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Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)

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Exploring Acceptance of Using an Online Platform to Teach Parents of Children

with Autism Methods in Applied Behavior Analysis (ABA)

BY

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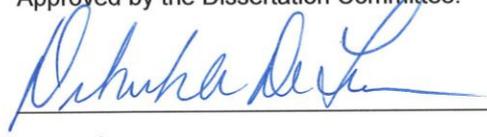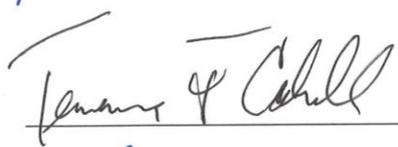
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This journey and its completion would not have been possible without the will of God. I am eternally grateful to God for empowering me in countless ways. He gave me the courage to take on this journey, the strength to overcome the hurdles that came along the way, and the resilience to move forward and reach my goals.

I thank Dr. Deborah DeLuca for showing me the wonders of the philosophy of science and the magnificence of challenging the mind. Sitting far away in the back of the classroom in your Philosophy of Science course, I was dreadfully intimidated yet mesmerized by your brilliance. I never thought I could be anywhere near your level or have the capacity to think on the level that you have helped me attain. Your passion for teaching and the dedication you have in guiding your students to reach their potential is inspirational. Your excitement and enthusiasm has taught me to set aside my reservations and be open to possibilities. Meeting you and being a student of yours is one of the best things that ever happened to me.

I thank Dr. Lee Cabell for demonstrating the process of translating pure numbers into meaningful results. Your guidance and expertise in methodology, research design and deciphering statistical analyses accordingly has been invaluable and I am grateful for your encouragement of that learning process. In the beginning, I walked into your office many times in absolute trepidation but over time I came out with a solid foundation that will carry me throughout my research career. You are firm in your

teachings but gentle at heart. Your feedback and constructive critiques have shaped me into becoming a stronger, more polished and meticulous researcher.

I thank Dr. Terrence Cahill for helping me to identify my approach to leadership. You taught me the importance of reflection; the understated value of remembering to step back every now and then to consider the bigger picture and not get lost in the details. Only then do we find emerging connections between concepts and witness the grand themes come to life.

I also express my gratitude to every parent and caregiver of a child with autism who values the life of their child even in the darkest hours of nearing total breakdown. Your strength and determination to provide the best possible life for your child despite the myriad of emotional, physical, psychological, and financial barriers in front of you is astounding. You are a force to behold and you have my utmost respect and admiration.

One of the greatest wonders of the human spirit is resilience. Indeed it is a captivating marvel to observe the ability of how certain individuals survive difficult situations, thrive, and make something valuable and worthwhile from their struggles while others barely stay afloat and continue onto a downward path of crippling but lasting consequences. From the moment I came into this world and as I have grown through the years, I watched my parents tread through a dark labyrinth of uncertainty and loss as they faced the overwhelming demands of raising my older brother who was

diagnosed with autism. Throughout the early years, it was difficult to find families who were going through similar experiences. As I watched my parents seek out various resources and applied a range of techniques to address concerns including interaction, communication, socialization, behavior management, and all sorts of techniques to provide him with the necessary life skills to enrich his quality of life, I constantly wondered if there were others out there facing the same thing and how were they addressing these issues? This led me to focus my studies in this area; asking questions of how parents dealt with professionals, how they felt about other people's involvement and whether it was intruding or helping them, how teachers and administration dealt with them and their children, and how parents of children with autism functioned in social circles.

Having watched my parents' experiences, the subject of parents of children with autism is one that is evidently close to me. Yet because I am a sibling, rather than a parent, of an individual with autism, I have a unique position on the matter. Inimitably, I hold a certain distance from the matter which allows for a distinctively less biased perspective, but I am close enough to understand what is not being asked in research, to see the gaps, and be able to ask the pertinent questions. This enables the participants in the study to perhaps be more comfortable and open to fully express their experiences as opposed to responding to someone who does not share such commonality of having a family member with autism.

On a final note, my research is guided by this simple quote below:

"What is more important than knowledge?" asked the mind.

"Seeing and caring with the heart," answered the soul.

Thus, a person can have all sorts of knowledge about all sorts of things, but if they feel nothing and do not care for other beings then the knowledge they possess is worthless. We have the knowledge and research that indicates these parents are stressed, strained, and overwrought by the peculiar and sometimes incomprehensible demands of rearing a child with autism. They do not need to be informed that they are stressed. They are well aware of that knowledge. What they need are caring solutions that improve their sense of wellbeing and gives them hope that they can manage in spite of their circumstances.

DEDICATION

To my mother and father, your unconditional love and guidance have been the driving force behind this journey.   Your support allows my dreams to take flight. I am grateful for your patience, your words of encouragement, and your loving embrace that always put me at ease. Thank you for the sacrifices and extra responsibilities you endured over these last few years. You instilled in me patience, resilience, and perseverance that will continue to carry me onward. Thank you for showing me the true meaning of everlasting unconditional bond of family.

To my dearest friends Aishah Zabarah, Nouf Al-Hajj, Mirriam Shah, and Aishah Sheikh: Thank you for all the wonderful treasures that come with your friendship. Throughout times of madness and exasperation, you provided stability and reassurance. Your delightful charm, wit and cynicism always kept me grounded, and without it this journey would have been a thousand times harder. You ladies transcend the meaning of friendship on so many levels and you are one of God's greatest blessings in my life.

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LIST OF ABBREVIATIONS

ABA	Applied Behavior Analysis
ASD	Autism Spectrum Disorder
C-TPB-TAM	The combined TPB/TAM
EE	Effort Expectancy
FC	Facilitating Conditions
IDT	Innovation Diffusion Theory
MM	Motivational Model
MPCU	Model of PC Utilization
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SCT	Social Cognitive Theory
SI	Social Influence
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Utilization of Technology

ABSTRACT

Exploring Acceptance of Using an Online Platform to Teach Parents of Children

with Autism Methods in Applied Behavior Analysis (ABA)

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Dr. Deborah DeLuca, Chair

Background and Purpose of the Study: A diagnosis of autism can lead to lifelong struggles for parents and children. These families face profound difficulties in coping with stress while seeking out early interventions and managing imperative service needs. Parents are increasingly turning to the internet for information, advice, and even formal training. Breakthroughs in technology have made the internet more accessible and more sophisticated. The involvement of parents in applying intervention strategies to help their autistic children has long been advocated as a useful approach. Enabling parents as interventionists provides renewed confidence and reduced stress for parents as well as developmental improvements for the child. Conversely, issues of time, cost, and travel restrict accessibility for parents in need of such training. For these cases, utilizing online programs is explored as an alternative option.

Methods: The study design was descriptive, cross-sectional and correlational, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model to

determine behavioral intention to use an online ABA training program. The sample consisted of 161 participants who identified as parents or primary caregivers of a child with autism.

Results: The demographic characteristics of parents and caregivers of children with autism were predominantly females in their 30s and 40s, college educated with a Bachelors or Masters, and rated themselves as very comfortable with using computers and similar technology devices. Multiple regression analysis revealed that 10% of the variability in behavioral intention to use an online ABA program is accounted for by education level. Education was the only statistically significant predictor having an inverse relationship with the interest in adopting ABA online programs. Hierarchical regression revealed that computer skills, laptop skills, tablet skills, and mobile/smartphone skills account for 5% of the variance in interest to use an online ABA program. However, when UTAUT variables are included, performance expectancy, social influence, and facilitating conditions account for 47% of the variance in the interest to use an online ABA program. All results were statistically significant at the alpha level of 0.05

Conclusion: The findings of the study suggest that parents and caregivers are more likely to use a system if: (1) they feel it will improve their performance in managing their child's behavior, (2) others around them such as family, friends, and their community support their use of the system and, (3) certain infrastructure (tech support) exists to assist in their use of the system. At the same time, parents and caregivers are

less likely to use a system if they are highly educated. Further research is needed to

gain a deeper understanding of the motivational factors that drive acceptance and

behavioral intention to adopt online ABA intervention training for parents and caregivers

of children with autism. Implications, practical application, theoretical relevance and

future direction are further discussed.

Chapter I

INTRODUCTION

Autism can profoundly affect many aspects of an individual's functioning:

impairments in communication limit the ability to understand events, people and the

environment; difficulties in social understanding mean that even the simplest

interactions are fraught with problems; and inability to cope with change and the need to

adhere to fixed routines and patterns of behavior make every-day life unsettling

(American Psychiatric Association, 2000). It is not surprising, therefore, that the impact

of autism is nothing short of devastating for those afflicted with the disorder and for

those who care for them (Brobst, Clopton & Hendrick, 2009). This review is divided into

several sections with aims to elucidate the fundamental deficits of autism and assess

the utilization of parent training in behavioral therapy using a web-based platform. The

first sections will provide an explanation of autism spectrum disorders and the

characteristic features of autism. The sections that follow will cover the experience of

parenting as it relates to raising a child with autism and the parental struggles and

family challenges that ensue. Next, matters involving research-based interventions

targeted for parents, parents as interventionists, and the limitations and barriers of

conventional parent-training programs will be discussed. The subsequent sections will

explore some possible applicable theories to consider, and examine some of the

existing tools that may help to elucidate further understanding. Ultimately, these

sections should provide an objective appreciation of what is known in the literature and what remains to be clarified.

Autism Spectrum Disorders

Autism is a complex condition of neural development that hinders an individual's ability to communicate, build relationships, and relate with the environment. Child psychiatrist Leo Kanner (1943) first used the term *"autism"* to describe children who had profound impairment in developing speech, did not socially interact with others and engaged in behavior that made them appear to retreat into their own world. Wing and Gould (1979) characterize it as a 'triad of impairments' which manifest as varying degrees of difficulty in the three core domains: communication, socialization and inflexibility in thinking and behavior. Understanding of autism has evolved over time, as it is now recognized as one of many developmental disorders categorized under the umbrella of Autism Spectrum Disorders (ASD), which include Asperger's syndrome, Rett's disorder, Childhood Disintegrative Disorder (CDD) and Pervasive Developmental Disorder not otherwise specified (PDD-NOS) (American Psychiatric Association, 2000). To distinguish among these types of developmental conditions, the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR) of the American Psychiatric Association (APA) specifies diagnostic criteria for these five disorders. Among the notable features, individuals with autism have great impediments as they have trouble understanding how to initiate and respond to joint attention and conversational

interaction with another person, have difficulties in social timing of communication and may not understand emotional cues expressed through language and gestures. Other common characteristics include engagement in repetitive activities, stereotyped movements, unusual responses to sensory experiences, and resistance to environmental change in daily routines (American Psychiatric Association, 2000).

Raising Children with Autism: Family Struggles & Parental Concerns

While parenting any child can be a challenging experience, parenting a child with autism can be particularly daunting as it has some exceptional difficulties. For instance, a child with autism may not express their basic wants or needs in the same way that a typically developing child would. Hence, parents are left puzzled since they cannot determine their child's needs. This can lead to increased frustration for both parent and child. The parents' frustration can cause them to feel doubtful of themselves and begin to question their parenting abilities, while the child's frustration can worsen over time and bring about aggressive worrisome behaviors such as hitting, tantrums, or self-injurious behaviors that not only disrupt the household but threaten the child's safety as well as the safety of other family members such as siblings. Since there is no cure for autism to date, rearing a child with autism while taking on the responsibility of managing developmental and behavioral problems as part of the nurturing, upbringing and caretaking of the autistic child falls largely on the family. Given the state of disorientation and bewilderment enforced onto families, the compulsive behaviors and

peculiar characteristics of autism concern parents since they are perplexingly difficult to decipher and impede a child's development and learning. Moreover, as children with autism transition into adolescence and adulthood, many of their exhibited patterns of language deficits, impaired social interactions, restricted interests and ritualistic conduct carry on with them throughout their lives (Sigman, Dijamca, Gratier, & Rozga, 2004). Thus, to avoid developmental and behavioral problems in later years, it is crucial that parents know how to manage and respond to their child's autistic behaviors early and accordingly (Matson, 2007).

Parents' expectations and beliefs about parenting begin before their child is born and are modified through interactions with their developing child (Kuhn & Carter, 2006). Due to the nature of this complex condition, the unusual characteristics of autism place extraordinary pressures on parents caring for children with autism (Brobst, Clopton, & Hendrick, 2009; Dabrowska & Pisula, 2010; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009; Lecavalier, Leone & Wiltz, 2006). Because children with autism behave in ways that are atypical and difficult to anticipate, how parents interpret their children's behavior plays a strong role in parental experience. Parents of children with autism describe their children as less adaptable, less accepted, and more demanding than typically developing children (Dabrowska & Pisula 2010, Oelofsen & Richardson, 2006). Research has shown that certain attributes unique to autism make parenting autistic children more demanding and more stressful than parenting children with other developmental disabilities or parenting typically developing children (Myers, Mackintosh, Goin-Kochel, 2009). The following highlights some of the main stressors:

The stress of future care-taking. One of the major sources of stress for parents relates to the uncertainties of their child's future. Parents fear that no one will take care of their child as they do. There also may be no other family members willing or capable of carrying out this task. Some studies (Gray & Holden, 1992; Holroyd, Brown, Wilker, & Simmons, 1975) found that aside from the frustrations of dealing with behavioral and developmental issues, mothers of children with autism are deeply terrified of having their child face a very bleak future. In a ten year longitudinal study, Gray (2002) found that mothers of children with autism reported less stress over their child's poor public behavior, obsessions, and toileting issues but had increasing anxiety over their child's wellbeing, particularly when the parents become too old or are no longer able to care for them on a daily basis. The mothers in this study discussed issues such as a lack of social skills, behavioral skills, coping skills, job training, and finding residential care as unresolved areas of concern.

The stress of finances. The diagnosis of autism can quickly drain a family's resources due to mounting expenses that include evaluations, educational programs, extracurricular activities, special needs services, and intensive therapies that are often paid out-of-pocket (Montes & Halterman, 2008). Children with autism are often involved with several different therapy activities and intervention strategies that take up a tremendous amount of the family's time and resources. Therapies and intervention strategies are expensive and health insurance often falls short in covering these needs (Sharpe & Baker, 2007). Moreover, the care-giving demands and supervision of a child with autism may lead one parent to resign from their job, switch from full time to part

time employment, or completely give up their career to stay at home and watch over the child (Gould, 2004). Financial strains may be escalated by having a reduced income stream to support all of the family's needs. With limited public and private support available, having a child stricken with autism places massive economic burdens, forcing many families to forfeit future financial security and even file bankruptcy to provide needed therapy for a child with autism (Sharpe & Baker, 2007).

    The stress of social integration and isolation. Taking an individual with autism out into the community can be stressful for the family. Children with autism have impulsive determination and do unpredictable things. This is primarily due to aspects related to the child's disability including the level of severity of the disability (Lecavalier et al., 2006), deficient social skills (Baker-Ericzen, Brookman-Frazee, & Stahmer, 2005), aggressive behavior (Higgins, Bailey & Pearce, 2005), and maladaptive behaviors (Tomanik et al, 2004; White & Hastings, 2004). These variables make family outings problematic because parents cannot anticipate the child's actions. There are times when the child is seemingly well-behaved and other times where the child may cause a scene. Depending on the circumstances and influences, a child with autism can suddenly become distressed and may throw themselves on the ground, scream, or act peculiar. In response, people may stare, make harsh comments, or be unforgiving to any strange or maladaptive behaviors that may occur (Ludlow, Skelley & Rohleder, 2012).

Maladaptive behaviors are defined as behaviors categorized as internalizing (e.g. emotionally reactive, depressed, anxious and withdrawn) and externalizing (e.g. self injury, aggression, defiance, inattentive and uncooperative) behavior problems that negatively impact learning, daily living skills and everyday activities (Bradley, Summers, Wood, Bryson, 2004; Eisenhower, Baker, Blacher, 2005; Brereton, Tonge, Einfeld, 2006). Maladaptive behaviors often cause more distress to families than the core autistic symptoms (Hastings et al. 2005; Lecavalier et al. 2006) as they interfere with day-to-day function and may prevent families from attending events and social gatherings. Taking these factors into account, families are often reluctant and uncomfortable when taking their child out to parks, shopping malls, restaurants, or to the homes of friends or relatives. This makes holidays and special occasions an especially difficult time for these families. Because of these experiences, parents of children with autism feel that they cannot socialize or relate to others, and thus they experience a sense of seclusion from friends, relatives, and the community; inevitably leading to a physiological residue of stress from the isolation (Hastings et al. 2005; Lecavalier et al. 2006).

The stress of not having a typical child. It is understood that parents of children with autism grieve the loss of the typically developing child they expected to have (Myers et al., 2009). Part of the devastation for parents comes from the loss of lifestyle that they envisioned for themselves and their family. Parents grow stressed as they struggle to decide how to allocate their attention and energy across family members and responsibilities (Hastings, 2003). The strength of the marriage and family

bond are put to the test as parents may feel remorse for neglecting or limiting the time they spend with their other children when so much attention is focused on the child with autism (Brobst et al., 2009; Dabrowska & Pisula, 2010; Hoffman et al., 2009; Lecavalier et al., 2006). The feelings of anguish that parents experience can be an additional build up of stress due to the child's ongoing temperament (Lecavalier et al., 2006; Dabrowska & Pisula, 2010). Current grief theory suggests that parents of children with developmental disabilities experience episodes of grief at various points in the life cycle as different events such as birthdays, holidays, and endless care-giving trigger grief reactions (Worthington, 1994). Considering the frustration, confusion, and despair that develops, over time the psychological tension wears down on parents leaving them in a state of chronic stress and sorrow (Myers et al., 2009).

In light of the aforementioned stressors – the financial problems, social isolation, dealing with tantrums, struggles with family and emotional and psychological turmoil – it is clear that raising a child with autism can be incredibly overwhelming. In some instances, parents undergo a less stressful experience as the child's condition may improve with age and some of the symptoms and behaviors subside (Shattuck et al., 2007). Nevertheless, some stressors can maintain an enduring impact as children with autism move onto adolescence and adulthood (Sigman et al., 2004), unless they are managed and dealt with early on.

Early Intervention & Research-Based Strategies

Children with autism need help to develop early skills in establishing joint attention, imitation of others, express interest and meaning, communicate immediate wants and needs, appreciate social interaction, enjoy the company of others, tolerate change, and adapt to transitions (National Autism Center, 2009). This broad developmental agenda has given rise to various approaches emphasizing the impact and importance of early intervention. Early intervention is a process of assessment and therapy provided to children to facilitate normal cognitive and emotional development and to prevent developmental disability or delay (The American Heritage Medical Dictionary, 2007). In the scope of autism, early intervention for autistic children is one of the most effective means of improving long-term social and academic outcomes (National Research Council, 2001). They become better prepared to face future academic challenges and continue to develop cognitively and socially. When children receive intense intervention services during the early stages, they demonstrate significant developmental gains despite variability in outcomes within groups of children treated (Matson, 2007).

Parents of children with autism are faced with baffling and often conflicting claims about the merits of different interventions. To combat the implications of life with autism, it is not surprising that many parents feel compelled to seek out and try various approaches to intervention for the sake of their child's future. Although no cure has been identified, interventions to treat autism have included a wide array of treatments

and therapies. Over time, established interventions for autism have emerged which generally fall under one of these categories which include biomedical interventions, motor-sensory therapies, speech-language therapy, and behavioral therapy (Baranek, 2002; Lovaas, 1987).

Biomedical interventions include chelation (i.e. a process designed to eliminate heavy metal toxins from the body), medication, vitamin supplementation, and treatment of food allergies through dietary interventions such as the gluten-free, casein-free diet. Though highly controversial and bearing limited substantial evidence, some families find diet and drug therapy helps in reducing their child's behavior problems and increases attention span while other families find no significant difference (National Autism Center, 2009).

Motor-sensory therapies include sensory integration, over-stimulation and patterning, music therapy, and animal-assisted therapy such as supervised horseback riding as methods designed to help the child integrate sensory experience, brain function and response, overcome aversion to certain stimuli, and expand ability to adapt to sensory aspects of the environment (Baranek, 2002).

Speech and language therapy helps a child with autism master the expressive and pragmatic language necessary for successful social interaction. This is the predominant therapy available in most public school systems at no additional cost. Although this form of therapy is accredited with favorable results, not all children with autism find benefit (Laski, Charlop, and Schreibman, 1988).

Behavioral interventions utilize a method of training where a child is asked to perform a specific action and responds. The therapist reacts with reward (e.g. giving a toy or praise), or correction. Most notably, increasing attention has been focused on Applied Behavior Analysis, which deals with the science of human behavior. Applied Behavior Analysis (ABA) is the process of systematically applying interventions based upon the principles of learning theory to improve socially significant behaviors to a meaningful degree (Baer, Wolf, & Risley, 1968). One of the most common forms of ABA is Discrete Trial Teaching (DTT), which involves the presentation of an antecedent by an instructor, followed by a response by the learner, followed by the delivery of a consequence that is contingent upon the learner's response. Discrete trials are repeated many times in fairly rapid succession during a teaching session (Smith, 2001). DTT can be used to improve language and academic skills, vocal and motor imitation, social functioning, independent living skills, challenging behaviors, and vocational skills (Granpeesheh, Tarbox & Dixon, 2009; Smith 2001). There has been compelling research demonstrating the efficacy of ABA in the reduction of disruptive behaviors typically observed in individuals with autism (Matson, 1996; Howlin, Magiati, Charman, 2009). Several studies across different groups of researchers have shown that ABA produces substantial gains when used to teach complex communication, social, play and self-help skills and that children who undergo ABA do best with 30 hours or more of early intensive behavioral intervention per week (Lovaas, 1987; Sallows & Graupner, 2005; Howard et al., 2005; Cohen, Amerine-Dickens, Smith, 2006; Eikeseth et al., 2007).   In consequence of mounting evidence, ABA-based interventions have been

endorsed by leading federal and state agencies, including the American Academy of

Child and Adolescent Psychiatry (Volkmar, Cook, Pomeroy, Realmuto, & Tanguay,

1999), American Academy of Neurology, American Academy of Family Physicians,

American Academy of Pediatrics, American Occupational Therapy Association,

American Speech-Language Hearing Association, American Psychological Association,

Society for Developmental and Behavioral Pediatrics, National Institute of Mental Health

(Filipek et al., 1999), and the United States Surgeon General (Satcher, 1999).

Although more research is necessary to determine whether numerous

interventions can lead to favorable outcomes, it is acknowledged that there are several

established treatments that have sufficient evidence-based support to demonstrate they

are effective (National Autism Center, 2009; National Research Council, 2001). The

vast majority of these interventions fall under the behavioral intervention category.

However, selecting among these treatments may still pose challenges since the number

of intervention options available can be overwhelming. Still, keeping parents actively

involved remains essential in the decision making process of selecting, implementing,

and assessing the intervention.

Including Parents as Interventionists

In pushing the boundaries of interventions, including parents as interventionists,

or co-therapists, has emerged as a key component to delivering intensive ongoing

treatment and continuous teaching of new skills (Koegel, Glahn, & Nieminen, 1978; Koegel, Schreibman, Britten, Burke, & O'Neil, 1982; Koegel, Bimbela, & Schreibman, 1996; Koegel, Roberts, Harrower, & Carter, 1999). The importance of parents as interventionists was initially evidenced by Lovaas and colleagues, who demonstrated that children whose parents were trained to continue an intervention showed sustained progress in comparison to those whose parents received no training (Lovaas, Koegel, Simmons, & Long, 1973). Moreover, parents serving as interventionists for children with autism have been instrumental in applying various interventions intended for increasing communication (Moes & Frea, 2002), enhancing social interaction (Koegel et al., 1996), reducing problematic behavior (Robbins, Dunlap & Plienis, 1991; Moes & Frea, 2002), and increasing positive interactions for improving relationships between parent and child (Ingersoll & Dvortcsak, 2006). As a result, parents have gained a more optimistic outlook in participating in their child's growth and report decreased stress at home (Koegel et al., 1982; Smith, Buch, & Gamby, 2000).

There are several benefits to having a parent-implemented model of intervention. It provides cost-effective, intensive intervention options and enables parents to facilitate positive behavioral change by creating enriched responsive environments that effectively target developmental problems in children with autism (Schriebman & Koegel, 1996). Training parents as interventionists or co-therapists allows consistent handling and provides increased skills, renewed confidence, and reduced strain for parents. Involving the parents as interventionists takes into account that as therapists and teachers come and go, family serves as the only stable institution in the lives of

autistic individuals. For the well being of the family and for children with autism who

face a lifetime of challenges, providing training and instruction for parents to effectively

support these individuals is essential to improve quality of life as they become better

prepared to manage and reduce the stressors they may confront (Koegel et al., 1982;

Smith, Buch, & Gamby, 2000) and strengthen family relationships (Ingersoll &

Dvortcsak, 2006).

Training for Parents

Parents who are perplexed at how to deal with the stressors and behavior

challenges in raising their autistic child underline a need for training and ongoing

support. Training opportunities can be formal or informal, led by teachers, therapy

providers, or outside consultants. There is sufficient evidence that parent training can

work in terms of observed improvements in children's developmental skills, which in turn

when developed can enhance emotional adjustment and prevent some of the

behavioral issues discussed earlier. A systematic review of the effectiveness of parent

education programs intended for addressing behavior problems in children up to age 3

years revealed positive change was found in parental perceptions and in objective

measures of children's behavior (Barlow, Parsons, & Stewart-Brown, 2002, 2005). This

provides good reason to suggest that training of parents in specific skills may bring

about positive changes in children with autism. In fact, the findings of a number of

multiple baseline studies suggest parent training in the techniques of applied behavior

analysis produces some positive language (Harris, Wolchik, & Milch, 1982; Laski et al., 1988; Smith et al., 2000) and behavior change (Koegel, Glahn, & Nieminen, 1978; Neef, 1995; Lerman, Swiezy, Perkins-Parks, & Roane, 2000). Further support in baseline studies also indicate a positive effect for most parents including increased parental knowledge (Harris et al., 1982), skills, and performance, (Koegel et al., 1978; Neef, 1995; Lerman et al., 2000).

From literature on child maltreatment prevention, it has been recommended that interventions which promote positive parenting form the foundation of improving parent-child interactions and relationships (Hammond, 2008). Recent reviews and meta-analyses examining predictors of outcome have found that the strongest intervention effects have emerged for behavioral programs and for programs delivered in the home, and that such programs have been shown to be superior to those focused on increasing support or promoting parent mental health (Baggett et al., 2008; Bakersman-Kranenburg, van IJzendoorn, & Juffer, 2003; MacLeod & Nelson, 2000).

In examining the effectiveness of training targeted to parents, Nefdt, Koegel, Singer, and Gerber (2009) administered a program via 14 chapters presented on a digital versatile disc (DVD) along with quizzes included. Parents who took the training rated higher in confidence, and their children were shown to use more functional verbalizations that children whose parents did not participate in the training program. Parents were able to increase their confidence and efficacy in teaching their child adaptive skills by simply educating themselves with the given materials. This study

provides support for the efficacy of self-directed programs such as online training. In another study, Johnson et al. (2007) addressed the matter of feasibility in developing a large-scale parent training program. This 24-week training program included a lecture based component with video vignettes, followed by a field type of training component in which the participants were observed and guided while using the learned techniques with a child. The effectiveness of this training was tested using 17 families at multiple sites. Results showed that the training procedure was feasible for parents, as determined by the high parent attendance and adherence rates. Even so, while this gives further support for the benefit of parent training in early treatment intervention, it is important to note that such intervention still faces certain limitations.

Limitations & Treatment Barriers

Despite the effectiveness of early intervention and using parent training, access remains severely limited for many high-need families. Barriers to service delivery and utilization, particularly in rural areas, often restrict accessibility. There are several limitations to on-site workshops and center-based parent training programs.   Major obstacles to accessing services include the lack of medical coverage, absence of reliable transportation, lack of childcare, and limited flexibility in work schedules (Connell et al., 1997; DeLeon,Wakefield, & Hagglund, 2003; Nordal et al., 2003; Organista, Muñoz, & Gonzalez, 1994; Stamm, 2003). These barriers differentially affect women, minorities, and the poor (Connell et al., 1997; Weissman & Jensen, 2002). For

example, center-based programs require parents to leave their home and depending on the time and frequency of training, this may require them to arrange for childcare. For parents of children with autism, many of them have difficulty finding someone who is capable of watching over their child (McGill, Papachristoforou, & Cooper, 2006; Openden, Symon, Koegel, & Koegel, 2006). Additionally, some training programs may be financially constraining when considering registration costs, travel costs, and ensuring adequate reliable transportation. Alternatively, parents may resort to in-home training or training in the natural setting. However, this too may not be a viable option since having a board certified analyst provide in-home consultations can be extremely expensive. In considering these barriers and limitations, it is therefore critically important that empirically supported interventions be adapted for a nontraditional delivery system in order to overcome barriers to treatment provision and utilization (Hollon et al., 2002).

To reiterate, parents under stress from raising children with autism are in need of early intervention as it provides indispensable value to these families. Providing home based versus center-based early intervention is efficacious, but despite the necessity, availability of such service is restricted due to the aforementioned limitations and barriers. However, recent advances in technology have expanded delivery avenues and provided greater accessibility for these families with the arrival of web-based training programs.

Web-Based Programs for Parents

Today's parents are increasingly turning to the internet to connect with others and search for information, resources, advice, and to share experiences as a means of coping, support and adaptation (Twoy, Connolly & Novak, 2007). One emerging area where advances in web-based technology seem most promising for this population is with parent-training (Carpenter et al., 2004). As the literature has already shown, parental training is beneficial for parents and autistic children as they reveal progress in language (Harris et al., 1982; Laski et al., 1988; Smith et al., 2000) and behavior change (Koegel et al., 1978; Neef, 1995; Lerman et al., 2000) in children and positive change in parental perceptions (Barlow et al., 2002, 2005), as well as increased parental knowledge (Harris et al., 1982), skills, and performance, (Koegel et al., 1978; Neef, 1995; Lerman et al., 2000). When parental training is transferred online, the internet can enable parents to access information from their home and implement it into actionable procedures in the natural environment or home setting. A study funded by the U.S. Department of Education detailed a variety of reasons that technology-based learning is especially helpful to families of children with disabilities (Rhim and Kowal, 2008). The key findings from the study suggest that the online landscape is appealing to parents for advantages that include: individualized program and pacing; extensive opportunities for parental involvement; extension of existing assistive technology for children with disabilities; frequent and immediate feedback; variety of presentation formats and personalized instruction; and more control over the learning environment

(e.g. flexibility of time and space) (Rhim & Kowal, 2008). In other words, these findings address many of the limitations and barriers previously mentioned.

Although there seems to be great potential in online and computer-based parent training programs, there may be disadvantages to using the internet. Even though the majority of parents will attempt to access the system from their home, professionals may not be able to deliver the same quality of services through technology as when delivered in person. Additionally, information delivered through online programs is presented in the same manner every time a parent accesses the program. This can be good for some learners but for others it can be a drawback, particularly for those who need clarification through various modes (Carpenter et al., 2004). In-person training, on the other hand, allows professionals to explain and model strategies in different ways in order to aid comprehension. One approach to overcoming this barrier is to have the online training include video conferencing (Carpenter et al., 2004), much like phone conferencing, for remote real-time consultation. This provides parents and professionals with the opportunity to collaborate and provide feedback more frequently and efficiently. For a web-based program to be successful, Carpenter et al. (2004) suggests that it should integrate daily progress reports, email reminders, animated material, weekly assignments, and written information.

Statement of the Problem

In an ideal world, parents would have access to trained professionals to provide intervention services for their child. Realistically however, access to such professionals is expensive and geographically limited, since these individuals are relatively few in number and generally clustered in large cities (Rhim & Kowal, 2008). Using online platform programs such as Rethink Autism may or may not be as good as face-to-face access to such professionals. Nevertheless, parents concerned over their child's future are compelled to seek out and try obtainable strategies deemed potentially beneficial, rather than do nothing. Thus, it seems logical that parents might benefit from access to an online program that offers a practical set of guidelines on how to interact with children with autism in everyday activities and in various situations. Such a resource might provide lucid information about intervention practices designed to teach parents how to help their children achieve specific objectives by showing live-action video examples of these activities. The web platform makes the information widely available for parents to access whenever needed. An online based training resource that presents a self-paced, continually accessible, and comprehensive curriculum would seem indispensable to parents seeking effective means to help their children with autism. Based on this need for an accessible, practical, and parent-friendly curriculum on the internet, an exploratory endeavor for this purpose should follow.

Purpose of the Study

The literature is replete with information about Applied Behavior Analysis (ABA) methods and its success in helping parents manage children who are on the autism spectrum (Lovaas, 1987; Matson, 1996; Sallows & Graupner, 2005; Howard et al., 2005; Cohen, Amerine-Dickens, Smith, 2006; Eikeseth et al., 2007; Howlin, Magiati, & Charman, 2009). However, the way that most parents learn about ABA techniques is through attending workshops and classes on the process. This is not always possible or practicable for parents who are located in remote locations, or have time constraints that make attending classes difficult or impossible (Connell et al., 1997; DeLeon,Wakefield, & Hagglund, 2003; Nordal et al., 2003; Organista, Muñoz, & Gonzalez, 1994; Stamm, 2003). Therefore, the primary purpose of this study is to make ABA behavioral training for parents of children diagnosed on the autism spectrum accessible through web-based learning opportunities, by exposing the parents to an online platform to teach parents of children with autism methods in Applied Behavior Analysis. Moreover, a secondary purpose to this study is to gain insight into the acceptance, usability and viability of how parents of children with autism engage with an online training program, and to evaluate their willingness to adopt such intervention with their children.

Research Questions

Depending on the type of research, scholars use research questions and hypotheses to shape and specifically focus the purpose of the study (Creswell, 2009). For this purpose, exploring the effectiveness of an online program for families of children with autism necessitates consideration of the following:

The first research question is descriptive in scope and will focus on demographic information specific to the population of parents in question. Descriptive questions do not have corresponding hypotheses attached to them as they are not usually predictive in scope; rather the focus is on reporting means, medians, modes, percentages, frequencies and averages of the groups.

RQ.1. What is the predominant gender, age, education level and computer/internet experience of parents/caregivers of children with autism?

The subsequent research questions are correlational or relationship-based since this section focuses on examining relationships between variables and are thus presented as hypotheses.

RQ.2. Do gender, age, education level and computer/internet experience influence intention to adopt the use of an online ABA program among parents of children with autism?

H.2. Gender, age, education level, and computer/internet experience will

have a statistically significant correlation with the intention to adopt an

online program for ABA intervention methods.

RQ.3. Is it possible to predict the occurrence of behavioral intention to adopt and

use an online program for early intervention in parents of children with autism

when considering the determining factors as measured by the Unified Theory of

Acceptance and Utilization of Technology?

H.3. Increased levels of performance expectancy, effort expectancy, social

influence, and facilitating conditions will have a statistically significant

correlation with intention to adopt an online program for ABA intervention

methods.

The purpose of this review leads up to explore the effectiveness of an online

training program to teach empirically-based interventions to parents of children with

autism in the home environment. The online program uses applied behavior analysis

(ABA) methods designed to teach parents skills to decrease problem behaviors

exhibited by their children with autism. To determine if an online system of ABA would

be an effective tool for disseminating information about recommended practices to

families, it is important to find out whether parents would utilize the training and find it

useful. To gain some insight into the usability and viability of parents utilizing such

training, it helps to look into the applicable theories to form a foundational basis of

understanding.

Chapter II

LITERATURE REVIEW

Theoretical Foundation

Although much has been revealed in guiding the understanding of autism, parenting children with autism, and managing behavior of autistic children; gathering and interpreting of this knowledge is not enough. Moving beyond knowledge gathering requires translating and implementing knowledge into meaningful solutions. This can be achieved through analysis of phenomena through the lenses of theoretical frameworks. In this case, finding a theoretical basis that provides a comprehensive understanding for exploring the viability of using an online module for parents of children with autism entails examining the theories of (1) self efficacy, (2) adult learning (andragogy) and (3) the acceptance and use of technology. The following sections provide further details for each but to give an overview: it is important to keep in mind that these areas are highlighted because self-efficacy focuses on a parent's judgment in their parenting skills and interactions with their autistic child. Depending on a parent's level of self efficacy, adult learning theory may take over and drive a parent to seek out knowledge or learn a skill that may improve their parenting ability, thereby improving self-efficacy. As discussed earlier, parents of children with autism are increasingly seeking knowledge and training by turning to the internet but even with the availability of online training resources, they provide little benefit so long as the resource is not accepted and implemented for utilization. Thus, adoption of such technology can be

explained by technology acceptance and use theory. For a clearer understanding, the sections below elucidate each of these theories in greater depth.

Self-Efficacy. In the earlier sections of this review, the matters of stress were discussed in relation to parenting children with autism. Studies have revealed that parental stress and depression are negatively associated with parenting capability and self-efficacy, or the parents' interpretation of competence in the parenting role (Hastings & Brown, 2002). Self-efficacy is defined as one's belief in one's ability to succeed in specific situations (Bandura, 1977). In a study examining wellbeing among mothers, having greater self-efficacy levels or understanding self-efficacy has been shown to reduce the effect of the child's behavior on the mothers' anxiety and depression (Kuhn & Carter, 2006). A better outlook to abilities and feelings about parenting a child with autism may lead to more supportive involvement that enhances a parent's wellbeing (Hastings & Taunt, 2002). Taking these factors into account, high levels of stress coupled with parents' inability to cope could adversely affect parents' ability to raise their children effectively and further aggravate tenuous relationships among family members, producing a family environment that could obstruct healthy developmental outcomes not only for the child but for all members of the household (Hastings et al, 2005). In the pursuit to create a better outcome, parents may seek to arm themselves through knowledge and education in managing their child's condition (Di Pietro, Whiteley, Mizgalewicz, & Illes, 2013). This sets in motion the course of andragogy.

Andragogy. One of the most prominent theories in adult learning is andragogy, which refers to the methods and techniques used for teaching adults and understanding how adults learn (Knowles, 1985). According to andragogy theory, adults are internally motivated and autonomous, which influences the way they learn since they are more likely to be self-managing, experiential, goal-oriented, relevancy-oriented, practical, and self-motivated (Knowles, 1985). Thus, andragogy refers to learner-focused form of education. This method of learning differs from pedagogy, which is more teacher-focused. In the pedagogic model, the teacher directs the learning as they assume responsibility for making decisions about what will be learned, how it will be learned, and when it will be learned. In the andragogic approach, the learner has greater control as they direct the learning process (Knowles, 1985; Knowles, Holton, & Swanson, 2005).

Knowles' conceptualization of andragogy is anchored in the unique characteristics of adult learners (Merriam, Caffarella, & Baumgartner, 2007) and suggests that successful online learning requires a match between course delivery and the particular attributes of the adult student. To expand on this, six notions were proposed about adult learners which determine how teaching of adults proceeds (Knowles et al., 2005).

The first notion is the need to know. Adults need to know why they are learning something, what the benefits are of knowing it, and what they risk by not learning it. When adults know how learning will happen, what learning will occur, and why it is

important, they will respond more positively to learning experiences. This leads to a need in including adults in deciding what it is they learn and setting goals and plans for their learning (Knowles et al., 2005).

The second notion is self concept. Adult learners have a self concept of being responsible for their own decisions. They are naturally self-directed in their lives and in their thinking, which may lead to self-management of learning. This has two elements; firstly, taking ownership of learning in terms of making decisions about what and how to learn, and secondly, self-direction, which includes self-management, motivation, and monitoring. Self-concept is likely to be context-dependent, that is, it will vary between different learning situations (Knowles et al., 2005).

The third notion is experience. Adult learners have experience and that experience is more diverse than is the case with children. Learning can therefore draw on this experience much more fully. However, adults may also have ingrained ideas from this experience, leading to bias or single-mindedness. Adults tend to associate experience with who they are. In other words, their identity is defined in terms of what experiences they have had. All of this means that learning needs to be associated with existing knowledge, and learning activities need to be situated in real experience. Learning should be active, constructive, and collaborative, and learners also need to recognize that sometimes relearning is required (Knowles et al., 2005).
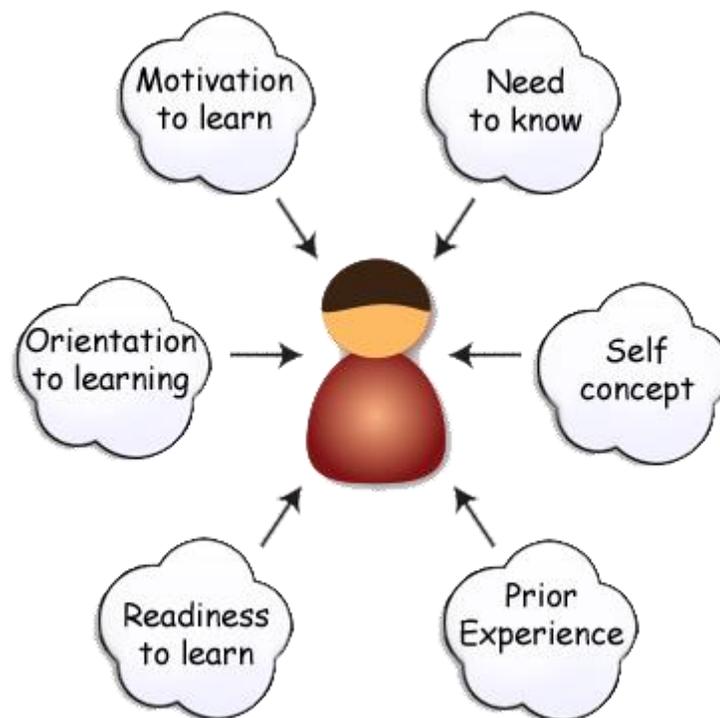
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Figure 2.1. Assumptions of Andragogy (Adapted from Knowles, Holton, and Swanson, 1998).

The fourth assumption is readiness to learn. Adult learners need learning to be timely and relevant and focus on what is useful in their particular context and situation. Pratt (1988) identifies two dimensions along which adults vary in different learning situations; that is, how much *direction* and *support* each learner requires. Direction is how much assistance is needed and is a factor of the learner's competence in the subject area and their general dependency. Support is how much encouragement is

needed from others and is a factor of their commitment and their confidence in their ability to learn.

The fifth notion is orientation to learn. Adult learning is problem-centered as opposed to content-centered so it focuses on tasks and problems rather than on subjects, so learning needs to be contextualized and experiential learning is most effective. Kolb (1984) proposed an experiential learning cycle where learners have concrete experiences of the here and now, they observe and reflect on those experiences, they generalize from those experiences to develop concepts and theories, and they then test these generalizations in new situations.

Finally, the sixth notion is motivation to learn. This may be extrinsic, for example, through rewards and grades, but in adults it is more likely to be intrinsic. For example, self-satisfaction, enjoyment, having choice and control over what is learned, and value, feeling that what is learned is worthwhile (Knowles et al., 2005).

All of this contrasts to pedagogy, which suggests that: (1) the teacher leads and makes key decisions; (2) that learners are dependent on the teacher in all aspects of the learning process, with natural dependency decreasing from childhood to adolescence; (3) that learner's own knowledge and experience is not considered important; instead knowledge comes from teachers and textbooks; (4) that readiness to learn is focused on what they are told they need to know; (5) that learning is subject-centered; and (6) that motivation is extrinsic, focusing on good grades and pleasing others. On the contrary, andragogy is characterized as a process model of learning; a

facilitator considers the activities and steps needed for learners to acquire knowledge and skills, rather than a content-model as seen in pedagogy where the teacher decides what will be taught and how it will be presented to the learner (Knowles et al., 2005). Parents of children with autism appear to fit the characteristics and assumptions of andragogy. As adult learners, parents want to use the knowledge and skills they learn to help their children, so taking andragogy into account can provide important guiding principles to consider when utilizing learning programs designed for parents.

Another important pillar of adult learning is self-directed learning (SDL). Knowles et al., (2005) defined SDL as an informal learning process in which an individual takes on the responsibility for all aspects of learning by identifying their learning needs, setting goals, finding resources, implementing strategies, and evaluating the outcomes. Learners can learn the content at their own pace and in their own way without an instructor. Instructors may serve as facilitators who are available to evaluate learning, answer questions and facilitate the learning process as needed. Thus, an instructor does not control or disseminate instruction, leaving control of the learning process at the hands of the learner (Roberson and Merriam, 2005). Other terms such as self-paced learning, self-planned learning, autonomous learning, self-teaching, and independent study are often used interchangeably with SDL (Knowles et al., 2005)

The factors involved with SDL include the goals, the process, and the learner. In an adult learning context, the goals are generally self-determined, as is the process. As for the learner, a successful SDL experience relies on motivation, which plays a key role

since adult learners are motivated by the opportunity to gain new skills, knowledge and

attitudes to improve their work performance, improve family life and health, participate in

a hobby, or simply enhance their intellect. However, one of the criticisms of SDL is the

amount of responsibility that it places on learners (Long, 2003). Since it is unstructured,

learners can easily become unproductive and distracted by their own needs,

assumptions and misperceptions. Another disadvantage is that learners are self-

directed depending on the situation and may not necessarily be self-directed in all

situations. Some adults may find difficulty in engaging in SDL because they lack the

time or resources (Hatcher, 1997). Taking all of this into account, parents find

themselves in situations that motivate them to actively seek to learn methods,

strategies, or interventions that can assist them in some aspect, such as dealing with

behavior problems, when handling their child. In considering current technology, many

turn to the internet for information in order to enhance knowledge and understanding of

their child's condition and establish a sense of parental control and competence (Di

Pietro et al., 2013) in dealing with their condition. Given these circumstances, it is

reasonable to suggest that parents of children with autism are likely candidates of SDL.

Unified Theory of Acceptance and the Use of Technology (UTAUT). A

prerequisite for successful utilization of an online learning system is technology

acceptance. The acceptance and adoption of technology is essentially anchored in

behavioral intention. Based on this notion, the decision to accept/adopt a technology is

a conscious act that can be foreseen by an individual's behavioral intention.

Accordingly, technology acceptance theory is based primarily on the Theory of

Reasoned Action (TRA), proposed by Fishbein and Ajzen (1975), which postulates that beliefs influence attitude, which in turn shapes a behavioral intention to engage in a particular behavior. The Theory of Planned Behavior (TPB) extends TRA by incorporating Perceived Behavioral Control (PBC) to account for social and environmental factors and situations where an individual lacks the control or resources necessary for carrying out the targeted behavior, despite a positive attitude toward it (Ajzen 1991).

The Technology Acceptance Model (TAM), which is specifically designed to address the determinants of end user computing technology acceptance (Chau and Hu 2002), shares with TRA a commonality that connects attitude to behavioral intention, but differs in its theorized determinants of attitude and behavioral intention (Davis, 1989). TAM suggests that when users are presented with a new technology, certain factors influence their decision about how and when they will use it. Notably, these factors are: perceived usefulness (PU), which is the degree to which a person believes that using a particular system would enhance his or her job performance; and perceived ease-of-use (PEOU) which is the degree to which a person believes that using a particular system would be free from effort (Davis 1989).
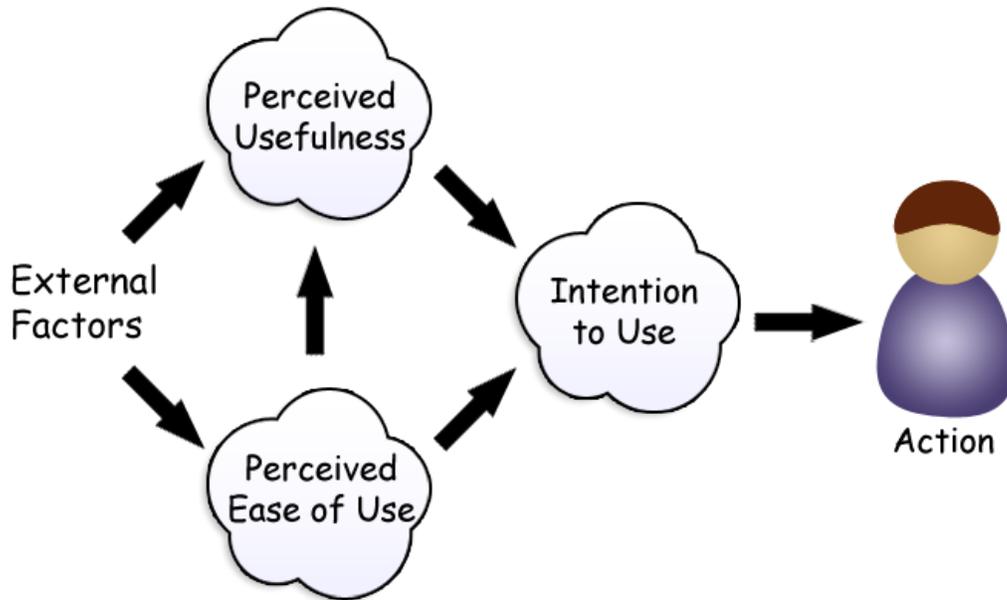
Figure 2.2. Technology Acceptance Model (TAM) adapted from Davis (1989).

Over time, the influx of technology acceptance studies resulted in the emergence of several competing models, some of whose similarities and differences in themes overlap. Venkatesh and colleagues (2003) integrated these theories and models to create a unified theoretical basis. The Unified Theory of Acceptance and the Use of Technology (UTAUT), proposed by Venkatesh, Morris, Davis, and Davis in 2003, is a relatively recent model. UTAUT was developed through a review and consolidation of the constructs from eight most prominent models that earlier research had employed to explain behavioral intention and use of technology:

- Theory of reasoned action (TRA) (Fishbein and Ajzen, 1975),

- Technology Acceptance Model (TAM) (Davis, 1989),

- Motivational Model (MM) (Davis, Bagozzi, & Warshaw, 1992),

- Theory of Planned Behavior (TPB) (Ajzen 1991),

- Combined TPB and TAM (C-TPB-TAM) (Taylor and Todd, 1995),

- Model of Personal Computer Utilization (MPCU) (Thompson, Higgins, & Howell, 1991),

- Innovation Diffusion Theory (IDT) (Moore and Benbasat, 1991), and

- Social Cognitive Theory (SCT) (Campeau and Higgins, 1995).

Table 2.1 presents the previous theories and their core constructs while Table 2.2 shows how the core constructs of UTAUT incorporate the constructs of these other theories. Integrating UTAUT as a theoretical frame can shed light on the willingness of parents of children with autism to use an online learning system. Employing measurement instruments can help confirm by assessing certain key constructs which are discussed in the subsequent section.

Table 2.1

Models and theories of individual acceptance and their definitions

Theory	Core Constructs	Definition
Theory of Reasoned Action (TRA)	Attitude Toward Behavior	An individual's positive or negative feelings (evaluative affect) about performing the target behavior (Fishbein and Ajzen, 1975).
	Subjective Norm	The person's perception that most people who are important to him think he should or should not perform the behavior in question (Fishbein and Ajzen, 1975)
Technology acceptance model (TAM)	Perceived Usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989).
	Perceived Ease of Use	The degree to which a person believes that using a particular system would be free of effort (Davis, 1989).
Motivational Model (MM)	Extrinsic Motivation	The perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself (Davis et al., 1992).
	Intrinsic Motivation	The perception that users will want to perform an activity for no apparent reinforcement other than the process of performing the activity per se (Davis et al., 1992).
Theory of Planned Behavior (TPB)	Attitude Toward Behavior	Adapted from TRA
	Perceived Behavioral Control	The perceived ease or difficulty of performing the behavior (Ajzen, 1991)
Combined TAM & TPB (C-TAM-TPB)	Attitude Toward Behavior	Adapted from TRA/TPB
	Perceived Behavioral Control	Adapted from TRA/TPB
	Perceived Usefulness	Adapted from TAM

Theory	Core Constructs	Definition
Model of PC Utilization (MPCU)	Job-fit	The extent to which an individual believes that using [a technology] can enhance the performance of his or her job (Thompson et al., 1991).
	Complexity	The degree to which an innovation is perceived as relatively difficult to understand and use (Thompson et al., 1991)
	Long-term Consequences	Outcomes that have a pay-off in the future (Thompson et al., 1991).
	Affect Towards Use	Feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act (Thompson, et al., 1991).
	Social Factors	The individual's internalization of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others, in specific social situations (Thompson et al., 1991)
	Facilitating Conditions	Objective factors in the environment that observers agree make an act easy to accomplish (Thompson et al., 1991).
Innovation Diffusion Theory (IDT)	Relative Advantage	The degree to which an innovation is perceived as being better than its precursor (Moore and Benbasat, 1991).
	Ease of Use	The degree to which an innovation is perceived as being difficult to use (Moore and Benbasat, 1991).
	Image	The degree to which use of an innovation is perceived to enhance one's image or status in one's social system (Moore and Benbasat, 1991).
	Visibility	The degree to which one can see others using the system in the organization (Moore and Benbasat, 1991).
	Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters (Moore and Benbasat, 1991).
IDT (continued)	Results Demonstrability	The tangibility of the results of using the innovation, including their observability and communicability (Moore and Benbasat, 1991)

Theory	Core Constructs	Definition
	Voluntariness of Use	The degree to which use of the innovation is perceived as being voluntary, or of free will (Moore and Benbasat, 1991)
Social Cognitive Theory (SCT)	Outcome Expectations – Performance	The performance-related consequences of the behavior. Specifically, performance expectations deal with job-related outcomes (Compeau and Higgins, 1995).
	Outcome Expectations – Personal	The personal consequences of the behavior. Specifically, personal expectation deal with the individual esteem and sense of accomplishment (Compeau and Higgins, 1995).
	Self-efficacy	Judgment of one's ability to use a technology to accomplish a particular job or task.
	Affect	An individual's liking for a particular behavior (e.g. computer use or internet use)
	Anxiety	Evoking anxious or emotional reactions when it comes to performing a behavior (e.g., using a computer or using the internet)
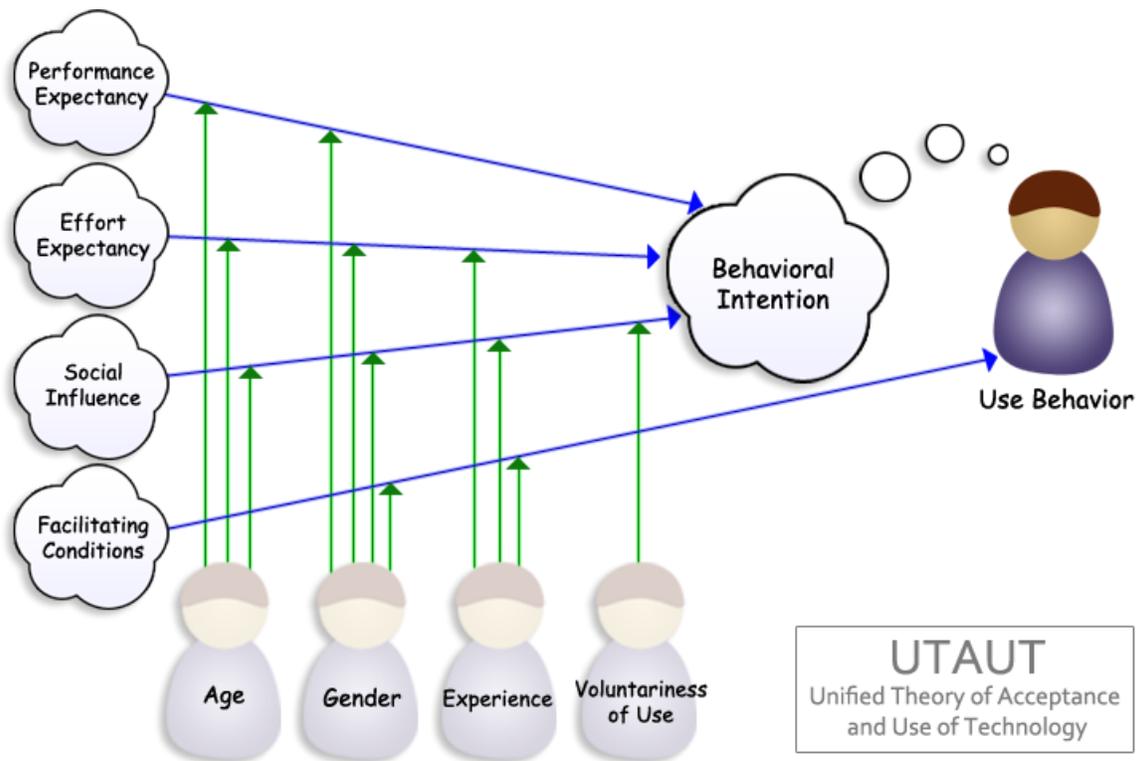
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Figure 2.3. Model for the Unified Theory of Acceptance and Utilization of Technology (UTAUT) adapted from Venkatesh, Morris, Davis, and Davis (2003).

Table 2.2
Overview of UTAUT core constructs and their definitions with construct and theory origins.

Core Construct		Definition in source	Construct and Theory Origin
Performance Expectancy	(PE)	Degree to which an individual believes that using the system will improve him or her to attain gains in job performance.	Perceived Usefulness (TAM/TAM2 & C-TAM-TPB) Extrinsic Motivation (MM) Job-fit (MPCU) Relative Advantage (IDT) Outcome Expectations (SCT)
Effort Expectancy	(EE)	Degree of ease associated with the use of the system.	Perceived Ease of Use (TAM/TAM2) Complexity (MPCU) Ease of Use (IDT)
Social Influence	(SI)	Degree to which an individual perceives that important others believe he or she should use the new system.	Subjective Norm (TRA, TAM2, TBP, and C-TAM-TPB) Social Factors (MPCU) Image (IDT)
Facilitating Conditions	(FC)	Degree to which an individual believes that an organizational or technical infrastructure exists to support use of the system.	Perceived Behavioral Control (TPB) and C-TAM-TPB) Facilitating Conditions (MPCU) Compatibility (IDT)
Behavioral Intention	(BI)	Intention to use the system in the future.	
Use Behavior	(UB)	Actual system usage.	

Assessment Instruments

When evaluating any type of online learning system, the variables to be measured must be clearly identified to facilitate the formation of an assessment strategy. The issues to consider when selecting or developing an assessment strategy or specific assessment tool are complex. Effective measurement relies on selecting or developing assessment strategies that demonstrate validity (measurement of the intended attribute) and reliability (consistency of measurement) and meet the specific needs of the investigative matter in question (Nunnally, 1978). In this case, the variables of interest in evaluating parents' use of a web based module are usability, usefulness, and applicability. Once the measurement variables are identified, consideration of the appropriate assessment instruments follows. For the objectives of this review, the relevant tools discussed are the System Usability Scale (SUS), the Post-Study System Usability Questionnaire (PSSUQ), and the instrument based on Unified Theory of Acceptance and Use of Technology or the UTAUT instrument.

System Usability Scale (SUS). One of the most extensively used, freely distributed questionnaires in measuring usability and user experience is the System Usability Scale. A highly regarded and very robust tool for usability evaluation, this short ten-item survey was developed to assess the usability of a product or system (Brooke, 1996). With odd-numbered items worded positive and even-numbered items are worded negatively, each item is scored on a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. In defining usability, the International Organization

for Standardization ISO 9241 Part 11 guidance on usability specifies that usability of a system can be measured only by taking into account the context of use of the system, which make up the user experience trinity. In essence, it considers: (1) who is using the system, (2) what is it being used for, and (3) what is the environment in which they are using it in. The SUS has been widely used for its brevity and versatility in the evaluation of a range of systems including hardware, consumer websites, cell-phones, and interactive voice response (IVR) systems. Studies by Tullis and Stetson (2004) showed that using SUS enables the user to get a measure of the perceived usability of a system with a sample as small as 12 participants and provide a fairly confident assessment of how participants respond to a system or product. Thus, using SUS enables the ability to reach a greater level of consistency between respondents sooner than with other questionnaires.

While the typical minimum reliability acceptance goal for questionnaires used in research and evaluation is .70 (Nunnaly, 1978), the SUS demonstrates good reliability ($\alpha = 0.91$). The SUS also shows evidence of sensitivity in being able to effectively distinguish between unusable and usable systems and demonstrates concurrent validity as it correlates highly with other questionnaire-based measurements of usability (Bangor, Kortum, and Miller, 2008). While it was intended to measure perceived ease-of-use, research shows that it provides an inclusive measure of system satisfaction and sub-scales of usability and learnability (Lewis & Sauro, 2009). Items 4 and 10 provide the learnability dimension while the other 8 items provide the usability dimensions with reasonable reliability (coefficient alpha of .91 and .70 respectively). Additionally, they

correlate highly with the overall SUS ($r = .985$ and $.784$ respectively) and correlate significantly with one another ($r = .664$) (Lewis & Sauro, 2009).

The Post-Study System Usability Questionnaire (PSSUQ) is a questionnaire that originated from an internal IBM project called SUMS (Systems Usability MetricS) and was developed to assess user satisfaction with system usability (Lewis, 1995). It consists of 19-items scored on a 7-point Likert scale, anchored at the end points with the terms "Strongly agree" for 1, "Strongly disagree" for 7, and a "Not applicable" (N/A) point outside the scale. The questionnaire takes approximately ten minutes to complete and allows participants to provide an overall evaluation of the system used. The constituents evaluated by PSSUQ are system usefulness (SYSUSE), information quality (INFOQUAL), interface quality (INTERQUAL), and overall satisfaction (OVERALL). When evaluated for consistency on a sample of 48 participants, coefficient alpha analyses showed that the overall scale and the three subscales have excellent reliability (OVERALL=.97, SYSUSE=.96, INFOQUAL=.91, and INTERQUAL=.91) (Lewis, 1992). The PSSUQ also has substantial construct validity and concurrent validity and is reasonably sensitive to manipulation of variables that should affect it (Lewis, 1995, 2002) making it useful in assessing subjective usability.

The Unified Theory of Acceptance and Use of Technology (UTAUT) Instrument. UTAUT holds that four key constructs are direct determinants of acceptance and adoption of technology. These determinants are: performance expectancy, effort expectancy, social influence and facilitating conditions. *Performance*

expectancy (PE) is the degree to which a user believes that using a technology will

provide gains in job or task performance; *effort expectancy* (EE) is the degree of ease in

using the system; *social influence* (SI) is the degree to which an individual perceives

that it is important that others believe that they should use the new system; and

facilitating conditions (FC) is the degree to which an individual believes that

organizational and technical infrastructures exist to support use of the system

(Venkatesh et al., 2003). In the UTAUT model, FC is included because in the

evaluation of this variable in previous models, the results showed that this factor is

related to intention to adopt. However, when other variables such as PE and EE are

included in the model, FC does not significantly predict intention because this variable is

related to use behavior and not behavioral intention. The four determinants of user

acceptance in UTAUT are moderated by gender, age, experience and voluntariness of

use to further integrate the essential elements of the eight previously established

theories. In essence, UTAUT can be seen as a developed version of TAM since

UTAUT's two main determinants, PE and EE, are essentially based on TAM's two

determinants, perceived usefulness (PU) and perceived ease of use (PEOU) (Louho,

Kallioja, and Oittinen,, 2006). Likewise, UTAUT's inclusion of two more determinants,

SI and FC as well as the four moderators contribute to a better understanding of the

intricacies involved in technology acceptance by users. The UTAUT model has

established construct validity and empirical applicability with Cronbach alphas of all

constructs exceeding the recommended level of 0.7 (PE=.91; EE=.90; SI=.88; FC=.85)

(Venkatesh et al., 2003). Longitudinal field studies of UTAUT were conducted at four

organizations with a pooled sample size of 645 tested at various stages of technology experience. Venkatesh and colleagues sampled for heterogeneity across technologies, organizations, industries, business functions, and nature of use. Cross validation was also done using data from two more organizations with another pooled sample of 399. Based on subsequent validation studies, UTAUT was found to account for 70 percent of the variance in behavioral intention to use a technology and about 50 percent in actual use of a technology (Venkatesh et al., 2003), making it rather superior to previous technology acceptance metrics. UTAUT has also been tested with other populations internationally and in other languages including English, Arabic, Czech, Dutch, French, Greek, and Malay and demonstrated that the instrument is robust enough to withstand translation and to be used cross-culturally (Oshlyansky, Cairns, & Thimbleby, 2007).

Table 2.3

Assessment Tools for Technology User Interaction

Measurement Tool	Items & Scale Type	Domains Assessed	Reliability	Validity
PSSUQ **Post-Study System** **Usability Questionnaire** **(Lewis, 1995)** **N=48**	19-items 7-point Likert scale.	Overall Satisfaction (1-19) System Usefulness (1-8) Information Quality (9-15) Interface Quality (16-18)	α = .97 OVERALL α = .96 SYSUSE α = .91 INFOQUAL α = .91 INTERQUAL	Construct validity, concurrent validity, evidence of sensitivity
SUS **System Usability Scale** **(Brooke, 1996)** **N=12**	10-items 5-point Likert scale.	Overall Usability Learnability	α = .92 Overall α = .91 Usability α = .70 Learnability	Construct validity, concurrent validity, evidence of sensitivity
UTAUT **Unified Theory of** **Acceptance and** **Utilization of Technology** **(Venkatesh et al., 2003)** **N=645 preliminary,** **N=399 cross validation**	31-items 7-point Likert scale.	Performance expectancy (PE) Effort expectancy (EE) Social influence (SI) Facilitating conditions (FC)	α = .91 PE α = .90 EE α = .88 SI α = .85 FC	Construct validity, evidence of sensitivity

There have been many efforts to develop usability questionnaires and scales for system or website product evaluation. However, with the strengths that these tools provide, each has its weaknesses. When using SUS for measuring usability, scores can range from 0 to 100 but these scores need interpretation and rebalancing into percentages (Lewis & Sauro, 2009). There have also been indications that existing questionnaires and scales such as PSSUQ are too generic (Keinonen, 1998) and that some items in SUS may have awkward wording (Finstad, 2006). The developers of those questionnaires advise that deficiencies in their questionnaires can be taken care of by the establishment of a context of use, characterization of end user population, and understanding of tasks for the system or website to be evaluated (van Veenendaal, 1998). The UTAUT has been acceptably robust across studies and user groups (Venkatesh et al., 2003), but scales used in the UTAUT model are new as they are in combination of a number of prior scales. It should be noted that no absolute research model exists across varying technological and organizational settings (Sundaravej, 2010). To judge whether an item is correlated to a construct or whether a variable of the model is significant depends on each context. Nonetheless, this does not diminish the value of UTAUT's original scales or the value of identifying measures that explain technology acceptance. Instead, it encourages further exploration of influences and factors that may alter the behavioral intention to use an information system in other settings. Within the context of this review, this makes the UTAUT seemingly appropriate for exploring the use of an online training program for parents of children with autism.

What is Known & What are the Gaps

To highlight the important points from the literature, it is well understood that parents of children with autism face unique challenges and demands that create significant stress in several aspects of their lives. It is also understood that these stressors can be addressed through early intensive intervention to create positive outcomes for children with autism. Moreover, it is established that training parents to actively engage in intervention strategies can augment the benefits, but restrictions such as availability, access, cost, and other barriers prevent several families from being able to receive training in early intervention. The internet has been established to be a novel tool in prevailing over these restrictions. There is a paucity of research that has examined web-based programs for parents. However, a growing body of research does exist concerning the use of technology to provide information to parents of children with special needs (Harris, 2004; Hourcade & Parette, 2001; Pacifici, Delaney, White, Nelson, & Cummings, 2006; Funderburk et al., 2008; Feil et al., 2008). This research indicates parents are able to take what they have learned and implement these skills into the home environment (Mackenzie, 1998) without having to employ trained personnel at high cost or difficult availability. The results from these studies demonstrate that an online instruction module is useful to parents who have access to such tools. Considering that parents of children with autism are affected around the world, many places lack easy access to center based early intervention programs or trained autism facilitators, so those with fewer resources may benefit from having a web-based option. Despite the potential, matters regarding usefulness, usability and

applicability of web-based parent training are not well understood and cannot be confirmed without documented research to shed light on this area and contribute to what has already been established in the literature.

Summary

In summary, parents of children with autism are at a loss at figuring out how to understand, interact, and connect with their child. This lack of understanding has led to tremendous stress, frustration and inability to cope with the immense strains of raising a child with autism. Auspiciously, children who receive early intensive treatment demonstrate substantial and sustained progress in communication, adaptive behavior, and social skills. The involvement of parents trained in early intervention strategies such as ABA further amplifies the likelihood of progress for children while empowering parents as they gain greater confidence in handling their children and strengthen the parent-child relationship. Nevertheless, some parents may not have access to such training. The struggle is intensified in regions where little support is provided to these families, fewer trained professionals exist, and access to intervention services is severely inadequate. To overcome these barriers, parents have turned to the internet to expand their options and search for alternatives. Using the internet to access online training for parents in early intervention methods has emerged as a means to address the barriers but its usefulness and feasibility in supporting parents in not well understood. Exploring the acceptance and use of online training for parents in early intervention methods can illuminate understanding and provide insight into the usability and applicability of parents utilizing the training. The results can contribute to the field in

finding impediments to adoption of technology intervention solutions and identify new

avenues of research. Therefore, it is worthwhile to investigate the viability of integrating

online learning systems as an option for parents and caregivers in such regions.

Chapter III

METHODS

This chapter presents the study's methodology, research design strategy, variables, population and sampling procedures, sample size, hypotheses, data collection, data analysis, limitations of the methodology, strategies for minimizing impact, and ethical considerations. Finally, the chapter covers instrument validity, reliability, human subjects, and related issues that are relevant to the study.

The research design is a descriptive, exploratory, cross-sectional, correlational study. Descriptive research involves describing a group of individuals on a set of variables (Portney and Watkins, 2009). For this study, the researcher will attempt to describe parents or primary caregivers of children with autism in terms of their intention to use an online program for early Applied Behavioral Analysis (ABA) intervention. In an exploratory study, the researcher examines a phenomenon of interest and explores its dimensions. In this case, the researcher is using the Unified Theory of Acceptance and Utilization of Technology (UTAUT) model proposed by Venkatesh et al. (2003). in attempts to explore the factors that may or may not influence the intention of parents or primary caregivers of children with autism to adopt and use an online program for early ABA intervention. Cross-sectional studies are used when data will be collected at one point in time to prevent testing or history effect; in this case data will be collected from parents or primary caregivers of children with autism at one point in time. Demographic characteristics of the sample will be organized and summarized through a descriptive

design. For this study, a descriptive, correlational design is chosen because the study

seeks to determine relationships among the independent variables (IV) (performance

expectancy, effort expectancy, social influence, and facilitating conditions) and the

dependent variable (DV) which in this case is behavioral intention to adopt online

intervention techniques for parents or primary caregivers of children with autism. Gall,

Gall and Borg define correlational research design as "a type of quantitative

investigation that seeks to discover the direction and degree of the relationship among

variables through the use of correlational statistics" (Gall et al., 2005, p. 546).

Correlation coefficients are used as "precise mathematical expression[s] of the types of

relationships between variables" (Gall et al., p. 219). For this type of research design,

the researcher does not control or manipulate any variables since the aim is to purely

study relationships. It is important to acknowledge that the research design is not

experimental, as variations in the independent variables occur without the researcher's

intervention. Correlational research involves the following steps: identifying participants,

deciding on measures for the variables under study, collecting data, analyzing the data

to determine relationships between variables (strengths and directions) and interpreting

the results to form conclusions (Creswell, 2005). Correlational studies are not used to

show cause-and-effect between variables. The focus is on relationships and degrees of

association (Creswell, 2005).

Target Population

For this study convenience sampling was used. The target population

was identified through an internet search of providers of autism-related services.

Participants were also identified through various autism organizations, ABA training providers, and online communities whose members include parents and caregivers of children with autism. These sites were contacted directly to inform them of the study (Appendix A1). Letters from sites that approve are found in Appendix C. Those that approved were requested to distribute a participant solicitation letter to their clients/members (Appendix A2) or were supplied with a recruitment flyer to post on the approving organization's website (Appendix B).

For most parents, having a child diagnosed with autism can be an overwhelming and life changing experience, but the diagnosis is just the first step in a lifetime of obstacles that the family will face. Parents under stress from raising children with autism are in need of early intervention as it provides indispensable value to these families. Providing home-based versus center-based early intervention is efficacious, but despite the necessity, availability of such service is restricted due to the aforementioned limitations and barriers. However, recent advances in technology have expanded delivery avenues and provided greater accessibility for these families with the arrival of web-based training programs. In considering the characteristics of these parents and the circumstances of their situation, this study sought to include participants with the following criteria:

Inclusion:

- Males and females
- Individuals who is/are parent(s) or primary caregiver(s) of a child with autism

- Adult(s), 18 years of age or above

- English speaking and reading capable

- Have access to a computer, tablet, iPhone, iPad, Smartphone, Android
  device, or laptop with an internet connection.

Exclusionary criteria will be as follows:

- Individuals who is/are not parent(s) or primary caregiver(s) of a child with
  autism

- Non-adult(s) under 18 years of age

- Non-English speaking and reading

- Lacking access to a computer, tablet, iPhone, iPad, Smartphone, Android
  device, or laptop with an internet connection.

Sampling Procedure

This study required a convenience sample size of 129 individuals (G*Power 3.1.9.2) (Faul et al., 2009) who are parents or primary caretakers of children with autism and who meet the inclusion and exclusion criteria. An a priori power analysis was used to determine an appropriate sample size based on the proposed regression analysis. The issue of sample size is an essential one, as it directly affects the statistical power of the study. The power of a statistical test is the probability of detecting a true relationship or group difference. A power analysis can reduce the risk for Type II errors

(a false negative) by estimating in advance how large a sample is needed (Portney and

Watkins, 2009). An a priori power analysis was determined using an effect size of

f^2=0.15 (medium effect) with an alpha α=0.05, and the power (1-beta) set at 0.95

representing a median or average effect and 95% confidence interval range standard to

social science research. The total sample size calculated using G*Power 3.1.9.2 (Faul

et al., 2009) was 129.

Recruitment of participants began upon receipt of the study research proposal

approval from the Seton Hall University Institutional Review Board along with attaining

permission from contacted autism organizations, ABA training providers, and online

communities. Prior to the first day of the study, the Principal Investigator (PI) uploaded

the Unified Theory of Acceptance and Utilization of Technology (UTAUT) survey (see

Appendix D3) to the *QuestionPro* electronic database survey system. The uploaded

survey contained each of the following: a letter of solicitation/implied consent (Appendix

D0), demographic survey (Appendix D1 and D2), the electronic UTAUT questionnaire

(Appendix D3), and a Thank You page (Appendix D4) which appears on-screen upon

completion of the survey.

As with any study, there is always the possibility of attrition and that fewer

participants may agree to complete the survey than originally projected or necessary for

sufficient power. As a contingency plan, snowball sampling was utilized (Biernacki &

Waldorf, 1981; Faugier & Sargeant, 1997). Snowball sampling is a non-probability

based sampling method that is most useful when the population of interest is rare,

unevenly distributed, hidden, or hard to reach. The approach for creating a snowball

sample is carried out in stages. In the first stage, a few individuals who meet selection

criteria were identified and invited to participate in the study via a letter of solicitation

(Appendix A2). In the second stage, these individuals were asked to identify others who

have the requisite characteristics and were encouraged to share the survey link with

other parents and caregivers of children with autism (Appendix D4). This process of

"chain referral" or "snowballing" was continued until an adequate sample was obtained

(Portney and Watkins, 2009).

Survey Instrument

The survey instrument consists of the self-administered online

questionnaire presented in Appendix D1, D2, and D3 and is divided into three sections.

The first section pertains to the demographics of participants noted (Appendix D1). The

second section identifies the level of the respondent's computer and internet knowledge

(Appendix D2). Finally, the third section includes a series of items used to assess

participants' perceptions related to their intention to use online ABA therapy programs

for managing child behavior as outlined by the constructs of the Unified Theory of

Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) (Appendix D3).

In accordance with the UTAUT model, it contains items that are designed to measure

the four determinants of technology adoption (independent variables) and behavioral

intention to use an online program (dependent variable). The four determinants of

technology adoption include *Performance expectancy* (PE) which is the degree to which

a user believes that using a technology will provide gains in job or task performance;

effort expectancy (EE) which is the degree of ease in using the system; *social influence*

(SI) which is the degree to which an individual perceives that it is important that others believe that they should use the new system; and *facilitating conditions* (FC) which is the degree to which an individual believes that organizational and technical infrastructures exist to support use of the system (Venkatesh et al., 2003). The items were formulated based on previously conducted tests of the UTAUT model. Lehmann and Hulbert (1972) suggest that if the focus of a study is on individual behavior, then five to seven-point scales should be used. The key factor in deciding how many scale points requires examining the benefits versus the costs involved. Although increasing number of scale points decreases the rounding error as a benefit, it may also lead to increased chances of non-response bias and low response rate due to respondent fatigue. Non-response bias occurs in statistical surveys if the answers of respondents differ from the potential answers of those who did not answer. To address this problem, setting the Likert scales to five-point levels can help researchers avoid non-response bias (Lehmann and Hulbert, 1972). Accordingly, this research study uses a five-point Likert scale with responses to these items ranging from "strongly agree" to "strongly disagree."

Survey Procedure

Once participants were identified, those who met the inclusion and exclusion criteria were contacted by their organization and were sent a link to a website hosting the actual questionnaire. The survey respondents submitted their responses to the questionnaire using a web browser. They received strict assurances that their anonymity would be maintained and that their data would be protected and remain

confidential, according to the letter of solicitation/implied informed consent (Appendix

D0). It is possible that fewer participants will agree to complete the survey than

originally projected or necessary for sufficient power. As stated previously, snowball

sampling was employed as a contingency plan. Each site that approved the study was

asked to email their clients/members notifying them of the study. They were invited to

participate in the study via a letter of solicitation (Appendix A2). This letter also

encouraged interested participants to share the survey link with other parents and

caregivers of children with autism (Appendix D4). In this way, the minimum sample size

was met. Surveys were reviewed to assure that each survey is completely filled;

incomplete surveys were not accepted. Once the target number of responses was

received, the data was retrieved from the *QuestionPro* electronic database survey

system and SPSS was used for analysis.

Ethical Assurances

Participation in the study was completely voluntary. Participants were free to

decide at any time not to participate, as there was no penalty for withdrawing or

declining to take part in the survey. Assurance of anonymity was of critical importance.

Protection and confidentiality was maintained throughout the duration of the research

project. No personal identifying information was collected from participants. The

responses were completely anonymous and the information provided by participants

was coded and treated as confidential. All data was stored in a password protected

electronic format, preventing the possibility for anyone to personally identify the

information supplied.

Data Analysis

Upon achieving the targeted sample size, the PI screened the surveys for missing or incomplete responses on the UTAUT questionnaire. The data was entered in SPSS and stored on a memory key. If a survey was missing any required responses, the data was not included in the analysis and was segregated and marked as such prior to storage.

Descriptive Statistics

The data was analyzed using both descriptive and inferential statistics, using PASW Statistics (formerly SPSS). Demographic characteristics were presented in tabular form using descriptive statistics and were used to report measures of spread and central tendency. This includes means and standard deviations or percentages and frequencies, as appropriate, for the socio-demographic variables such as age, gender, education level and experience. These data will be displayed for both those participants who both do and do not intend to use ABA training in order to inform the following research question:

RQ.1. What is the predominant gender, age, education level and computer/internet experience of parents/caregivers of children with autism?

Inferential Statistics

While descriptive statistics are used to describe a sample's characteristics, inferential statistics is used to infer something about the population from which the

sample was drawn based on the characteristics of the sample. After describing the spread of participant demographic information, multiple linear regression will then be used to assess these demographic factors for a significant relationship with the intention to learn ABA methodologies via an online platform. Multiple linear regression is the appropriate analysis when the goal of research is to assess multiple correlations with a single continuous outcome (Tabachnick & Fidell, 2012). This will be used to answer the following question:

> RQ.2. Do gender, age, education level and computer/internet experience influence intention to adopt the use of an online ABA program among parents of children with autism?

>> H.2. Gender, age, education level, and computer/internet experience will have a statistically significant correlation with the intention to adopt an online program for ABA intervention methods.

For this regression, a significant model will indicate that one or more of these demographic factors are correlated with an interest in learning ABA methodologies online. In this case, individual demographic factors will be examined, and any significant predictors will be considered as covariates. Thus, in the following statistical analyses, the effect of these demographic factors may be identified so that the effect of performance expectancy, effort expectancy, social influence, and facilitating conditions may be examined as they contribute to behavioral intention above what is explained by demographic details.

When considering the factors that influence the intention to adopt and use an online program for early intervention in parents of children with autism (as measured by the Unified Theory of Acceptance and Utilization of Technology, UTAUT), research question two addresses each of these specifically:

RQ.3. Is it possible to predict the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism when considering the determining factors as measured by the Unified Theory of Acceptance and Utilization of Technology?

H.3. Increased levels of performance expectancy, effort expectancy, social influence, and facilitating conditions will have a statistically significant correlation with intention to adopt an online program for ABA intervention methods.

Applied to this study, when testing a relationship between variables, there are four independent variables (*Performance expectancy* (PE), *effort expectancy* (EE), *social influence* (SI) and *facilitating conditions* (FC)) and one dependent variable (behavioral intention). For this set of research questions, hierarchical regression will be used to predict the dependent variable from a set of independent, or predictor variables. Since the likelihood of attaining a perfect fit between the determinants of technology adoption and actual use behavior is unlikely, the ability to predict the dependent variable (behavioral intention) will be improved by including more than one independent predictor variable. Incorporating demographic data further enhances the regression

model's predictive ability (Pallant, 2010). Therefore, multiple linear regression is an

appropriate data analysis choice. Using multiple linear regression, the hierarchical

variable entry method will allow the examination of UTAUT factors as they affect

behavioral intention above and beyond the effect of demographic covariates. This will

be accomplished by adding only demographic covariates into step one of the

regression, and adding the final four independent variables in step two.

Thus, in regards to question 3 particularly, when 3 or more independent variables

are used, the index of correlation is the multiple correlation coefficient R^2, which varies

from 0.0 to 1.0, showing the strength of the relationship between several independent

variables (e.g. performance expectancy, effort expectancy, social influence, and

facilitating conditions) and a dependent variable (e.g. behavioral intention to use an

online ABA program), without reference to a direction. Thus, by calculating R^2, the

proportion of variance in the dependent variable accounted for by the combined

simultaneous influence of the independent variables is attained, and this reveals the

accuracy of the prediction (Tabachnick & Fidell, 2012). By comparing the R^2 from step

one with that of step two, the contribution of demographic factors may be explained and

compared with the overall contribution of the demographic factors with the UTAUT

factors. Thus, the change in R^2 from step one to step two is then a measurement of the

UTAUT factors' contribution only.

If a significant regression model is determined, individual predictors may be

further assessed. Using a series of t tests, each predictor variable will be assessed for

significant predictive ability that is unique to that variable. Significant variables may

then be interpreted using the unstandardized *B* value to determine the change in behavioral intention that corresponds with a change in the significant predictor. The standardized β may also be interpreted as a partial correlation coefficient, such that it indicates the strength of relationship between a particular predictor variable and behavioral intention, while controlling for all other predictors in the model (Urdan, 2010).

Prior to analysis, the assumptions of the regression analysis will be assessed. For the regression analysis to provide statistically valid results, the assumptions of normality and homoscedasticity must be met. The assumption of normality is that the regression's residuals follow a normal distribution, and will be visually assessed using a normal P-P plot. If data on the P-P plot does not greatly deviate from a normal line, the assumption is met. The assumption of homoscedasticity is that data falls near evenly around the regression line from one end to the other. This assumption will be visually assessed using a standardized residual plot, where a random rectangular distribution indicates that the assumption is met (Tabachnick & Fidell, 2012). In addition, issues of multicollinearity will be assessed using variance inflation factors (VIFs). This assessment takes into account correlations among the predictor variables, which may be problematic to the overall regression equation, and subsequently to the interpretation of the results. According to Stevens (2009), VIFs above 10 indicate issues of multicollinearity. Variables with VIFs of 10 or higher will be compounded with other highly correlated predictors, or removed from the mode, depending on which is appropriate given their degree of correlation.

Chapter IV

RESULTS

This chapter presents a profile of the parents and caregivers based on the description of the demographic characteristics, followed by a detailed presentation of regression analyses, including the reliability of technology acceptance measures.

Pre Analysis Data Cleaning

Data originally consisted of 215 observations. However, prior to use in the following analyses, responses were assessed for non-completion. Upon analysis of the response data, 54 were found to have not completed the survey. After removing these incomplete responses, the final data consisted of a total of 161 responses, which is more than adequate as it exceeds the calculated sample size of 129 as noted in the previous chapter. Using the 161 responses, analyses were conducted on this final sample only. Figures 4.1 and 4.2 provide a global overview of the sample representing those who participated. Not surprisingly, the majority of respondents came from the US but few participants came from other regions and countries which offer some diversity to the sample.

Response Distribution

List of Countries	
US	90.41%
Unknown	1.37%
GB	1.37%
Brazil	0.91%
New Zealand	0.91%
Sweden	0.91%
Spain	0.46%
Ireland	0.46%
Philippines	0.46%
Australia	0.46%
Canada	0.46%
Belgium	0.46%
Georgia	0.46%
Columbia	0.46%
Russia	0.46%

Calculated sample size   N = 129
Achieved sample size   N = 161 (215 responded, 54 dropouts)
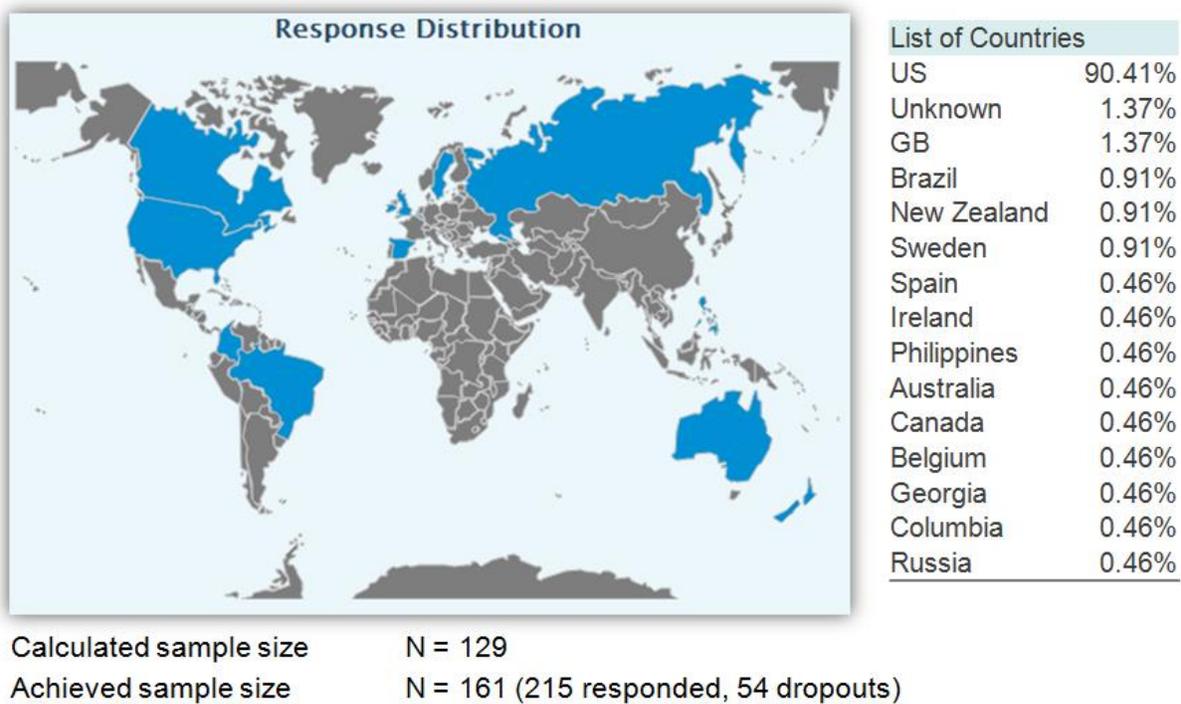
Figure 4.1. PI-Created Global sample overview.

Response Distribution

List of States		List of States	
NJ	10.96%	GA	1.37%
CA	9.59%	AZ	1.37%
TX	5.48%	WI	1.37%
NY	5.48%	MT	1.37%
FL	5.48%	IN	1.37%
PA	5.02%	IA	0.91%
MD	3.65%	OR	0.91%
NC	3.65%	OK	0.91%
CO	2.74%	LA	0.46%
MA	2.74%	SC	0.46%
MI	2.28%	RI	0.46%
VA	2.28%	AL	0.46%
OH	2.28%	UT	0.46%
IL	2.28%	DE	0.46%
TN	2.28%	AR	0.46%
MN	2.28%	KY	0.46%
MO	1.83%	HI	0.46%
WA	1.83%		

Outside US   9.59%
Unknown (US)   4.57%
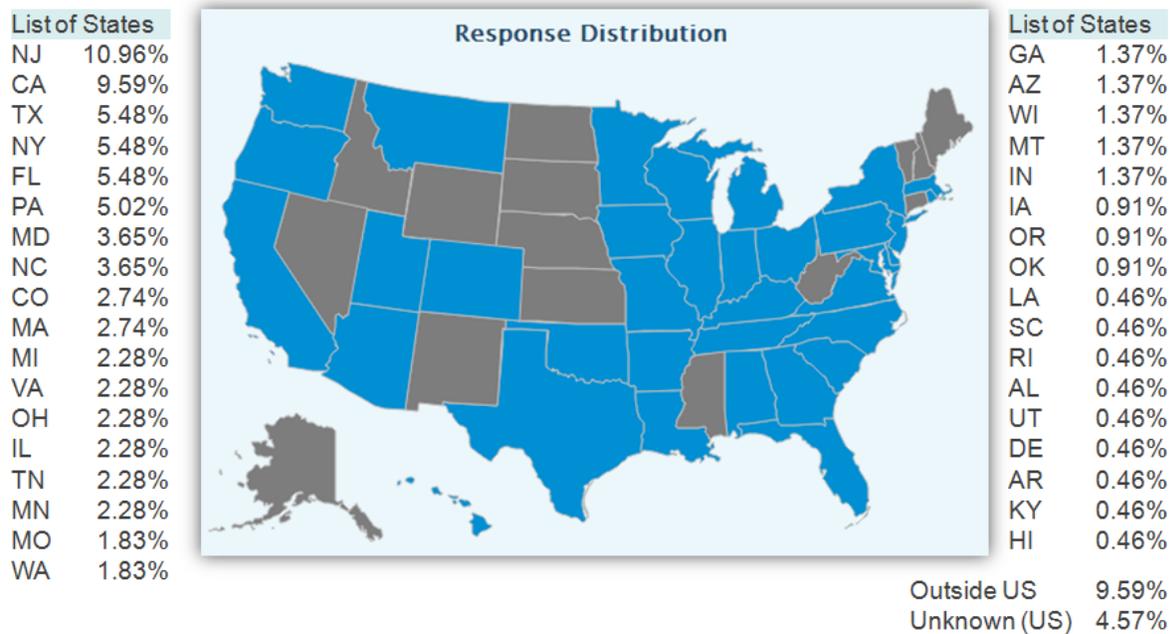
Figure 4.2. PI-Created U.S. sample overview.

Research Question 1: Frequencies and Percentages

What is the predominant gender, age, education level and computer/internet experience of parents/caregivers of children with autism?

A total of 161 participants responded to the full questionnaire. Among these participants, a majority (144, 89.4%) were female. There were 61 (37.9%) that reported their age within the range of 41 to 50 years old, and 48 (29.8%) that reported their age within the range of 31 to 40 years old, representing the largest age groups. A total of 44 (27.3%) of participants reported having earned a bachelor's degree, and 41 (25.5%) reported having earned a master's degree for their highest level of education completed. A majority of the sample (112, 74.5%) reported they were married, and were white or Caucasian (120, 74.5 %). There were a total of 74 (46%) that reported having full time employment, and a large portion (99, 61.5%) reported they lived in suburban areas. A total of 137 (85.1%) responded they were mothers to an autistic child, and others included fathers or grandparent caretakers.

The respondents were asked to rate their computer skills, and 76 (47.2%) rated themselves as having average skill while 60 (37.3%) rated themselves as advanced. Larger proportions (118, 73.3%) rated themselves as being very comfortable with using a desktop computer. Another majority (106, 65.8%) rated themselves as being very comfortable with using a laptop computer. A large portion (86, 53.4%) rated themselves as being very comfortable with using a tablet computer as well. Finally, a total of 88 (54.7%) rated themselves as being very comfortable with using a mobile and or smart phone. There were 92 (57.1%) participants who were interested in learning strategies

to manage their child's behavior. A large portion of the participants (72, 44.7%) were

interested in learning ABA to manage their child's behavior. There were also 83

(51.6%) participants interested in using an online program to manage their child's

behavior. Frequencies and percentages of sample demographics are presented in

Table 4.1.

Table 4.1

Frequencies and Percentages for Sample Demographics

Demographic	*n*	*%*
Gender		
Female	144	89.4
Other	17	10.6
Age		
21-30	6	3.7
31-40	48	29.8
41-50	61	37.9
51-60	37	23
61 or older	2	1.2
Prefer not to answer	1	0.6
Missing	6	3.7
Highest Level of Education		
High School	9	5.6
Some College	24	14.9
Trade/Vocational/Technical	7	4.3
Associates	14	8.7
Bachelors	44	27.3
Masters	41	25.5
Professional	7	4.3
Doctorate	8	5.0
Prefer not to answer	1	0.6
Missing	6	3.7
Marital Status		
Married	112	69.6
Other	49	30.4
Ethnicity		
White or Caucasian	120	74.5
Other	41	25.5
Employment Status		
Self Employed	10	6.2
Part Time	22	13.7
Full Time	74	46
Homemaker	33	20.5
Student	3	1.9
Unemployed	8	5.0
Retired	3	1.9
Prefer not to answer	1	0.6
Missing	7	4.3
Relationship to Child With Autism		

Mother	137	85.1
Other	24	14.9
Type of Area Lived In		
Suburban	99	61.5
Other	62	38.5
Rate Computer Skills		
Novice	4	2.5
Basic	5	3.1
Average	76	47.2
Advanced	60	37.3
Expert	11	6.8
Missing	5	3.1
Desktop Computer Skills		
Very Uncomfortable	16	9.9
Somewhat Uncomfortable	2	1.2
Neutral	5	3.1
Somewhat Comfortable	14	8.7
Very Comfortable	118	73.3
Missing	6	3.7
Laptop Computer Skills		
Very Uncomfortable	15	9.3
Somewhat Uncomfortable	4	2.5
Neutral	5	3.1
Somewhat Comfortable	23	14.3
Very Comfortable	106	65.8
Missing	8	5
Tablet Computer Skills		
Very Uncomfortable	13	8.1
Somewhat Uncomfortable	9	5.6
Neutral	11	6.8
Somewhat Comfortable	35	21.7
Very Comfortable	86	53.4
Missing	7	4.3
Mobile/Smartphone Skills		
Very Uncomfortable	14	8.7
Somewhat Uncomfortable	13	8.1
Neutral	13	8.1
Somewhat Comfortable	28	17.4
Very Comfortable	88	54.7
Missing	5	3.1
Interest Learning to Manage Childs Behavior		
Not At All Interested	1	0.6
Slightly Interested	5	3.1
Moderately Interested	15	9.3
Very Interested	42	26.1

Highly Interested	92	57.1
Missing	5	3.7
Interest Learning ABA		
Not At All Interested	2	1.2
Slightly Interested	9	5.6
Moderately Interested	23	14.3
Very Interested	50	31.1
Highly Interested	72	44.7
Missing	5	3.1
Interested Using Online Program		
Not At All Interested	2	1.2
Slightly Interested	9	5.6
Moderately Interested	16	9.9
Very Interested	45	28
Highly Interested	83	51.6
Missing	6	3.7

Note. Due to rounding error percentages may not sum to 100%.

Descriptive Statistics

Performance Expectancy scores ranged from 2 to 5, with $M = 3.46$ and $SD = 0.64$. Effort Expectancy scores ranged from 2 to 5, with $M = 3.41$ and $SD = 0.57$. Social Influence scores ranged from 1.25 to 5, with $M = 3.12$ and $SD = 0.71$. Facilitating Condition scores ranged from 1 to 5, with $M = 3.59$ and $SD = 0.68$. Behavioral Intention scores ranged from 1 to 3.75, with $M = 2.68$ and $SD = 0.58$. Table 4.2 presents descriptive statistics for these continuous variables.

Table 4.2

Descriptive Statistics for Continuous Variables

Variable	*Min*	*Max*	*M*	*SD*
Performance Expectancy	2	5	3.46	0.64
Effort Expectancy	2	5	3.41	0.57
Social Influence	1.25	5	3.12	0.71
Facilitating Condition	1	5	3.59	0.68
Behavioral Intention	1	3.75	2.68	0.58

Reliability

There were five composite scores used for this study. These scores included performance expectancy, effort expectancy, social influence, facilitating condition, and behavioral intention. Cronbach's alpha, a measure of internal consistency, was computed for all five scores. The Cronbach's alpha provides the mean correlation between each pair of items and the number of items in a scale (Brace, Kemp & Snelgar, 2006), and will be evaluated using the guidelines suggested by George and Mallery (2010) where > .9 Excellent, > .8 Good, > .7 Acceptable, > .6 Questionable, > .5 Poor, < .5 Unacceptable. All the composite scores showed adequate reliability, as their alpha coefficient was calculated to surpass .70, which is the recommended level of acceptance (Nunnally, 1978). Table 4.3 presents the Cronbach's alpha for all composite scales.

Table 4.3

Cronbach's Alpha for Composite Scores

Composite Score	*Items*	*Cronbach Alpha*
Performance Expectancy	4	.88
Effort Expectancy	4	.78
Social Influence	4	.84
Facilitating Condition	4	.71
Behavioral Intention	3	.90

Research Question 2

Do gender, age, education level and computer/internet experience influence intention to adopt the use of an online ABA program among parents of children with autism?

To examine this research question, a multiple linear regression was conducted to determine whether gender, age, education level, and computer or internet skills are statistically significant in predicting intention to use an online ABA program among parents of children with autism. Prior to conducting the multiple linear regression, the assumptions of the analyses were assessed, and included normality, homoscedasticity, and the absence of multicollinearity. A normal P-P plot was used to assess the normality of residuals among the predictor's variables and the dependent variable. Homoscedasticity was interpreted through the standardized residual scatterplot, and multicollinearity was assessed using variance inflation factors (VIFs)

The normal P-P plot was found to follow a normal line, indicating that the assumption of normality was met, and is included in Figure 4.3. Upon examination of the standardized residual scatterplot, the presence of a rectangular distribution indicated homoscedasticity was present; thus, the assumption was met as well (Stevens, 2009). The scatterplot for interpreting homoscedasticity can be found in Figure 4.4. The absence of multicollinearity is the assumption that the predictor variables are not too closely related, and was assessed using Variance Inflation Factors (VIFs). VIF values greater than 10 suggest the presence of multicollinearity, and a violation of this assumption (Stevens, 2009). None of the predictor variables showed

any signs of detrimental multicollinearity, with the highest VIF value being 7.57; thus,
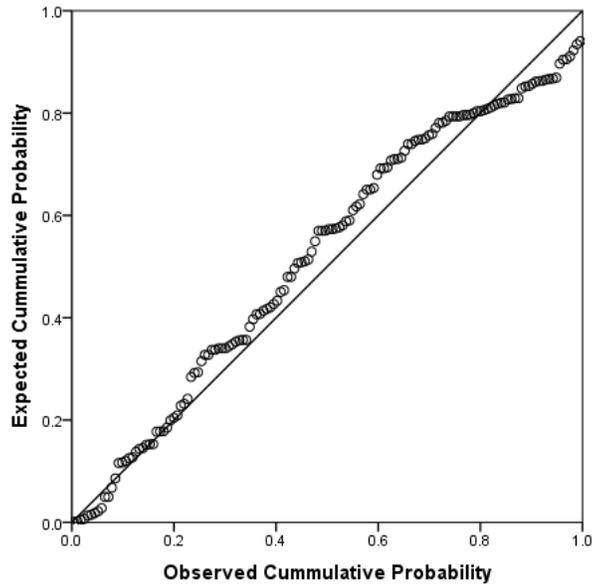
the assumption was met as well.

Figure 4.3. Normal P-P plot of normality of residuals among the predictor variables and the dependent variable.
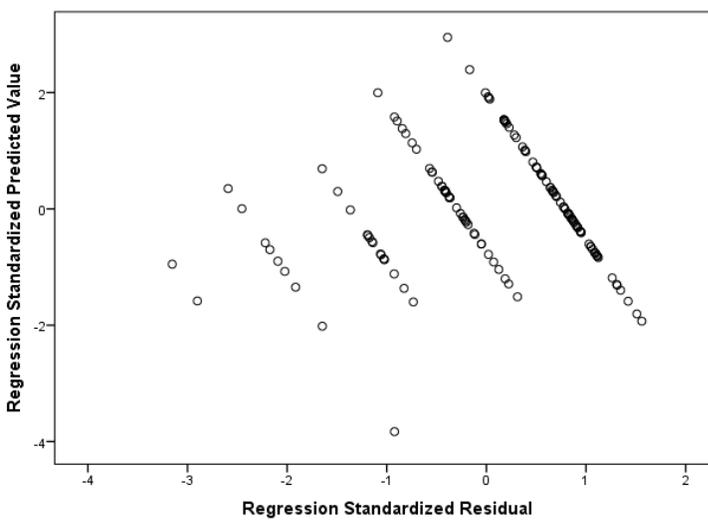

Figure 4.4. Scatterplot for interpreting homoscedasticity.

Results of the linear regression indicated that one or more of the covariates (gender, age, education level and computer/internet experience) do significantly predict parents intention to adopt online ABA programs to manage their child's autism, $F(8,139)= 2.93$, $p = .005$, Adjusted $R^2 = .095$, and the null hypothesis could be rejected in favor of the alternative. When considering the coefficient of determination, both R^2 and the adjusted R^2 give an overview of how many data points fall within the line of the regression equation. However, the main difference between the two is that R^2 assumes that every single variable explains the variation in the dependent variable, while the adjusted R^2 shows the percentage of variation explained by only the independent variables that actually affect the dependent variable. In this study, the adjusted R^2 suggested that 10% of the variability in parents adopting online ABA programs to manage their child's autism can be explained by one or more of the predictors (gender, age, and education level and computer/internet experience). Among the set of predictor variables, the education level was found to be a statistically significant predictor of the interest in adopting ABA online programs ($t = -3.32$, $p < .001$). Examination of the unstandardized beta coefficient (i.e., B) indicated that a single unit increase in someone's education level resulted in a 0.14 decrease in their interest in adopting an online ABA program to manage their child's autism. Table 4.4 presents the results of the multiple linear regression.

Table 4.4

Results of Multiple Linear Regression with Gender, Age, Education Level and Computer/Internet Experience Predicting Interest in Adopting ABA Online Programs

Source	B	SE	β	t	p
Rate Computer Skills	0.18	0.11	-.19	1.61	.110
Desktop Computer Skills	-0.15	0.14	-.19	-1.05	.290
Laptop Computer Skills	0.16	0.16	.22	1.01	.310
Tablet Computer Skills	-0.03	0.13	-.04	-0.22	.820
Mobile/Smart Phone Skills	0.11	0.11	.14	0.89	.370
Gender	-0.54	0.31	-.14	-1.73	.080
Age	-0.01	0.09	-.01	-0.08	.930
Education	-0.14	0.04	-.28	-3.32	.001

Note. $F_{(8,139)}$= 2.93, p = .005, Adjusted R^2 = .095

Based on assessment of the variables overall, the initial regression equation was:

Interest in Adopting =.18(Computer skills) + .15(Desktop skills) + .16(Laptop skills)

- .03(Tablet skills) + .11(Smartphone skills) - .54(Gender) - .01(Age)

- .14(Education) + 4.51

However, closer assessment of variables individually revealed that only one variable was significant which is reflected in the true equation below:

Interest in Adopting = - .14(Education) + 4.51

Research Question 3

Is it possible to predict the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism when considering the determining factors as measured by the Unified Theory of Acceptance and Utilization of Technology (UTAUT)?

For this research question it was hypothesized that based on UTAUT predictors, increased levels of performance expectancy, effort expectancy, social influence, and facilitating conditions will have a statistically significant correlation with intention to adopt an online program for ABA intervention methods. To examine this research question, a hierarchical linear regression was conducted to determine whether computer skills, age, gender, education, and factors measured by the UTAUT (performance expectancy, effort expectancy, social influence, and facilitating condition) are statistically significant in predicting the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism. A hierarchical linear regression is an appropriate statistical analysis when the goal of the research is to assess the predictive effect an independent variable has on a continuous dependent variable, while specifically controlling for the effects of additional variables (Tabachnick & Fidell, 2012).

Prior to analysis, Pearson correlations were performed on the series of previously used covariates to determine which were appropriate for use as controls in this analysis. Gender, age, education, rating of computer skills, desktop computer skills, laptop computer skills, tablet computer skills, and mobile/smartphone skills versus

behavioral intention were all included in the matrix. Table 4.5 shows the results of the

Pearson correlation.

Table 4.5

Pearson Correlation between Potential Covariates and Behavioral Intention

Source	Behavioral intention
Gender	-.08
Age	-.08
Education	-.11
Rate Computer Skills	.19*
Rate Desktop Skills	.09
Rate Laptop Skills	.19*
Rate Tablet Skills	.23*
Rate Mobile/Smartphone Skills	.18*

After performing the Pearson Correlation, the covariates most appropriate to

include in the analysis are rating of computer skills, rating of laptop skills, and rating of

tablet skills, and rating of mobile or smartphone skills. These significant covariates were

then used in the following regression analysis. The first step (block) of the hierarchical

linear regression assesses how much variance in the dependent variable is accounted

for by these covariates. The second step (block) assesses how much additional

variance is accounted for by the addition of the independent variables, which are

defined as the factors measured by the Unified Theory of Acceptance and Utilization of

Technology (i.e., performance expectancy, effort expectancy, social influence, and

facilitating condition).

Prior to conducting the hierarchical linear regression, the assumptions of the

analyses must be assessed. These assumptions were tested using a normal P-P plot,

standardized residual plot, and VIFs. The normal P-P plot can be found in Figure 4.5,

and indicated that the regression residuals were sufficiently normally distributed.

Homoscedasticity was found to be met through the standardized prediction versus

standardized residual regression scatterplot, which can be found in Figure 4.6. None of

the predictor variables showed any detrimental signs of multicollinearity, with the

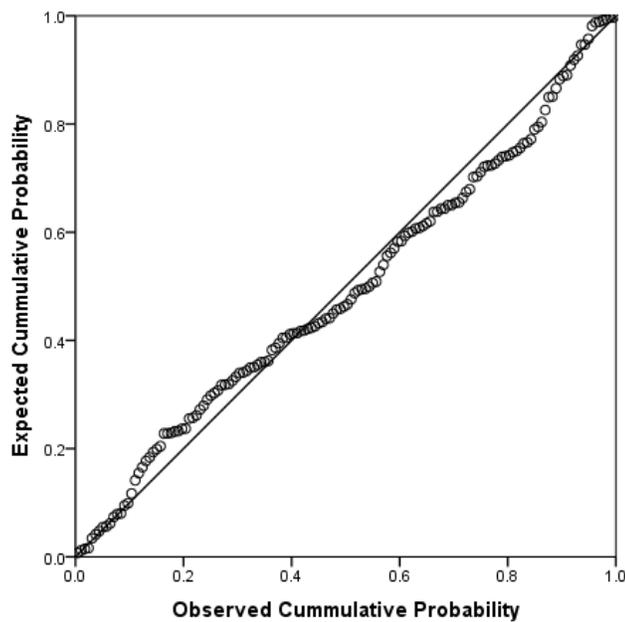highest VIF value being 4.71; thus, the assumption was met as well.

Figure 4.5. Normal P-P plot of normality of residuals among the predictor variables and
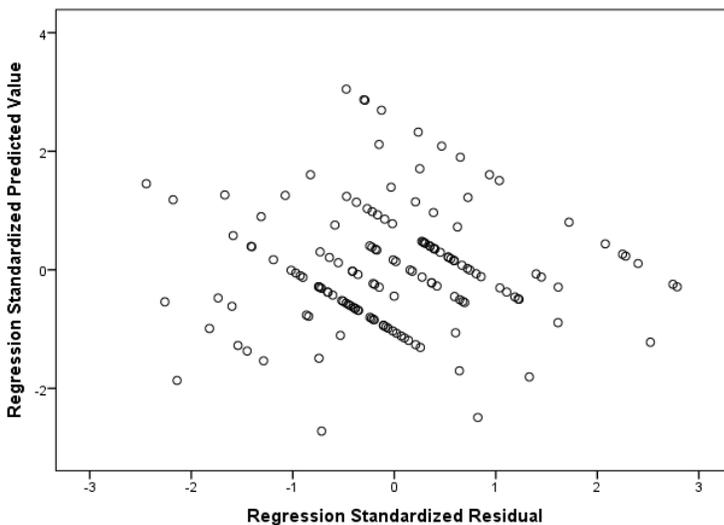the dependent variable.

Figure 4.6. Scatterplot for interpreting homoscedasticity.

Results of step 1 of the hierarchical regression indicated that one or more of the covariates (rating of computer skills, rating of laptop skills, and rating of tablet skills, and rating of mobile/smartphone skills) do significantly predict the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism, $F(4, 145) = 3.12$, $p = .01$, adjusted $R^2 = .054$. The adjusted R^2 value suggested that 5.4% of the variability in of the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism could be accounted for by the group of significant covariates alone. Due to these significant results, the null hypothesis could be rejected in favor of the alternative.

Results of step 2 of the hierarchical regression indicated that a linear combination of the significant covariates and independent variables do significantly predict the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism, $F(8, 141) = 17.79$, $p < .001$,

adjusted R^2 = .474. The adjusted R^2 value suggested that up to 47.4% of the variability in the occurrence of behavioral intention to adopt and use an online program for early intervention in parents of children with autism was explained by these predictor variables. An additional 42% (47.4% - 5.4%) of the variability in the occurrence of behavioral intention can be explained by the inclusion of the predictor variables.

Because the model was significantly predictive, the individual predictor variables were assessed further. Performance expectancy ($t = 2.47$, $p = .010$) was a significant predictor, and examination of the unstandardized beta value indicated that one unit increase in performance expectancy yielded a 0.20 unit increase in behavioral intention. Social influence was also a significant predictor ($t = 4.34$, $p < .001$), and examination of the unstandardized beta indicated that one unit increase in social influence yielded a 0.27 increase in behavioral intention. Facilitating conditions was another significant predictor ($t = 2.07$, $p = .040$), and this unstandardized beta indicated that a one unit increase in facilitating conditions yielded a 0.16 increase in behavioral intention. Table 4.6 presents results for the first and second blocks of the hierarchical linear regression.

Table 4.6

Results of Hierarchical Regression with Covariates and Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition Predicting the Occurrence of Behavioral Intention

Source	B	SE	β	t	p	R^2_{adj}
Step 1						.054
Rate Computer Skills	0.13	0.06	.17	2.03	.040	
Rate Laptop Skills	-0.00	0.06	-.00	-0.01	.990	
Rate Tablet Skills	0.08	0.07	.17	1.03	.300	
Rate Mobile/Smartphone Skills	0.00	0.07	.00	0.02	.980	
Step 2						.474
Rate Computer Skills	0.07	0.04	.09	1.51	.130	
Rate Laptop Skills	0.01	0.05	.03	0.34	.720	
Rate Tablet Skills	0.03	0.05	.08	0.64	.510	
Rate Mobile/Smartphone Skills	-0.03	0.05	-.07	-0.63	.520	
Performance Expectancy	0.20	0.08	.22	2.47	.010	
Effort Expectancy	0.04	0.10	.04	0.45	.640	
Social Influence	0.27	0.06	.33	4.34	<.001	
Facilitating Condition	0.16	0.08	.19	2.07	.040	

Note. Step 1: $F(4, 145) = 3.12$, $p = .010$, *Adjusted R^2* = .054; Step 2: $F(8, 141) = 17.79$, $p < .001$, *Adjusted R^2* = .474.

Based on assessment of the variables overall, the initial regression equation was:

> *Behavioral Intention*
>
> $=.07$ *(Computer skills)* $+ .01$ *(Laptop skills)* $+ .03$ *(Tablet skills)*
>
> $-.03$*(Smartphone skills)* $+ .20$ *(Performance Expectancy)*
>
> $+.04$*(Effort Expectancy)* $+ .27$*(Social Influence)*
>
> $+.16$*(Facilitating Conditions)* $- .002$

However, closer assessment of variables individually revealed that performance expectancy, social influence, and facilitating conditions are significant which is reflected in the true equation below:

> *Behavioral Intention*
>
> $=.20$ *(Performance Expectancy)* $+ .27$*(Social Influence)*
>
> $+.16$*(Facilitating Conditions)* $- .002$

Power Analysis

Following completion of the analyses, findings from each hypothesis test were assessed to determine the achieved level of power, and whether the sample size limited any of these analyses' power. To determine the achieved power for each analysis, G*Power 3.1.9 was used, and parameters from each analysis were entered into the calculations. Power corresponds with the probability that an analysis will detect an effect when one actually exists. For regression one, the achieved power was calculated to be .94 as demonstrated in Figure 4.7, while regression two achieved a power of .81 for step one and a power greater than .99 (see Figures 4.8 and 4.9). Thus, regression one would detect significance 94 times out of 100 if the effect exists, while step two of regression two would detect an overall relationship between the variables of interest and the outcome variable over 99 times out of 100 if that effect exists. The lowest power was found in step one of regression two, which achieved a power of .81. Although this was the lowest power in the study, it still meets the proposed benchmark of .80 which is the typical goal in the social sciences (Cohen, 1992; Faul, Erdfelder, Buchner, & Lang, 2009).
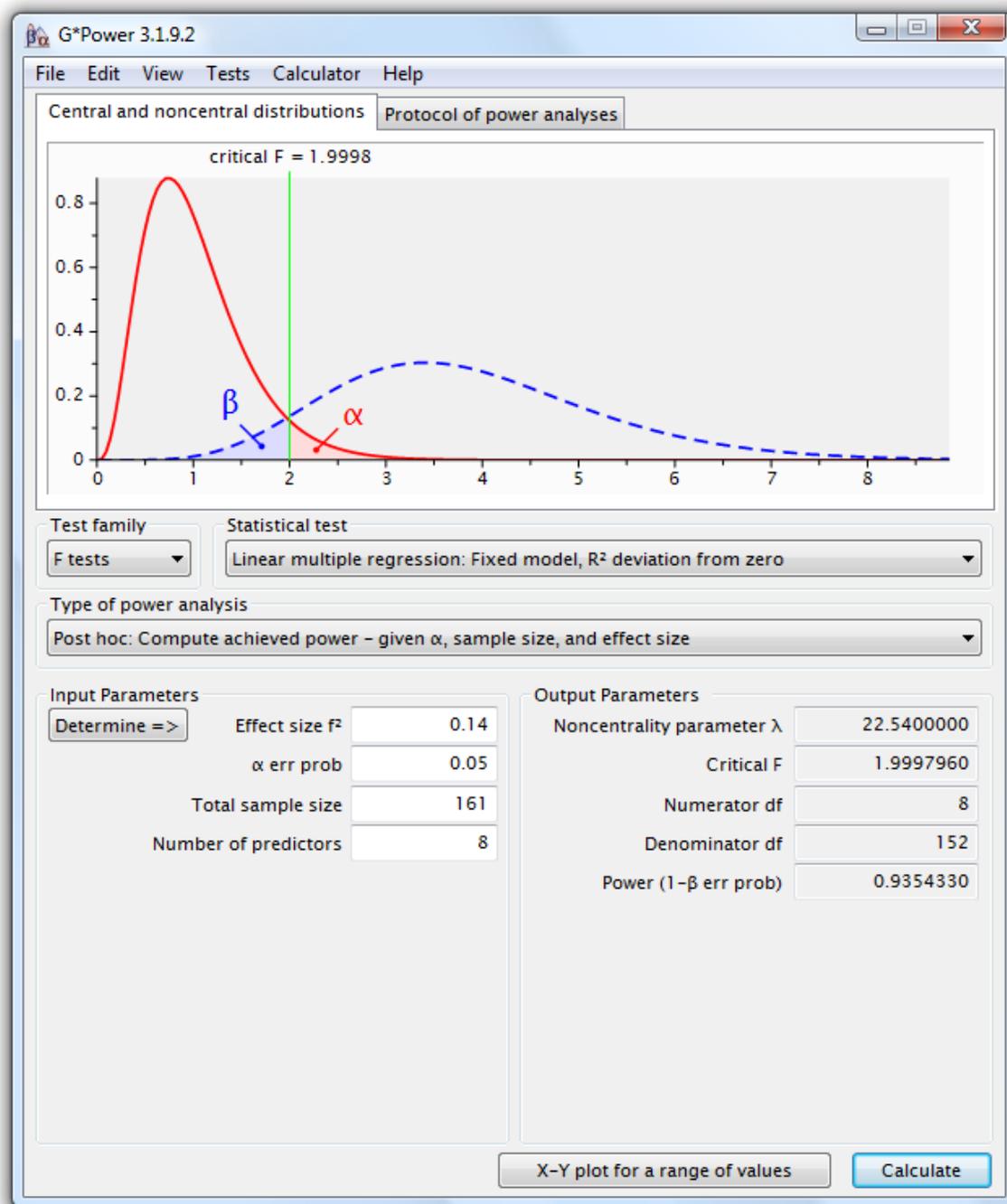
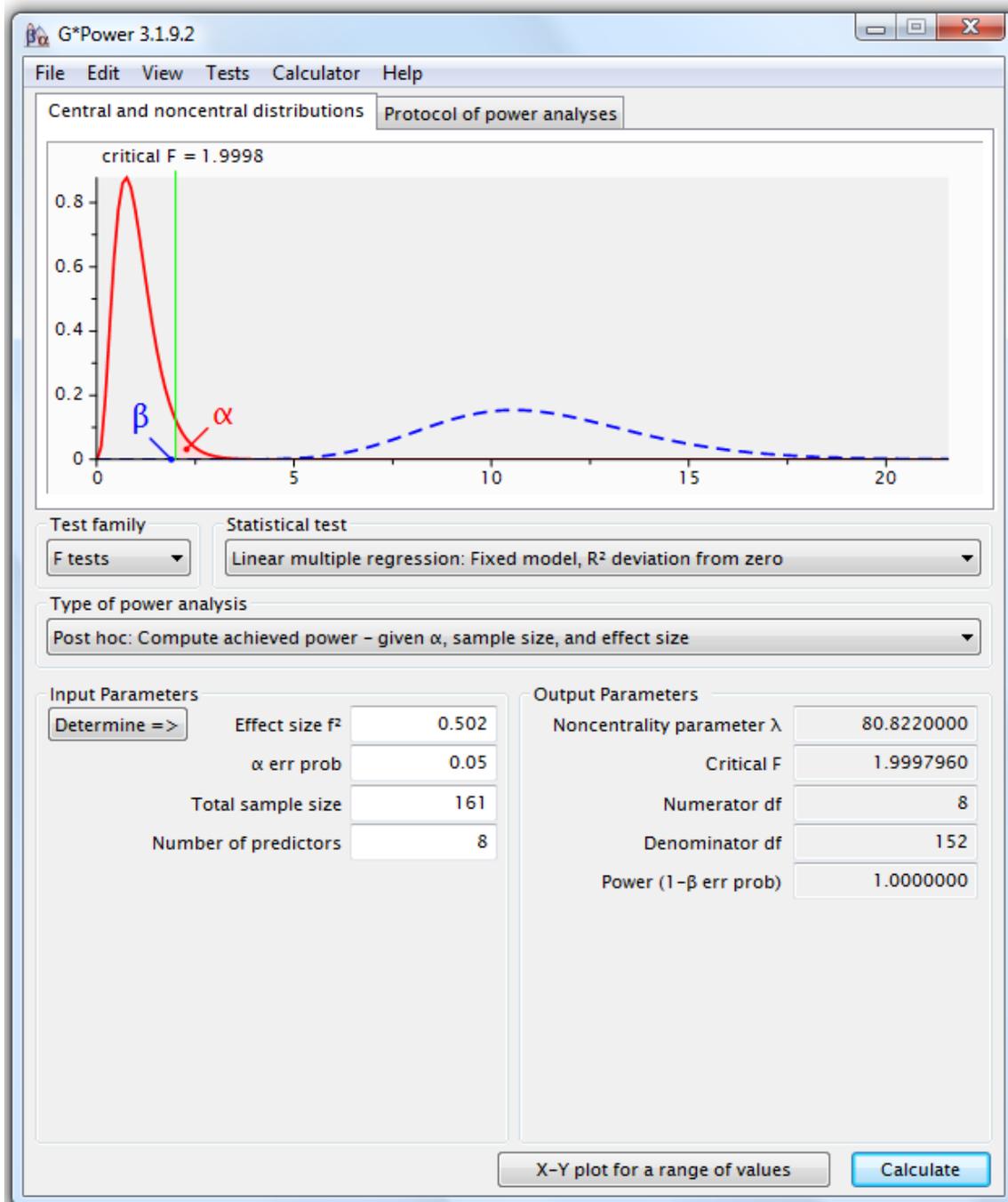*Figure 4.7.* Statistical power analysis for multiple linear regression in Research Question 2 using G*Power (Faul et al., 2009).
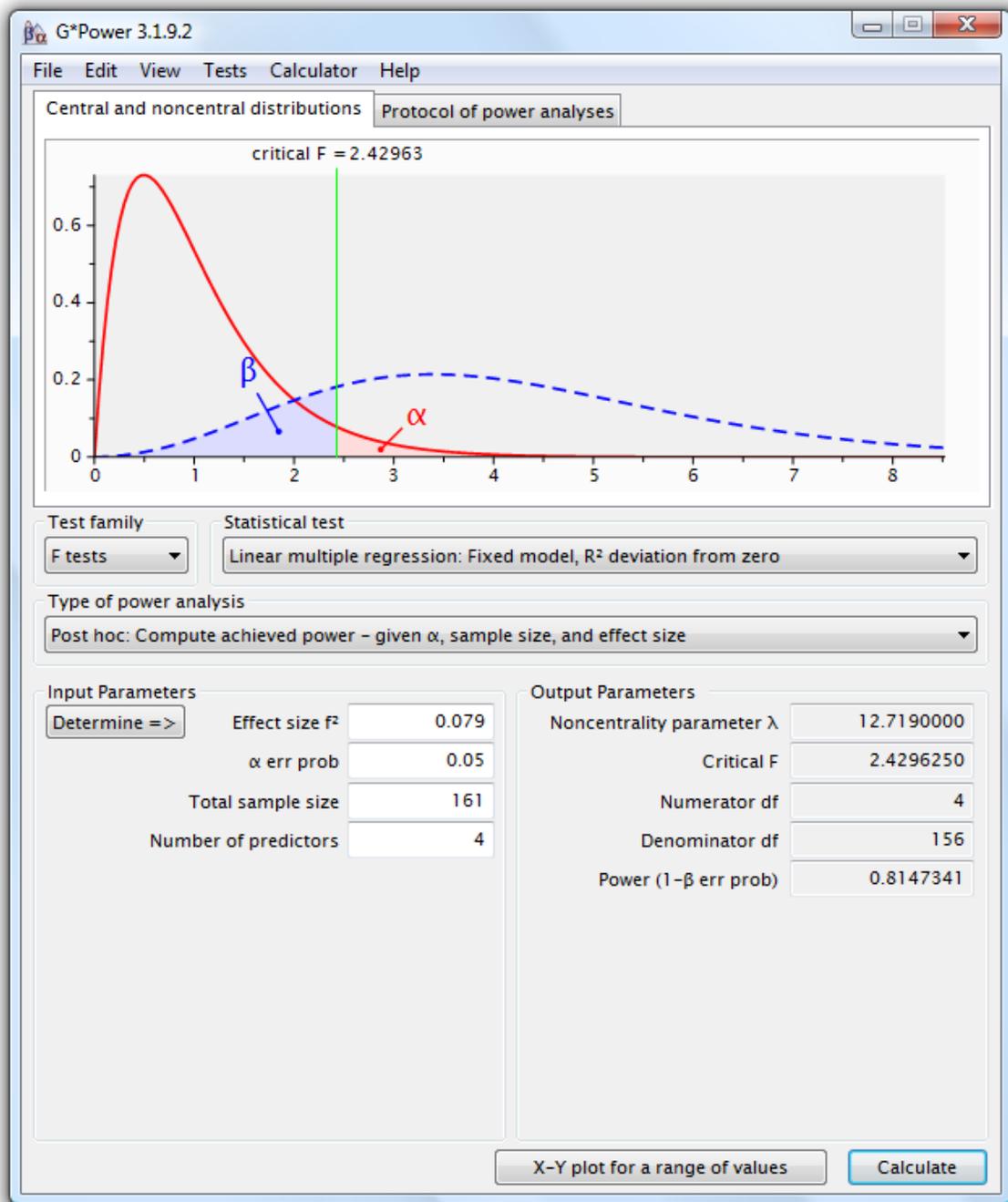
Figure 4.8. Statistical power analysis for hierarchical regression step 1 in Research Question 3 using G*Power (Faul et al., 2009).

Figure 4.9. Statistical power analysis for hierarchical regression step 2 in Research Question 3 using G*Power (Faul et al., 2009).

Chapter V

DISCUSSION & CONCLUSIONS

Interest in using the internet and web-based interventions has been increasing

rapidly in the last several years (Wantland et al., 2004; Diaz et al., 2002). This research

study was conducted with the objectives of gaining insight into the acceptance, usability

and viability of how parents of children with autism engage with a web-based online

training program, and to evaluate their willingness to adopt such intervention with their

children. This study assessed parents' intention to adopt the use of an online parent

training program, as measured by the Unified Theory of Acceptance and Utilization of

Technology (UTAUT). In this chapter, the discussion is organized around the results

and findings in respect to the restructuring of the research model. The original UTAUT

model along with the revised resultant research model is presented. The section that

follows covers an explanation of how the results and findings relate to the literature.

Finally, the subsequent sections present the research limitations, implications for

practice and research contributions, and conclude with recommendations for future

research.

Discussion of Results in Relation to the Original UTAUT Model

In the original theoretical model, Venkatesh et al., (2003) state that performance

expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions

(FC) influence an individual's behavioral intention (BI) to use a technology. However,

this was not observed in this study since the results revealed that effort expectancy had

no statistically significant influence on behavioral intention. Another important note is

that UTAUT also suggests that Age, Gender, Experience and Voluntariness of Use

mediate the aforementioned UTAUT technology acceptance factors. However, this was

not observed either. It should be noted that in the case of Voluntariness of Use, this is

typically tested when the technology in question is used for a mandated setting such as

the workplace or school where it may be required. For this study, voluntariness of use

is assumed for the parents and caregivers since they are not required or obligated to

use the system. Figure 5.1 presents a graphical representation of these results.
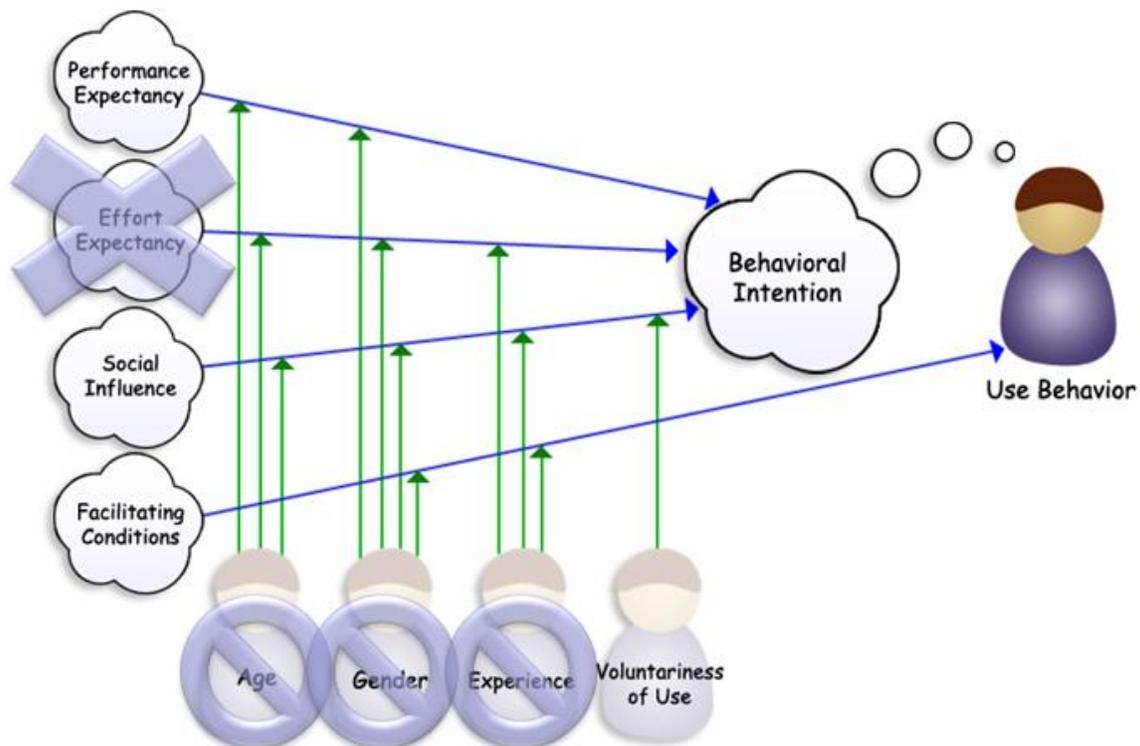
Figure 5.1. PI-Created initial model adapted from the UTAUT model (Venkatesh et al., 2003) with regards to study findings.

Based on the outcome of this study, once the non-significant variables are eliminated, it is revealed that PE, SI, and FC are statistically significant influencers of BI. In an interesting twist, education, an added variable explored in this study, is also revealed as a statistically significant influencer for BI but holds a negative correlation. In other words, with increased education comes decreased behavioral intention to adopt and use the online intervention. A visual demonstration o f this is portrayed in a figure 5.2.
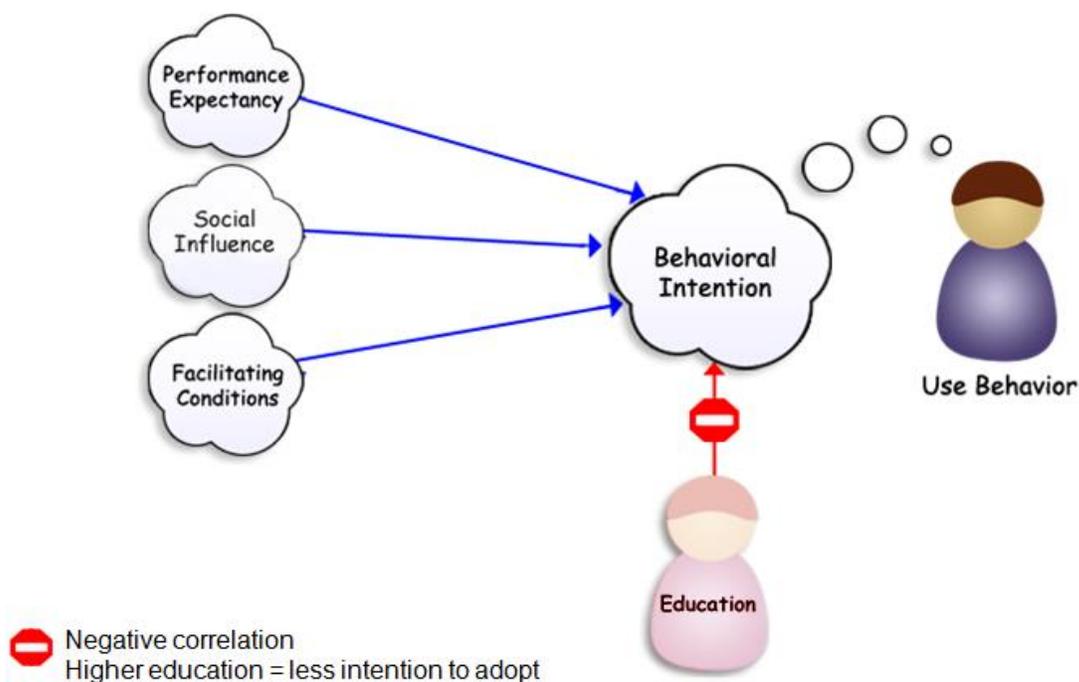
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Figure 5.2. PI-Created revised resultant research model.

Given the revised resultant research model modified from the initial UTAUT framework, it can be interpreted that parents and caregivers are more likely to use a system if: (1) they feel it will improve their performance in managing their child's

behavior; (2) others around them (family, friends, community, etc.) support their use of the system; and (3) certain infrastructure or technical support is in place to assist them if they need help or have questions when using the system. Conversely, parents and caregivers are less likely to demonstrate intention to adopt or use a system if the parents are highly educated.

When taking education into account, this prompts further deliberation of what other factors might come into play in predicting behavioral intention. One model that might expand on the understanding of these results and may contribute to explain the inverse correlation between higher education and behavioral intention is Knowles' principles of andragogy (see figures 2.1 and 2.2). Within the principles of andragogy, many of the characteristics of adult learners seem applicable to parents of children with autism.

- ***Need to know***: When the need arises, parents seek out knowledge to understand their child's condition.

- ***Self concept***: in being self-directed, they take initiative by searching online to look for information

- ***Prior experience***: They refer back to their experiences to reflect on how this knowledge relates to their life.

- ***Readiness to learn***: depending on where their child falls on the autism spectrum, parents determine whether or not this information applies to their family.

- ***Orientation to learning***: typically most parents are only interested in information that is relevant to their situation so the information must address a problem they are facing.

- ***Motivation to learn***: to be motivated parents need to feel that the knowledge they are gaining is worthwhile and beneficial in helping them deal with their child's autism.

Linking the principles of andragogy back to UTAUT, highly educated parents who attempt to use an online intervention program will not easily accept what is given to them on screen and apply them. Autism is a spectrum so it manifests differently for every child. They seek greater interaction so they can challenge, interpret, and react to make sure the content applies to their child appropriately. This results in a modification to the resultant UTAUT model as shown in figure 5.3.
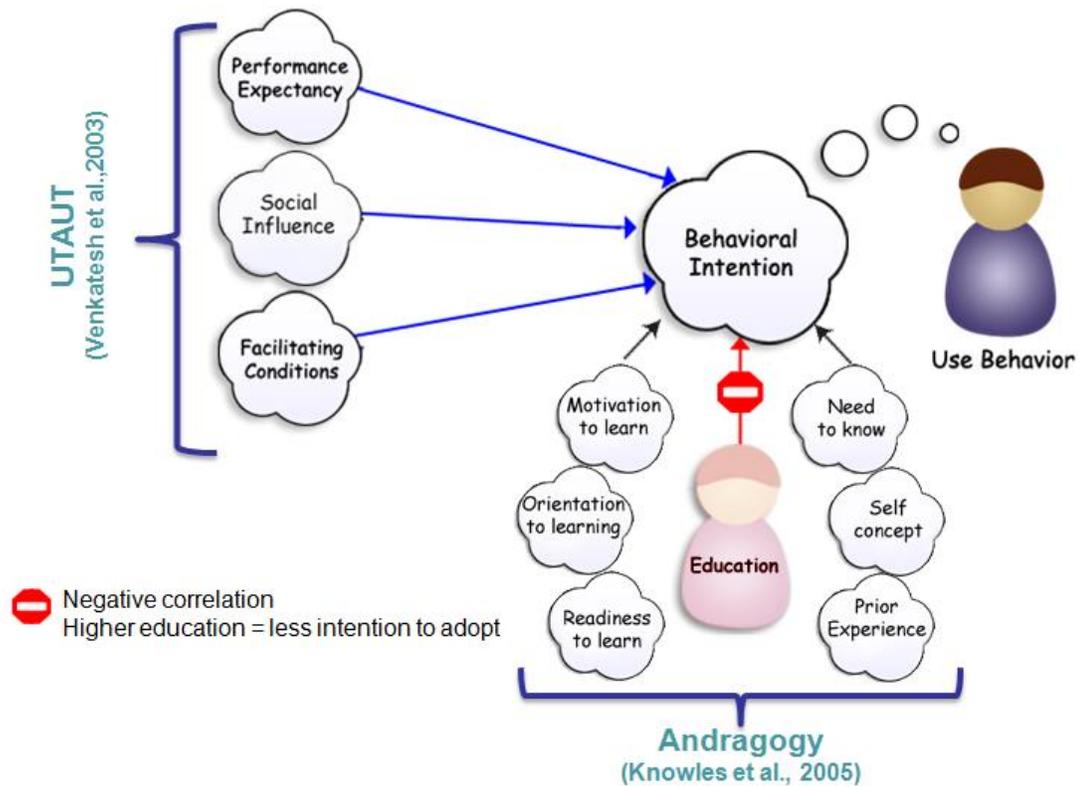
Figure 5.3. PI-Created resultant research model incorporating UTAUT concepts and andragogy principles.

For the objectives of this research, andragogy can help our understanding since it may explain the phenomenon of education having an inverse relationship with behavioral intention. Andragogy explains how adults learn and what drives their learning process. Adults and those in particular who seek higher education tend to be more critical with the material they are learning and do not easily adopt an idea or concept without questioning. As a result, the model shown in figure 5.3 captures the engagement element that andragogy embodies and enhances the UTAUT model. Each

theory individually is insufficient but when combined, they explain more in this population than either theory can by itself.

Discussion of Results in Relation to the Literature

It was anticipated that all four UTAUT variables (PE, EE, SI, FC) would be statistically significant predictors of behavioral intention to adopt an online intervention technology for parents of children with autism. However, only three out of the four variables came out significant. In 2007 a study by Wu, Tao, and Yang found the same three variables were key influencing factors in adopting 3G technologies. This study found that the factors that significantly influenced behavioral intention include performance expectancy, social influence, and facilitating conditions, while effort expectancy did not. Similarly, a 2014 study by Sun and Lu also support the significance of performance expectancy and social influence and add site credibility as one of the key influencing factors in adopting the use of a healthcare website.

On the other hand, among the findings that were not expected in this study is that age and technology experience had no significant influence. This finding is in contrast with a 2015 study by Magsamen-Conrad et al., in which they did find age and experience to play a statistically significant role in behavioral intention. One novel finding was that effort expectancy or "user friendliness" of technology had no significant influence on behavioral intention. This suggests that parents do not seem to be concerned about the complexity of the online intervention. This may imply that they are willing to use a system or program if they feel that it will provide a strong benefit making the effort to use the system worthwhile.

Overall, UTAUT explains part of what is happening in terms of what leads up to behavioral intention to adopt a web-based intervention technology but it does not provide the full picture. Andragogy steps in to further elucidate the adult learning process in determining intention to adopt an intervention. A study by Chesbro and Davis (2002) found that andragogy can be applied to the process of education-based intervention with older adults, specifically to individualized osteoporosis education. Another study also emphasized the role of andragogy when applied to aural rehabiilitation (Brueggeman, 2005). The literature highlight that there is a logical connection between principles of andragogy and technology acceptance (Marshall, Mills, & Olsen, 2008).

Limitations

Although a great deal of care was taken in each step of this study, there were some limitations that need to be considered in order to evaluate it from a comprehensive point of view. Among the limitations is generalizability. Since nonpurposive sampling was used, the generalizability of the findings is limited to the scope of the study. Another limitation is the fact that actual usage was not measured but the intention to use was measured instead. Even though intention is a reliable predictor of usage, measuring the user conceptions during or after actual use may reveal an different outcome. Additionally, the research design, which implemented a correlational approach, could be factored in as a limitation since using an alternative research design may generate different results. Finally, cultural bias may also be

observed as another limitation. Most participants were from Western countries which have access to resources for autism management and support. It is inconclusive to suggest that the same outcome would apply in other regions where there may not be as many autism resources and support available and would benefit from having online access to these resources.

Implications of the Results for Practice

In considering how these findings would apply for practical use, program developers should take these findings into consideration to maximize the acceptance and the success of utilizing intervention technologies targeted to parents and caregivers of children with autism. For researchers, the conclusions of the study with regards to the item and scale construction should not be copied blindly across various online intervention technologies and web-based systems. This is because it is important to take into account the limitations of the study and how they may not translate across all parents and caregivers or all online intervention programs.

Recommendations for Further Research

To expand on the findings and increase our understanding of using online platforms for families of children with autism, further research is needed. It would be useful to replicate the study on different populations. Despite the diverse global sample size, most respondents came from the US and while the US is extremely well-

developed technologically, the results of this study should be confirmed with a larger

sample size, an assortment of ages, and across a variety of cultures. It would be

particularly useful to investigate areas that are technologically well-developed but

lacking in autism resources and support. Expanding in minimally represented regions

may also help to reveal if a cultural bias exists.

Another suggestion is to investigate pre and post use of an online program. This

approach would be useful to determine if there is a change in behavioral intention pre

and post use of the online intervention technology. Additionally, future research should

examine qualitative aspects with open ended questions. What would motivate parents

to use an online program? What would deter parents from using an online program?

What is their previous experience, if any, in using an online program for autism behavior

management? Answers to these and similar types of questions would allow for deeper

insight into parents and caregivers' beliefs about using an online program. Future

research should also examine other variables in predicting technology adoption. Other

variables to consider may include self-efficacy, attitude towards technology, perceptions

of quality content received from an online program as opposed to in-person

consultations, perceived costs in using a web-based system, and credibility among

other aspects to explore.

Conclusion

In summary parents and caregivers of children with autism have struggled to

understand and connect with their child. This struggle has led to difficulty in coping with

the strains of raising a child with autism. Children who receive early intensive treatment demonstrate substantial and sustained progress in communication, adaptive behavior, and social skills. The involvement of parents and caregivers in early intervention strategies amplifies progress in children while empowering parents as they gain greater confidence in handling their child. Further exploration and research on the use of online training for parents in early intervention methods can illuminate understanding and provide insight into the usability and applicability of parents utilizing the training.

Through this study, it is now understood that education plays a significant inverse role in influencing parents' and caregivers' intention to utilize online training. It is also understood that performance expectancy, social influence, and facilitating conditions must be taken into account to increase intention to adopt and utilize online training. Conversely, age, gender, technical experience and effort expectancy do not need to be taken into account to increase intention to adopt and utilize online training.

Parent training in early intervention considers the wellbeing of the family as paramount as it offers greater support for the family and avoids the temptation of viewing the child as if they exist in isolation. Thus, it is necessary to understand the needs of parents of autistic children since many parents feel helpless or unable to connect with their children, provide for them, and properly care for them. Increasing access to parent training is key to enabling parents to deal with the behavioral challenges of autism and help restore and maintain family stability.
Online parent training gives us a starting point to empowering parents to manage their children's condition.

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APPENDICES

Appendix A

Letters of Solicitation / Recruitment

A1 Participant Solicitation Letter

A2 Participant Recruitment Flyer

A3 Participant Reminder Letter

Appendix A1

Participant Solicitation Letter

Study Title: *Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)*

Dear Parent or Caregiver:
My name is Marwah Zagzoug. I am a doctoral student at Seton Hall University in the Department of Interprofessional Health Sciences & Health Administration. I am carrying out the study mentioned above as part of my dissertation requirement for the PhD in Health Sciences degree.

Purpose
You are invited to take part in this study to share your thoughts on using online programs designed for parents and caregivers of children with autism.

Procedure
You will be asked to complete one questionnaire. It consists of the following sections:
- Part 1: technology experience and knowledge of *Applied Behavior Analysis* (ABA).
- Part 2: perceptions on using online ABA programs.
- Part 3: demographic information.

Answer the survey based on your point of view. Please respond candidly to all questions. It is important to answer each section completely.

Time
This survey will only take 10 minutes to complete.

Decision to Join the Study
Taking part in this study is your choice. You may decide at any time not to take part in the study. There is no penalty if you withdraw or change your mind.

Anonymity
Your responses will be completely anonymous. You will not be asked for your name anywhere on the survey.

Confidentiality
Your privacy will be protected throughout the study. The information you provide will be coded. All data is stored on a password protected USB memory key. It will remain in a secured filing cabinet for three years. After this time, the data will be destroyed.

How to Get Started
The survey is available on *QuestionPro*. Completing the survey indicates your consent to take part in this study. The survey link is: http://abaonline.questionpro.com

Contact Information
For questions about this study, please contact the principle investigator, Marwah Zagzoug (zagzouma@shu.edu), through the Department of Interprofessional Health Sciences & Health Administration in the Seton Hall University School of Health and Medical Sciences.
For questions about the rights of research participants, please can contact Dr. Mary Ruzicka, Chair of the Institutional Review Board, in the office of IRB at Seton Hall University at 973-313-6314.

Thank you for your consideration. Your opinions will contribute to the success of this study.

Appendix A2

Participant Recruitment Flyer

Research Study

SCHOOL OF HEALTH
AND MEDICAL SCIENCES
SETON HALL UNIVERSITY

Are you a parent or primary caregiver of a child with autism?

If so, please consider taking part in this study:

Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)

You are invited to take part in this study to share your thoughts on using an online program designed for parents and caregivers of children with autism. You will be asked to complete a short 10-minute questionnaire.

How to Get Started
Visit http://abaonline.questionpro.com
Or scan the QR code on the right to learn more.
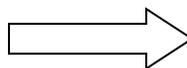
If you know someone who is a parent or caregiver of a child with autism, please tell them about this study and share the link

Your opinions will contribute to the success of this study!

For questions about this study, please contact the principle investigator, Marwah Zagzoug (zagzouma@shu.edu), through the Department of Interprofessional Health Sciences & Health Administration in the Seton Hall University School of Health and Medical Sciences.

For questions about the rights of research participants, please can contact Dr. Mary Ruzicka, Chair of the Institutional Review Board, in the office of IRB at Seton Hall University at 973-313-6314.

Appendix A3

Participant Reminder Letter

Research Study

SCHOOL OF HEALTH
AND MEDICAL SCIENCES
SETON HALL UNIVERSITY

Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)

Dear Participant:

This is a friendly reminder to please take a moment to fill out this very important survey. If you have already completed the survey, thank you for your timely cooperation and please ignore this reminder.

You are invited to take part in this study to share your thoughts on using online programs designed for parents and caregivers of children with autism.

You will be asked to complete a 10-minute questionnaire, which consists of the following sections:
- Part 1: technology experience and knowledge of *Applied Behavior Analysis* (ABA).
- Part 2: perceptions on using online ABA programs.
- Part 3: demographic information.

Answer the survey based on your point of view. Please respond candidly to all questions. It is important to answer each section completely.

How to Get Started
Visit http://abaonline.questionpro.com
Or scan the QR code on the right to learn more.
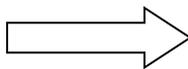
If you know someone who is a parent or caregiver of a child with autism, please tell them about this study and share the link

For questions about this study: please contact the principle investigator, Marwah Zagzoug (zagzouma@shu.edu), through the Department of Interprofessional Health Sciences & Health Administration in the Seton Hall University School of Health and Medical Sciences.

For questions about the rights of research participants: please can contact Dr. Mary Ruzicka, Chair of the Institutional Review Board, in the office of IRB at Seton Hall University at 973-313-6314.

Thank you. Your opinions will contribute to the success of this study!

Appendix B

Letter of Permission to Conduct Research Study

Appendix B

Letter of Permission to Conduct Research Study

RE: Permission to Conduct Study

Dear Director:

I am a doctoral student at Seton Hall University in the Department of Interprofessional Health Sciences & Heath Administration. I am writing my dissertation under the direction of my dissertation committee chaired by Dr. Deborah DeLuca.

As part of the approval process by Seton Hall University Institutional Review Board, I am required to obtain gatekeeper permission from sites where I recruit participants. Thus, I would like your permission to reach out to your members to conduct my research study. Specifically, I would like to access your population of parents, guardians, and/or caregivers of autistic children to conduct this research.

The purpose of the study is to gain insight into the acceptance of using online programs geared for parents and caregivers of children with autism and to evaluate their willingness to adopt such intervention with their children for behavioral management. The project merely consists of taking a short online survey that can be answered by participants within approximately 10 minutes.

If you approve, I will follow-up with a participant solicitation letter to distribute to your members. This letter will include the website link which will take them to the online survey.

If this is acceptable to you, a paper or electronic letter indicating your approval would assist me in fulfilling Seton Hall University's Institutional Review Board requirements and allow me to proceed with my scholarly pursuits. If there is more formal paperwork to be completed or you have further questions, please feel free to contact me.

Your timely consideration and assistance are greatly appreciated.

Sincerely,

Marwah Zagzoug, MSHS
Principal Investigator

Appendix C

Letters of Approval

C1 Letter of Approval from Dr. Venkatesh to use UTAUT

C2 Letter of Approval from ASAP-A Step Ahead Program, LLC

C3 Letter of Approval from ABA4U

C4 Letter of Approval from Seton Hall University IRB

Appendix C1

**Letter of Approval from
Dr. Venkatesh to use UTAUT**

RE: Permission to use UTAUT

Viswanath Venkatesh <vvenkatesh@vvenkatesh.us>

Sun 1/25/2015 2:50 AM

Inbox

Mark as unread

To: ☐ Marwah Zagzoug;

Thanks for your interest. I am sorry for the delayed response which is due to a hectic travel schedule.

You have my permission.

You will find related papers at: http://vvenkatesh.com/Downloads/Papers/fulltext/downloadpapers.htm

You may also find my book (that can be purchased for a significant student discount and faculty member discount) to be of use: http://vvenkatesh.com/book

Hope this helps.

Sincerely,
Viswanath Venkatesh
Distinguished Professor and George and Boyce Billingsley Chair in Information Systems
Walton College of Business
University of Arkansas
Fayetteville, AR 72701
Phone: 479-575-3869; Fax: 479-575-3689
Email: vvenkatesh@vvenkatesh.us
Website: http://vvenkatesh.com

From: Marwah Zagzoug [mailto:███████████.shu.edu]
Sent: Friday, January 16, 2015 2:05 AM
To: vvenkatesh@vvenkatesh.us
Subject: Re: Permission to use UTAUT
Importance: High

Dear Dr. Venkatesh:

I am a doctoral student at Seton Hall University in the Department of Interprofessional Health Sciences & Heath Administration. I am writing my dissertation under the direction of my dissertation committee chaired by Dr. Deborah DeLuca. I am seeking permission/acknowledgement that you are aware that I will be using the UTAUT survey tool and will give credit as appropriate. I will include full proper citation of the material and will use this survey only for the research study with the accordance that no other reproduction or distribution will take place.

If this is acceptable to you, a paper or electronic letter indicating your approval would assist me in fulfilling Seton Hall University's Institutional Review Board requirements and allow me to proceed with my scholarly pursuits.

If there is more formal paperwork to be completed or you have further questions, please feel free to contact me. Your timely consideration and assistance are greatly appreciated.

Sincerely,

Marwah Zagzoug
PhD Research Candidate
Department of Interprofessional Health Sciences and Health Administration
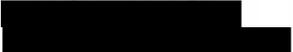School of Health and Medical Sciences
Seton Hall University

APPENDIX C-2

**Letter of Approval from
ASAP-A Step Ahead Program, LLC**
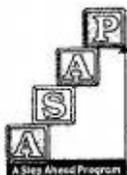
ASAP-A Step Ahead Program, LLC
33 Joss Way
Millington, NJ 07946
Phone: 908-542-0002 Fax: 908-542-0001
www.asapprogram.org

Marwah Zagzoug, MSHS
Principal Investigator

██████████

Date: 02/25/2015

RE: Authorization to Conduct Study and/or Access Membership

Dear Marwah Zagzoug,

Thank you for your interest in conducting research in the area of autism and online Applied Behavior Analysis (ABA) and for contacting us to be part of this very important work.

Our organization, ASAP – A Step Ahead Program, LLC, is more than willing to assist you with your PhD research work, and would be happy to announce your work to our clients through an e-mail notification as well as alert our affiliate(s) to your need for membership participation.

Thank you for considering ASAP – A Step Ahead Program, LLC for inclusion in this research effort and we look forward to contributing to this endeavor.

Sincerely,

Lina Slim-Topdjian, PhD, CCC-SLP, BCBA
Founder/ Executive Director of Educational and Behavioral Services
l.slim-topdjian@asapprogram.org
Phone: 908-542-0002

APPENDIX C-3

Letter of Approval from ABA4U

Marwah Zagzoug, MSHS

Principal Investigator

February 9, 2015

RE: Authorization to Conduct Study and/or Access Membership

Dear Marwah Zagzoug,

Thank you for your interest in conducting research in the area of autism and online Applied Behavior Analysis (ABA) and for contacting us to be part of this very important work.

ABA4You is more than willing to assist you with your PhD research work, and would be happy to announce your work to our patients through an e-mail notification as well as alert our affiliate(s) to your need for membership participation.

Thank you for considering ABA4You for inclusion in this research effort and we look forward to contributing to this endeavor.

Sincerely,
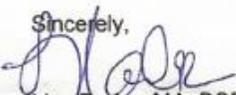
Lisa Rader, MA, BCBA
Executive Director
lrader@aba4unj.com

APPENDIX C-4

Letter of Approval from Seton Hall University IRB

SETON HALL ∎∎∎ UNIVERSITY.
1 8 5 6

May 27, 2015

Marwah Zagzoug

█████████

Dear Ms. Zagzoug,

The Seton Hall University Institutional Review Board has reviewed your research proposal entitled "Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)" and has categorized it as exempt.

Enclosed for your records is the signed Request for Approval form.

Please note that, <u>where applicable</u>, subjects must sign and must be given a copy of the Seton Hall University current stamped Letter of Solicitation or Consent Form before the subjects' participation. All data, as well as the investigator's copies of the signed Consent Forms, must be retained by the principal investigator for a period of at least three years following the termination of the project.

Should you wish to make changes to the IRB approved procedures, the following materials must be submitted for IRB review and be approved by the IRB prior to being instituted:

- Description of proposed revisions;
- *If applicable*, any new or revised materials, such as recruitment fliers, letters to subjects, or consent documents; and
- *If applicable*, updated letters of approval from cooperating institutions and IRBs.

At the present time, there is no need for further action on your part with the IRB.

In harmony with federal regulations, none of the investigators or research staff involved in the study took part in the final decision.

Sincerely,

Mary F. Ruzicka, Ph.D

Mary F. Ruzicka, Ph.D.
Professor
Director, Institutional Review Board

Office of Institutional Review Board
Presidents Hall · 400 South Orange Avenue · South Orange, New Jersey 07079 · Tel: 973.313.6314 · Fax: 973.275.2361 · *www.shu.edu*

A   HOME   FOR   THE   MIND,   THE   HEART   AND   THE   SPIRIT

Appendix D

Online Survey

D0 Survey Solicitation Message

D1 PI-Created Survey Part 1: Technology and ABA Knowledge

D2 Survey Part 2: Online ABA UTAUT

D3 PI-Created Survey Part 3: Demographics Information

D4 PI-Created Survey Thank You Page

D5 PI-Created Survey Instrument Constructs (Item) Measurements

Appendix D0

Survey Solicitation Message

Research Study

SCHOOL OF HEALTH AND MEDICAL SCIENCES
SETON HALL UNIVERSITY

Exploring Acceptance of Using an Online Platform to Teach Parents of Children with Autism Methods in Applied Behavior Analysis (ABA)

Welcome

Dear Parent or Caregiver,
You are invited to take part in this study to share your thoughts on using an online program designed for parents and caregivers of children with autism.

Purpose: The purpose of the study is to find out how parents and caregivers respond to using an online program to learn Applied Behavior Analysis (ABA).

Time: The questionnaire will take no more than 10 minutes of your time.

Procedure:
You will be asked to complete one questionnaire. It consists of the following sections:
• Part 1: technology experience and knowledge of *Applied Behavior Analysis* (ABA).
• Part 2: perceptions on using online ABA programs.
• Part 3: demographic information.

Answer the survey based on your point of view. Please respond candidly to all questions. It is important to answer each section completely.

Decision to Join the Study: Taking part in this study is your choice. You may decide at any time not to take part in the study. There is no penalty if you withdraw or change your mind.

Anonymity: Your responses will be completely anonymous. You will not be asked for your name anywhere on the survey.

Confidentiality: Your privacy will be protected throughout the study. The information you provide will be coded. All data is stored on a password protected USB memory key. It will remain in a secured filing cabinet for three years. After this time, the data will be destroyed.

Contact:
For questions regarding this survey, please contact the principal investigator, Marwah Zagzoug (zagzouma@shu.edu), through the Department of Interprofessional Health Sciences & Health Administration in the Seton Hall University School of Health and Medical Sciences. For questions regarding the rights of research participants, please contact Dr. Mary Ruzicka, Chair of the Institutional Review Board, in the office of IRB at Seton Hall University at 973-313-6314.

Thank you. Your opinions will contribute to the success of this study.

Please start the survey now by clicking on the Continue button below.

Continue

This study is part of a doctoral dissertation at Seton Hall University in the Department of Interprofessional Health Sciences & Health Administration.

Appendix D1
PI-Created Survey Part 1

Survey Part 1: Technology and ABA Knowledge

Part 1 of 3: Technology Experience and Knowledge of Applied Behavior Analysis (ABA)

How would you rate your computer skills? *

- ○ Novice
- ○ Basic
- ○ Average
- ○ Advanced
- ○ Expert

How comfortable are you with using the following:

	Very Uncomfortable	Somewhat Uncomfortable	Neutral	Somewhat Comfortable	Very Comfortable
Desktop Computer	○	○	○	○	○
Laptop Computer	○	○	○	○	○
Tablet Computer	○	○	○	○	○
Mobile Phone / Smartphone	○	○	○	○	○

Please indicate your level of interest to each of the following:

	Not at All Interested	Slightly Interested	Moderately Interested	Very Interested	Highly Interested
Interest in learning strategies to manage behavior in children with autism	○	○	○	○	○
Interest in learning ABA to manage behavior in children with autism	○	○	○	○	○
Interest in using an online program to manage behavior in children with autism	○	○	○	○	○

Please indicate if you have received any type of training in Applied Behavioral Analysis or ABA (Select all that apply):

- ☐ No training
- ☐ On-site training center
- ☐ Workshop or seminar
- ☐ Other (Please specify) [_____]

- ☐ University or college course
- ☐ At-home consultation
- ☐ Online courses / modules

[Continue]

This study is part of a doctoral dissertation at Seton Hall University in the Department of Interprofessional Health Sciences & Health Administration.

Appendix D2

Survey Part 2: Online ABA UTAUT

Note: if you have any questions or need further info on how the UTAUT was utilized in this study please contact marwah.zagzoug@gmail.com.

Appendix D3
PI-Created Demographic Survey

Survey Part 3: Demographic Information

Questions marked with an * are required to be answered

Part 3 of 3: Demographic Questions

The following section asks for demographic information. This information is necessary for research purposes and will be used in analysis of research data only.

What is your gender? *
- ○ Male
- ○ Female
- ○ Prefer not to answer

Which category describes your age? *
- ○ 18–20
- ○ 21–30
- ○ 31–40
- ○ 41–50
- ○ 51–60
- ○ 61 or older
- ○ Prefer not to answer

Your marital status is:
- ○ Single
- ○ Married
- ○ Divorced
- ○ Separated
- ○ Widowed
- ○ Living with partner
- ○ Prefer not to answer

How would you describe yourself?
- ○ American Indian or Alaska Native
- ○ Arab or Middle Eastern
- ○ Asian
- ○ Black or African American
- ○ Hispanic or Latino
- ○ Native Hawaiian or Other Pacific Islander
- ○ White or Caucasian
- ○ Prefer not to answer
- ○ Other (Please specify) [_____]

Your highest level of education completed is: *

- ○ High School
- ○ Some College
- ○ Trade/Vocational/Technical
- ○ Associates Degree
- ○ Bachelors Degree
- ○ Other (Please specify)

- ○ Masters Degree
- ○ Professional Degree
- ○ Doctorate Degree
- ○ Prefer not to answer

Your current employment status is:

- ○ Self-employed
- ○ Part-time employed
- ○ Full-time employed
- ○ Homemaker
- ○ Student

- ○ Unemployed
- ○ Retired
- ○ Military
- ○ Prefer not to answer

What is your relationship to the child with autism?

- ○ Mother
- ○ Father
- ○ Step-Mother
- ○ Step-Father
- ○ Adoptive-Parent
- ○ Grandmother
- ○ Other (Please specify)

- ○ Grandfather
- ○ Aunt
- ○ Uncle
- ○ Non-related caregiver
- ○ Prefer not to answer

Which of the following best describes the type of area you live in?

- ○ Urban
- ○ Suburban
- ○ Rural

Research shows there is a relationship between income level and ease of access to various healthcare and educational resources (Montes & Halterman, 2008). Please indicate which of the following best describes your annual income level.

- ○ $0–$24,999
- ○ $25,000–$49,999
- ○ $50,000–$74,999
- ○ $75,000–$99,999
- ○ $100,000–$124,999

- ○ $125,000–$149,999
- ○ $150,000–$174,999
- ○ $175,000–$199,999
- ○ $200,000 and up
- ○ Prefer not to answer

Appendix D4
PI-Created Thank You Page

Survey Thank You Page

This survey is now complete. Your participation is appreciated!

Thank you for contributing to the success of this study!

If you know someone who is a parent or caregiver of a child with autism, you can share this survey with them by giving them this link (http://abaonline.questionpro.com) or you can click the icons below to share this survey on Facebook or Twitter.

SHARE THIS SURVEY:

Powered By **QuestionPro**

Appendix D5
PI-Created Measurement Rubric

Survey Instrument Construct (Item) Measurements

PI-Created Survey Instrument Construct (Item) Measurements Rubric

Indicator	Description	Scale of Measurement	Type
	Demographic Information		
NA	Gender	Nominal	Control Variable
NA	Age	Ordinal	Control Variable
NA	Marital Status	Nominal	Control Variable
NA	Ethnicity	Nominal	Control Variable
NA	Education level	Ordinal	Control Variable
NA	Employment status	Nominal	Control Variable
NA	Relation to child with autism	Nominal	Control Variable
NA	Type of area you live in	Nominal	Control Variable
NA	Annual income	Ordinal	Control Variable
NA	How would you rate your computer skills	Ordinal	Control Variable
NA	How comfortable are you in using a desktop	Ordinal	Control Variable
NA	How comfortable are you in using a laptop	Ordinal	Control Variable
NA	How comfortable are you in using a tablet	Ordinal	Control Variable
NA	How comfortable are you in using a mobile/smart phone	Ordinal	Control Variable
NA	Interest in learning strategies to manage behavior	Ordinal	Control Variable
NA	Interest in learning ABA to manage behavior	Ordinal	Control Variable
NA	Interest in using an online program to manage behavior	Ordinal	Control Variable
NA	Indicate if you have received any type of training in ABA	Nominal	Control Variable

Indicator	Description	Type
	UTAUT Measurements - Performance Expectancy	
PE1	Using online ABA training in managing my child's behavior increases my productivity	1-5 Likert Scale
PE2	Using online ABA training in managing my child's behavior enables me to achieve things that are important to me	1-5 Likert Scale
PE3	I find using online ABA training in managing my child's behavior useful	1-5 Likert Scale
PE4	Using online ABA training in managing my child's behavior helps me accomplish things more quickly.	1-5 Likert Scale

Indicator	Description	Type
	UTAUT Measurements - Effort Expectancy	
EE1	I find online ABA programs easy to use	1-5 Likert Scale
EE2	Learning how to use online ABA training is easy for me	1-5 Likert Scale
EE3	My interaction with online ABA training is clear and understandable	1-5 Likert Scale
EE4	It is easy for me to become skillful at using an online ABA training program	1-5 Likert Scale

Indicator	Description	Type
	UTAUT Measurements - Social Influence	
SI1	My family supports the use of online ABA training to manage my child's behavior	1-5 Likert Scale
SI2	My friends think that I should use online ABA training	1-5 Likert Scale
SI3	People whose opinions I value suggest that I use online ABA training to manage my child's behavior	1-5 Likert Scale
SI4	People who are important to me think I should use online ABA training to manage my child's behavior.	1-5 Likert Scale

Indicator	Description	Type
	UTAUT Measurements - Facilitating Condition	
FC1	I can get help from others when using online ABA training	1-5 Likert Scale
FC2	I have the knowledge necessary to use online ABA training	1-5 Likert Scale
FC3	Using online ABA training is compatible to other systems I use	1-5 Likert Scale
FC4	I have the resources necessary to use online ABA training to manage my child's behavior.	1-5 Likert Scale

Indicator	Description	Type
	UTAUT Measurements - Behavioral Intention	
BI1	I intend to use online ABA training in the future	1-5 Likert Scale
BI2	I am determined to use online ABA training in the future	1-5 Likert Scale
BI3	I plan to use online ABA training in the future	1-5 Likert Scale

Appendix E

**PI-Created and Idealized
Flowchart Procedural Methodology and Data
Collection Process**

Flowchart Procedural Methodology and Data Collection Process