu.edu. You may call anonymously if you wish.

Please indicate your consent by signing below.

_____ _____

Signature of person agreeing to take part **Date**

_____

Printed name of person above

_____ _____

Signature of person who explained the study to participant above and obtained consent **Date**

_____

Printed name of person above

APPROVED
NU IRB# _____
VALID _____
THROUGH _____

XXXXXX, 2013

Lincoln Kamau
10 Plaza Street
Brooklyn, CT 06234

Special Education Director
xxxx

Re: Request for Consent to Participate in a Research Study

Dear potential participants,

I am Doctor of Education student at Northeastern University, Boston preparing to begin my doctoral research project. The goal of this study is to explore the success and difficulties that you encountered in your schools as you went about in the adoption, implementation and maintenance of ABA-based treatment approaches for children with Autism Spectrum Disorders (ASDs).

I am writing to invite you to participate in this research. This research will comprise of;

a. I plan to conduct a comprehensive interview with each participant, which I will record and transcribe. I imagine these interviews will take 45-60 minutes. My goals for the interviews are to explore in detail how you arrived at adopting the ABA program, challenges you encountered and how you have addressed them.

b. There is no compensation offered for participation

c. I do not foresee participation in the project posing any risks for you.

d. There are no direct benefits to you for participating in the study. However, your answers may help us to learn more about setting up and running the ABA-based program.

e. Your participation in the research project is entirely voluntary. You can refuse to answer any question and may withdraw at any time. Your decision to participate or not will have no effect on you.

f. I will offer you the opportunity to review the transcript of study interviews and to request that any of your contributions be withheld from analysis.

g. I will protect your wellbeing by ensuring that any challenges and obstacles that are discussed during the interview are not framed as individual failures.

h. All digital recordings will be deleted and destroyed following transcription and analysis

Additionally, I am seeking your assistance in any documentation that may be related to the ABA program that you may deem appropriate to inform my inquiry.

Finally, your review of my interpretations of project data, particularly as it represents your personal perspective, is critical to the validity of my research. I will actively seek your review of findings and conclusions and ask for your verification of my interpretations. I will do my best to limit the time required of you, but your corroboration of my findings will be valuable.

Please let me know if you have any questions or concerns about participating in this research. You may contact me at kamau.l@ husky.neu.edu or (774) 303 -7435. You can also contact Dr. Yufeng Qian, the Principal Investigator at Je.Qian@neu.edu or (305) 781-9466.

If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, Email: irb@neu.edu. You may call anonymously if you wish.

Thanks a lot,

Lincoln Kamau