

A Study of Current Interventions and Professional Development Interests of Teachers
of Early Childhood Special Education for Children with Autism Spectrum Disorders

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Maria L. Balbo

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Jennifer York-Barr, Ph.D., Adviser

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Dedication

I would like to dedicate this dissertation to all of those who inspired and persevered with me through the doctoral process. Without support of others, completing this doctorate program would have been utterly impossible.

First of all, to my husband, Peter, I give you my wholehearted thanks for all of the patience, understanding, sacrifice, and encouragement you gave me to reach this goal. I could not have gotten to this point without your partnering with me in keeping my nose to the grindstone to stay on course and picking up slack for my responsibilities at home. In addition, I want to thank my children for their own personal sacrifices in terms of time and energy that may have been taken away from them in pursuit of my personal journey. So, to Jessica, Alysha, Tracy, Deb, and families, thanks for the support and understanding you have given.

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Abstract

Although research-based interventions for young students with Autism Spectrum Disorders exist and are supported in the literature, early intervention teachers in public schools often lack knowledge and training in the adoption and proper use of these effective-intervention interventions. The purpose of this study was to investigate current interventions and professional development interests of early childhood special education teachers of children with Autism Spectrum Disorders (ASD) in Minnesota. This study employed a descriptive methodology utilizing an online, web-based survey to gather information from four separate groups representing all regions in the state: early childhood special education teachers, early childhood special education coordinators, special education directors, and regional autism consultants.

Results indicate that research-based interventions for young children with Autism Spectrum Disorder are implemented at a low level of frequency across the state. The top rated past learning methods that had supported early childhood special education teachers in their knowledge of research-based interventions were identified as: experience in the classroom with other ASD students, experience with other children with disabilities, and workshops/in-services. The top rated future learning methods to advance knowledge of ASD interventions were: learning with other colleagues, workshops/in-services, and mentoring by autism teachers. Leading barriers found to prevent early intervention teachers in accessing training in the area of Autism Spectrum Disorders were found to be: inability to take time away from the classroom, cost of training, and shortage of training funds.

Keywords: early intervention, Autism Spectrum Disorders, research-based interventions, research-based interventions, professional development

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Chapter 1

Introduction

Autism is a spectrum disorder that begins in infancy or the toddler years and is defined by deficits in three core areas of development: social development, communication, and repetitive behaviors or interests (Lord, Risi, DiLavore, Shulman, Thurm, & Pickles, 2006; Humphrey & Parkinson, 2006). Autism is considered a spectrum disorder because individuals on the autism spectrum can vary significantly in the degree to which behaviors or characteristics manifest. Those at the lower end of the spectrum, and who may be considered as having classic autism, may fail to develop functional speech and often have additional learning disabilities. At the other end of the spectrum are those with high-functioning autism and Asperger's Syndrome, who usually develop adequate cognitive and linguistic abilities. Autism and autism spectrum disorders (ASD) are lifelong neurodevelopmental disorders (Francis, 2005).

In 2009, the Centers for Disease Control and Prevention released statistics on the prevalence rate of ASD in the United States. These statistics found that 1 in 110 births in the United States was identified as on the autism spectrum, making ASD the fastest-growing developmental disability in the United States, with an annual growth of between 10% and 17% and an increase of 172% during the 1990s. This increase has considerable implications for school districts as they experience increased numbers of students with ASD who require special education services.

Jabrink & Knapp (2001) estimate that the cost of lifelong care for individuals with ASD can be reduced by two-thirds with early diagnosis and early intervention. The growth in numbers of students identified with ASD has impacted early intervention

programs since early identification of children under age 3 has become more prevalent. To date, there is no known cure for or cause of ASD; Howlin (1997) argues that “appropriate structured educational programs and management in the early years can play a significant role in enhancing functioning in later life” (as cited in Dahle, 2003).

Some studies indicate that children who participate in intensive interventions beginning by age 3 have a significantly better outcome than those whose intervention begins after age 5 (Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris & Handleman, 2000, as cited in Woods & Wetherby, 2003; McGee, Morrier, & Daly, 1999). These intervention findings suggest the need to identify and provide programming for children identified with ASD as early as possible.

Researched-based educational interventions for young students with ASD are supported in the literature (Simpson, 2005). Hurth, Shaw, Izeman, Whaley, and Rogers (1999) concluded that, although effective educational interventions for young children with ASD exist, Early Childhood Special Education (ECSE) teachers do not always use and implement these interventions with students with ASD. Instead of employing researched-based interventions, teachers may use interventions that have no research base and that have no positive effect on these students with specialized needs. Therefore, the increased incidence of children identified with ASD, combined with earlier identification, has resulted in the need for ECSE teachers to gain awareness of the early signs of autism in children referred to them for evaluation. Furthermore, once identified, ECSE teachers need to become more aware of and more adept at the implementation of research-based interventions for students with ASD.

The gap between the existence of research-based interventions for young children with ASD and the barriers to implementation of those effective interventions by ECSE teachers is central to this study. Several barriers to implementation of research-based interventions are addressed in Chapter 2, such as the effect of teacher shortages (Simpson, 2004; National Research Council, 2001; Ludlow, Conner, & Schechter, 2005) in special education. The National Research Council (2001) concluded that personnel preparation is varied and remains one of the weakest elements of effective programming for students with ASD. Roberts and Prior (2006) found that teachers are given little planning time, while inadequate technical support was noted as a contributing factor by Schwartz, Sandall, McBride, and Boulware, (2004), and Humphrey and Parkinson (2006). Colleges have been slow to implement programs in low-incidence areas, such as autism, due to the expense involved (Scheuermann, Webber, Boutot, & Goodwin, 2003).

Yell, Drasgow, and Lowrey (2005) suggest that teacher trainers, leaders, and coordinators must be connected to research and prepare students and colleagues to discriminate between research-based interventions and testimonials or unproven methods or interventions. They go on to state that research-based interventions will not affect student achievement until they are actually implemented in the classroom. The National Research Council report, *Educating Children with Autism* (2001), indicates that most teachers receive relatively little, if any, formal instruction in research-based interventions for children with ASD. Lerman, Vorndran, Addison, and Kuhn (2004) concluded that “Models for transferring a broad range of research findings on best interventions for children with autism to current public school teachers have received little attention in the literature” (p. 511).

Statement of the Problem

Although research-based interventions for young students with ASD exist and are supported in the literature, ECSE teachers in public schools often lack knowledge of and training in the adoption and proper use of these effective-intervention strategies. Thus, young students with ASD may fail to achieve outcomes that fully reflect their capabilities. This is a problem for the following reasons:

- Students may be exposed to intervention and treatments that lack efficacy and result in poor responses to intervention and treatment efforts.
- ECSE teachers are ill-equipped and incorporate unproven methods that may encourage unhealthy, unrealistic, and improbable expectations—and may waste valuable brain development time.
- Politically, at a time steeped in accountability, school districts need to move in the direction of research-based intervention for the potential increase in all students' outcomes.
- Contesting the methodology used with students with autism is the fastest growing area of litigation in special education, according to Baird (1999, as cited in Iovannone, Dunlap, Huber & Kincaid, 2003).

This problem potentially impacts several major stakeholders, including: students with ASD, parents, ECSE teachers, regular education teachers, administrators, staff development coordinators, school districts, higher education personnel, policy makers, and taxpayers.

Purpose of the Study

The study's purpose was to determine factors that influence the implementation of research-based interventions by ECSE teachers of students with ASD in Minnesota. This study sought to discover the extent to which ECSE teachers have knowledge of research-based interventions for students with ASD. In addition, this study investigated potential barriers to implementation of research-based interventions in Minnesota, as well as inquired about how ECSE teachers obtain training on research-based interventions. Although numerous studies indicate a variety of implementation barriers ECSE teachers face, this study extends the literature by specifically investigating the impact of factors discovered in the literature and compares differences between ECSE teachers in rural versus metro school districts. The researcher sought to discover how ECSE teachers in Minnesota receive information about research-based interventions, what they know of the research-based interventions described in the literature review, how important their perceptions are of research-based interventions, how prepared they feel to implement research-based interventions, what barriers prevent access to ASD training, what their preferred method of training is, and how administrators perceive the issues surrounding training and implementation of research-based interventions. Information was gathered from multiple sources (i.e., ECSE teachers, ECSE coordinators, ASD consultants, and Directors of Special Education).

The Research Questions

- 1) To what extent do currently practicing Early Childhood Special Education teachers implement research-based interventions with children with Autism Spectrum Disorders?

- 2) What learning methods have supported Early Childhood Special Education teachers in their knowledge of research-based interventions for children with Autism Spectrum Disorders?
- 3) What learning methods are preferred by early intervention teachers in advancing their knowledge of Autism Spectrum Disorders?
- 4) What factors have been barriers for Early Childhood Special Education teachers in accessing training in the area of Autism Spectrum Disorders?

Data Collection Methods

A descriptive methodology was employed in this study. The survey method was chosen to gather information about the current status of information and knowledge of ECSE teachers regarding research-based interventions for students with ASD. Surveys are useful in revealing the current status of a target variable (Thomas, 2003), thus an online survey was used to provide breadth of information. The purpose of a typical survey is to collect information from a sample and generalize it to a larger population (Patten, 2005).

The researcher sought information about knowledge and the implementation of research-based interventions in early intervention programs serving children with ASD in Minnesota. Through online surveying samples of targeted audiences, the researcher desired to be able to generalize the perceptions of current interventions of the target audience samples to the larger population of school district personnel in Minnesota. Four different audiences were targeted:

- ECSE teachers
- ECSE coordinators

- Regional autism consultants
- Directors of Special Education

Study Delimitations and Limitations

The design allowed for a variety of data to be collected, providing a more complete picture of the knowledge base of research-based interventions, potential barriers that may prevent their implementation, and training preferences. Input from ECSE teachers, ECSE coordinators, autism spectrum disorder (ASD) consultants, and Directors of Special Education provided valuable perceptions from a variety of sources, thus permitting a clearer understanding of influential factors. Using input from both direct service provider and administrator respondents added depth to the issues involved and allowed comparisons between respondents.

Thomas (2003) states that surveys fail to describe the qualitative features unique to each member of the collective the survey is meant to represent. Although a survey can be an effective means of collecting information, it is limited in its social input. Survey results reflect those who do respond, but not necessarily those who do not. Generalizability must be cautioned when only those who choose to respond have a voice. Using an electronic survey limits respondents to those who are electronically literate and comfortable with completing an online survey.

An email database of all ECSE coordinators, ASD consultants, and Directors of Special Education was available, so response rates were tabulated. However, there were more than 800 ECSE teachers licensed in Minnesota, although it was unknown how many ECSE teachers were actually practicing. Therefore, access to ECSE teachers was gained through contact with their respective ECSE coordinators. Response rates had to be

calculated for this group, as reliance on the ECSE coordinators to forward the survey to a defined number of ECSE teachers was necessary, thus reliability suffered.

Significance of the Proposed Study

In the review of literature on research-based interventions for young children with ASD, Lerman et al. (2004) argued that little attention has been given in the literature to reviewing models for transferring a broad range of research findings on best interventions for children with autism to public school teachers. Odom, Brantlinger, Gersten, Horner, Thompson, and Harris (2005) stressed that factors leading to the adoption of effective interventions in typical school systems under naturally existing conditions need to be determined and that research would require investigation into organizational factors that facilitate or impede adoption of innovative interventions in local contexts.

The National Research Council (2001) report indicated that relatively little has been written on the task of personnel preparation for providing interventions for children with ASD. This task has been exacerbated by the escalating numbers of children identified with ASD, thus an increase in the number of students with unique, special needs has occurred at the same time as shortages of qualified ECSE teachers. This growing number of students with ASD would benefit from research-based interventions in their educational programming. Striffler and Fire (1999) explained that “State policy makers are beginning to recognize that no matter how progressive their early intervention service systems may be, they will not be effective unless there are competent and qualified personnel to implement them” (p. 50).

This study adds to the knowledge base of research-based intervention research on the topic of early intervention for students with ASD. It informs the field about what

Minnesota ECSE teachers know of research-based interventions for children on the autism spectrum. Further, it explains how current ECSE teachers have received information on research-based interventions and what factors prevent them from accessing training in the implementation of effective interventions. Although the study was conducted only in Minnesota, some generalizations may be made to early intervention programs in other states.

As the identification of children with ASD has increased, so too have the number of contested Individualized Education Plans (Heflin & Simpson, 1998). Contesting the methodology used with students with autism has been the fastest growing area of litigation in special education, according to Baird (1999, as cited in Iovannone et al., 2003). This factor alone lends credibility to the significance of this study. If school districts do not discover where the gap exists for ECSE teachers to implement research-based interventions, school districts could become increasingly vulnerable to litigation—a costly experience in terms of time, finances, and overall resources.

Through collection of data from ECSE teachers, ECSE coordinators, autism consultants, and Directors of Special Education, the perspectives of teachers and administrators were obtained. Information was gathered concerning pre-service training and in-service training specific to ASD. Further insight was gleaned regarding years of teaching experience, teaching licensure, and technical assistance sources. Some data were compared across roles to discover the significance of relationships or discrepancies among type of respondent.

Summary

ECSE teachers in Minnesota and across the nation are faced with the increased challenges of providing intervention services for young children with or suspected of having ASD. Further information was needed to determine how ECSE teachers receive information about research-based interventions, the knowledge base of these effective interventions, preferred learning methods for ECSE teachers, and barriers that prevent them from accessing training in working with young children with ASD. This study informs policy makers about what gaps exist in Minnesota early intervention teacher training to work with the unique challenges presented by this population of students.

Definition of Key Terms

Categorical – Refers to the special education disability categories through which children meet eligibility criteria for special education services.

Curriculum – A planned, sequenced program of study based on knowledge, skills, and disposition standards/competencies (Sandall, Hemmeter, Smith, & McLean, 2005).

Early intervention/early childhood special education – Specialized interventions, knowledge, and skills needed to meet the individualized needs of young children with special needs and their families (Sandall, et al., 2005).

In-service – The process of providing ongoing professional development for professionals and paraeducators in a specific discipline, with the outcome being enhanced professional intervention (Sandall et al., 2005).

Multidisciplinary or Interdisciplinary – Refers to professionals from many professional disciplines that represent expertise in working together with young children with disabilities and their families to accomplish important outcomes (Sandall, et al., 2005).

Pre-service – Postsecondary programs at the two-year, four-year, or graduate level that lead to entry-level preparation in the field of study and result in a degree and/or licensure in that field (Sandall, et al., 2005).

Research-based interventions – Informed by research, in which the characteristics and consequences of environmental variables are empirically established and the relationship directly informs what practitioners can do to produce the desired outcome (Dunst, 2002).

Stakeholders – People or representatives of groups of people affected by a decision or intervention (Sandall, et al., 2005).

Chapter 2

Literature Review

“ ... if basic elements of effective programming are not incorporated into interventions and treatments and programs are not based on objectively verifiable effective methods, children and youth with ASD will fail to achieve outcomes that fully reflect their capabilities.”

Simpson, de Boer-Ott, Griswold, Myles, Byrd, Ganz, Cook, Otten, Ben-Arieh, Kline, & Adams, 2005, p. 147.

Introduction

Research-based interventions for young students with Autism Spectrum Disorder (ASD) currently exist. Although these interventions are supported in the literature (Simpson, 2005), some early childhood special education (ECSE) and early intervention teachers in public schools do not adopt or properly implement these interventions with their ASD students. Instead of implementing researched-based interventions, teachers may use interventions that have no research base and that may have no positive effect on these students.

Autism is a spectrum disorder whereby those at the lower end of the spectrum, who may be considered as having classic autism, may fail to develop functional speech and often have additional learning disabilities. At the other end of the spectrum are those with high-functioning autism and those with Asperger's Syndrome, who usually develop adequate cognitive and linguistic abilities. The common difficulties of those on the

autism spectrum are in the three core areas of communication, social development, and stereotypic or ritualistic behaviors (Humphrey & Parkinson, 2006). Autism and autism spectrum disorders are lifelong neurodevelopmental disorders (Francis, 2005).

Jabrink and Knapp (2001) estimate that the cost of lifelong care for individuals with ASD can be reduced by two-thirds with early diagnosis and early intervention. The growth in numbers of students identified with ASD has impacted early intervention programs since early identification of children under age 3 has become more prevalent. Since most teachers have received relatively little formal coursework or training in researched-based interventions for children with autism (National Research Council, 2001), they are ill-prepared to meet the demands presented by many of these students. To date, there is no known cure or cause for ASD, but, Howlin (1997) (as cited in Dahle, 2003) states, “appropriate structured educational programs and management in the early years can play a significant role in enhancing functioning in later life.”

Growing research indicates that the age when intervention begins is predictive of outcomes for children with ASD. Research shows that children who begin intensive interventions by age 3 have a significantly better outcome than those whose intervention begins after age 5 (Fenske, et al., 1985; Harris & Handleman, 2000, as cited in Woods & Wetherby, 2003; and McGee, et al., 1999). These intervention findings suggest a need to identify and provide programming for children with ASD as early as possible.

The increased incidence of ASD among children, combined with earlier identification, has resulted in the need for early intervention teachers to gain awareness about the early signs of autism in children referred to them for evaluation. Once a child is identified as having ASD, an appropriate program of service is established. Hurth et al.

(1999) concluded that, although effective educational interventions for young children with ASD and their families exist, early intervention teachers do not always use effective, researched-based interventions when writing and implementing educational programs for these students.

Early intervention teachers today face challenges in the growing complexity of student needs. Amid increased accountability requirements, ECSE teachers sometimes struggle to maintain essential paperwork, attend team meetings, meet due process timelines, communicate with parents, and program each student's individual needs. Unlike most other special education teachers, ECSE teachers are cross-categorical teachers, which means they teach all disability categorical areas, and they must teach in the child's natural environment (i.e., in home for newborn to 3-year-olds and in settings with typically developing children for 3- to 5-year-olds) to the greatest extent possible. "The limited time that is available for teachers to participate in continuing education and for qualified consultants to provide comprehensive instruction is one key barrier to disseminating research findings," according to Lerman et al. (2004).

Because Minnesota has no formal state teaching licensure for ASD, teachers are faced with the task of defining and securing appropriate professional development activities themselves. Continuing education programs specific to ASD can be limited both in frequency and availability, particularly in outstate Minnesota. Moreover, the formats for delivery of these continuing education programs may not be processes perceived to be most effective for building teacher competencies.

This literature review was conducted by examining research studies in the fields of research-based intervention, evidence-based practices, early intervention in autism,

existing policies in Minnesota, and professional development. Searches were conducted for peer-reviewed works through Education Full Text, ERIC, Google Scholar, and JSTOR databases. Moreover, the Minnesota Department of Education website, the Autism Society of Minnesota (AUSM), and the Minnesota Autism Network provided important background information. Some authors included here did not conduct research but synthesized major findings of the research at the time of their writing; they have generally been included for context-setting purposes. A *St. Paul Pioneer Press* newspaper article was cited for context purposes.

This review begins with a discussion of the policy context for early intervention in autism. Next, studies are reviewed categorically, beginning with literature on research-based interventions in early intervention for children with autism, followed by a review of both personnel preparation for early intervention teachers of students with autism and existing policies for teachers of students with ASD. The review ends with professional development models for building teacher competencies. Finally, the chapter concludes with a summary of key findings, a conclusion, and a brief overview of the proposed research study.

Policy Context

In 2002, Congress enacted the No Child Left Behind (NCLB) Act of 2001. A prominent aspect of the law relates to using effective education interventions developed from scientifically based research—indeed, this approach is mentioned more than 100 times in NCLB. These interventions are defined as “those that have met rigorous peer review and other standards and that, when consistently and reliably applied with fidelity, have a history of yielding positive results,” according to Simpson et al. (2004) (as cited in

Simpson, 2005). Simply stated, this policy is designed to compel educators to use interventions that have been proven to work, and was the result of concerns that effective educational interventions, as proven by research, are not being used in schools (Odom et al., 2005).

Since 2000, the federal government has tripled its research dollars for autism and increased support for education and early intervention services (Olson, 2007). Under the Individuals with Disabilities Education Act (IDEA) of 1997, the primary federal legislation addressing the educational needs of children with disabilities, and Minnesota's State Performance Plan for the years 2005 through 2010, the federal government has legislated and will monitor specific indicators for children ages birth to 3, including two key indicators relevant to young children with autism: early intervention services conducted in the child's home or community setting, and early intervention services that improve infants/toddlers social-emotional, knowledge, and behavior skills.

On December 19, 2006, President George W. Bush signed into law the Combating Autism Act of 2006 (S. 843), which authorizes appropriations for expanded activities related to autism research, prevention, and treatment through 2011. A specific focus of the act authorizes the Secretary of Health and Human Services to: a) increase the number of individuals able to provide research-based interventions for individuals diagnosed with ASD or other developmental disabilities, and b) promote the use of research-based interventions for individuals at higher risk for ASD and other developmental disabilities as early as practicable.

Based on prevalence statistics from the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2009), 1 in 110 births in the

United States will be identified as being on the autism spectrum. ASD is the fastest-growing developmental disability in the United States, with an annual growth of between 10% and 17% and a 172% increase during the 1990s. School enrollment of children with autism and related conditions in the United States grew from 5,000 students in the 1991–1992 school year to 94,000 in the 2000–2001 school year (U.S. Department of Education, 2002). Recent international research suggests an average ASD prevalence of 1 in 175 children (Insel, 2006). Minnesota Department of Education Special Education Data indicates the state’s incidence of children who met eligibility criteria for ASD grew from 959 in 1996 to 9,929 in 2006. This increase has significant implications for school districts as they enroll increased numbers of ASD students who require specialized services.

On June 8, 2007, the *St. Paul Pioneer Press* featured an article about the University of Minnesota’s goal to become the Midwest’s premier autism research institute (Olson, 2007). According to the article, the University of Minnesota is in the process of raising \$2 million to study and improve the treatment of autism, the nation’s fastest growing developmental disability. Doctors hope the university will grow into one of the country’s top autism centers to evaluate best available treatments and to study potential causes of the disorder.

The *Pioneer Press* article also stated that the university’s action coincides with concerns generated by Minnesota insurers over rising costs incurred by autistic children and the lack of research on how best to treat them. In collaboration, Blue Cross and Blue Shield of Minnesota will work with the university and has established its own advisory

group on the issue. A registry of autistic children in Minnesota will be used to research trends in the development and treatment of autism.

As the identification of children with ASD has increased, so too have the number of contested Individualized Education Plans (IEPs) (Heflin & Simpson, 1998). Contesting the methodology used with students with autism is the fastest growing area of litigation in special education, according to Baird (1999) (as cited in Iovannone et al., 2003). The internet has provided a plethora of information for parents in search of interventions deemed effective for their students.

At the request of the U.S. Department of Education's Office of Special Education Programs, the National Research Council (NRC) undertook a project to consider the state of the scientific research of the effects of early educational intervention on young children with ASD. The recommendations of this committee, released in 2001, were made on the basis of empirical findings, information from selected representative programs, and findings in the general education and developmental literature. This landmark report concluded that there is strong, consistent agreement across comprehensive ASD early intervention programs on a number of critical issues:

- Entry into intervention programs as soon as an autism spectrum diagnosis is seriously considered.
- Active engagement in intensive instructional programming for a minimum of the equivalent of a full school day, five days a week (at least 25 hours), with full-year programming varied according to the child's chronological age and developmental level.

- Repeated, planned teaching opportunities generally organized around relatively brief periods of time for the youngest children (e.g., 15 minute to 20 minute intervals), including sufficient amounts of adult attention in one-to-one and very small group instruction to meet individualized goals.
- Inclusion of a family component, including parent training.
- Mechanisms for ongoing program evaluation and assessments of individual children's progress, with results translated into adjustments in programming (p. 219).

The NRC recommendations included six kinds of interventions that should be given priority: 1) functional, spontaneous communication; 2) social instruction; 3) cognitive development; 4) play skills; 5) interventions to address problem behaviors; and, 6) functional academics, as appropriate (p. 221).

Students with ASD present distinct challenges for the teachers trying to design effective instructional programs. Even though an impressive body of research identifying effective interventions has emerged, few attempts have been made to integrate the findings into a curricular foundation that can be adopted by school districts (Simpson, de Boer-Ott, & Myles, 2003).

Early childhood educators need training in instructional interventions and methods to structure classrooms in order to teach young children with autism, because these strategies are unique to the field of autism (Dahle, 2003). In 2001, the NRC recommended that relevant state and federal agencies, including the Office of Special Education Programs, "should accelerate their personnel preparation funds for 5 years for those who work with, and are responsible for, children with autistic spectrum disorders

and their families” (p. 8). “The national challenge is to close the gap between the quality of model programs and the reality of most publicly funded early educational programs” (p. 140).

So what is the answer to increase teacher competencies for those working with ASD students at the early-intervention level? A look at the literature for providing teacher learning opportunities will explore the topics of distance education, video conferencing, online mentoring, professional learning communities, and reflective intervention as methods of delivering and building competencies for early intervention teachers of ASD students.

Review of Studies

Research-based Intervention in Early Intervention with Autism

In this section of the literature review, the author’s goal is to describe the significant characteristics of research-based programs for young children with autism. A brief, historical perspective on research-based intervention is followed by a chronological review of summarized and synthesized major studies of research-based programs in early intervention programs for children with autism.

Odom et al. (2005) state that the search for evidence-based practice originated in the field of medicine, extending back to the mid-19th century. The modern era of research-based intervention surfaced in the early 1970s and 1980s and peaked in Great Britain in the early 1990s with a movement to address the gap between medical research and practitioners’ applications. Both general and special education have adopted scientific research as the appropriate foundation for selecting interventions amid concerns, similar to medicine, that effective, research-based interventions are not being

used in schools. Yet, discussions in the field of special education persist regarding the gap between research and intervention (p. 142). At this time, the special education profession has yet to develop systematic guidelines for specifying types and levels of research needed to identify an intervention as research-based and effective (p. 144).

Dunst (2002) (as cited in Odom et al., 2005) provides an operational definition of evidence-based practices as those “informed by research, in which the characteristics and consequences of environmental variables are empirically established and the relationship directly informs what practitioners can do to produce the desired outcome” (2003).

Wesley and Buysse (2006) provide a definition of evidence-based practice as “one in which professionals reflect upon and make decisions about their work by systematically considering information from several sources” (p. 131). They go on to propose the following definition of evidence-based practice for the early childhood field: “a decision-making process that integrates the best available research evidence with family and professional wisdom and values” (p. 131).

Wolery and Garfinkle (2002) define intervention as “attempts to organize instructional and therapeutic interventions to influence outcomes” (p. 467). Simpson (2005) states that there is an increasing perception that improved student outcomes would most likely take place within a restructured education system. Lerman, et al. (as cited in Simpson, 2005) explain this restructuring would include teachers’ willingness and ability to adopt and implement effective-intervention materials and strategies.

Many programs and treatments, based on different philosophies, have been developed for children on the autism spectrum. Although each program is built on a different foundation and uses distinctive intervention strategies, some components do

overlap. Due to the distinctive nature of autism and its exponential increase in incidence, a number of controversial treatments and interventions have surfaced for which there is little scientific support and efficacy (Simpson, 2005). Both parents and professionals have fallen prey to their willingness to consider unproven interventions. Simpson states that these unproven interventions have led to unhealthy, unrealistic, and improbable expectations and may, in some cases, have retarded the progress of some students with ASD (p. 141).

In 2002, the U.S. Department of Education established a knowledge base of validated educational interventions that have been proven effective through clinical trials using large-scale replication methods. The department also created incentives for programs receiving federal education funds to implement such interventions. In the case of studies with ASD students, research methodology has not generally been used to evaluate methods, due to the limited samples of ASD students who have similar characteristics, programs, needs, etc., and lack of randomization (Simpson, 2005). The scientifically based research requirement of NCLB appears to restrict and indeed may prevent the identification of effective interventions for students with ASD.

Although the importance of early intervention and early childhood programs is common knowledge among researchers, the debate over which specific methodologies are most effective with children with ASD continues. Heflin and Simpson (1998) proposed recommendations for assisting parents and professionals in becoming better consumers of intervention methods for students with ASD and for selecting appropriate intervention options. The authors developed five basic questions to use in the selection process:

- 1) What are the anticipated outcomes of the programming option?
- 2) What are the potential risks?
- 3) How will the option be evaluated?
- 4) What proof is available that the option is effective?
- 5) What other options would be excluded if this option is chosen? (p. 215)

In 1992, Powers (as cited in Iovannone et al., 2003) provided one of the first research studies of core components for early intervention programs for students with autism. His report concluded that no one program was effective for all, but he did identify a set of best interventions that should be included in programs for students with autism: (a) early intervention, (b) intensive treatment, (c) structured treatment using principles of applied behavior analysis, (d) specific curricula emphasizing social and communication skills, (e) programming for generalization, (f) integration with typical peers when possible, and (g) parent involvement in the school, community, and home.

A review of the literature by Dawson and Osterling (1997) on interventions of eight nationally known, well-respected models of early intervention programs identified the key common elements of the programs: (a) specific curriculum content focusing on core deficits of autism, (b) highly supportive and structured teaching environment, (c) predictability and routine, (d) functional approach to problem behaviors, (e) planned transitions between preschool and kindergarten/first grade, and (f) family involvement.

The literature reviewed by Iovannone, et al. (2003), identified six essential themes across the research studies: (a) individualized supports and services for students and families, (b) systematic instruction, (c) comprehensible and/or structured environments,

(d) specialized curriculum content, (e) functional approach to problem behaviors, and (f) family involvement.

Hurth et al. (1999) conducted an extensive literature review on nationally recognized programs for young children with ASD that demonstrated effectiveness. From their analysis, six elements of effective early intervention programs, covering specific strategies, settings, and curricular areas, were identified: (a) earliest possible start to intervention, (b) individualization of services for children and families, (c) systematic and planned teaching, (d) specialized curriculum, (e) intensity of engagement, and (f) family involvement. Three additional components were presented as common to some but not all programs: structured environment, developmentally appropriate interventions, and intervention in settings with typical children or in natural environments.

The Australian Government Department of Health and Aging in 2006 funded a review of the research to identify the most effective models of intervention in early intervention for children with ASD (Roberts & Prior, 2006). The authors found that effective programs tend to contain the same key components, regardless of philosophical orientations. These elements were:

- Provide an autism-specific curriculum focusing on attention, compliance, imitation, language, and social skills.
- Address children's need for highly supportive teaching environments.
- Include specific strategies to promote generalization of new skills.
- Adopt a functional communication approach in addressing challenging behaviors.
- Support children in their transition from the preschool classroom.

- Ensure that family members are supported and engaged in a collaborative partnership with professionals involved in the delivery of treatments.

Moreover, reviewers found important strategies or methods not used by all, but by a significant number, and thus worth noting: use of visual supports; sufficient intensity of a minimum of 15 hours per week; a multidisciplinary, collaborative approach (teachers, speech pathologists, psychologists, parents, etc.); inclusion of peers; emphasis on independent functioning; and addressing obsessions and rituals (p. 82).

The study found that different children with autism respond in different ways to any given treatment or intervention program. The authors noted the importance of the fact that no single program will suit all children with autism and their families, indicating that successful outcomes require not only that an effective method be chosen but also that it be properly matched to the needs of an individual child and the planning team (Simpson, 2005). However, research indicates substantial short- and long-term benefits can be derived from early, intensive, family-based treatment programs, regardless of their theoretical basis, so long as the child's strengths and weaknesses and family circumstances are considered (Roberts & Prior, 2006).

Simpson (2005) evaluated 33 interventions and treatments commonly used for children and youth with ASD. From the review of the literature, the team organized the methods into five categories: (a) interpersonal relationship, (b) skill-based, (c) cognitive, (d) physiological/ biological/neurological, and (e) other. The authors then rated these methods into four categories: (a) scientifically based interventions, (b) promising interventions, (c) interventions with limited supporting information, and (d) interventions that are not recommended.

Scientifically based practices were defined as “interventions that have significant and convincing empirical efficacy and support” (p. 9). Promising interventions were defined as “interventions that emerged as having efficacy and utility with individuals with ASD” (p. 9). Interventions with limited supporting information “lacked objective and convincing supporting research but had undecided, possible, or potential utility and efficacy” (p. 9). Lastly, not recommended were those interventions and treatments that lacked efficacy and might potentially cause harm to the child with ASD.

Their analysis rated no interventions in the interpersonal, physiological/biological/neurological, and other categories as scientifically based. In the skill-based category, applied behavior analysis (Alberto & Troutman, 2003; Anderson & Romanczk, 1999, as cited in Simpson, 2005), discrete trial training (Maurice, Green, & Luce, 1996, as cited in Simpson, 2005) and pivotal response training (Koegel, Harrower, & Carter, 1999, as cited in Simpson, 2005) were rated scientifically based interventions. In the cognitive category, Learning Experiences: An Alternative Program for Preschoolers and Parents (LEAP) (Strain & Hoyson, 2000, as cited in Simpson, 2005) was also rated as a scientifically based intervention. Holding therapy (Welch, 1988, as cited in Simpson, 2005) and facilitated communication (Biklen, 1993; Biklen & Schubert, 1991 as cited in Simpson, 2005) were not recommended because of the lack of efficacy and potential to be harmful.

Levy, Kim, and Olive (2006) collected and examined 24 intervention studies conducted with young children with autism from 1975 to 2001. The synthesis of their findings revealed that several features of interventions had positive effects on the treatment of autism, including: parent involvement, intensive behavioral intervention,

multicomponent early intervention, language/speech treatment, and imitative interaction procedure. When analyzed further, four elements showed consistent positive effects across contexts: (a) parental involvement, (b) intensive behavioral therapy, (c) multicomponent interventions, and (d) duration of interventions.

The authors caution that they did not consider the methodological rigor of the studies included in their review, and indeed this synthesis included studies that have since been criticized (p. 60). They do state, though, that the findings have implications for professionals developing and implementing early intervention programs for children with autism. “Children with autism appear more likely to benefit from interventions initiated at an early age, that are intensive and long-lasting (at least 1 year), that target various developmental areas, and that include parents, who can facilitate the generalization process of learned skills” (p. 60).

Summary of research-based intervention literature.

Two components are prevalent in all the research findings on research-based programs: parent/family involvement and structured teaching. All reviews of the research-based interventions literature acknowledge the important role parents play in their children’s intervention, although how parents are asked to participate differs across programs and approaches (National Research Council, 2001). Families are recognized as critical partners in educational planning and delivery of support and services. Although terminology differed somewhat among the studies, structured teaching or systematic instruction is a component that scholars have agreed is critical in programs for young ASD students. Systematic instruction involves careful planning for teaching by identifying educational goals, carefully implementing them, evaluating the effectiveness

of the teaching procedures, and adjusting instruction based on data (Iovannone et al., 2003). Meaningful data collection for making instructional decisions has been identified as a significant help to schools winning due process cases related to methodology disagreements. Moreover, students with ASD have shown significant progress in attaining competencies when programs use instructional approaches that are both comprehensive and systematic (p. 158).

Three other components were found in four of the seven literature reviews: (a) earliest possible start to intervention, (b) intensity of treatment, and (c) specific curricula. Children who begin intervention programs earlier have better outcomes. At least two retrospective studies have found less restrictive placement outcomes for children who started intervention at earlier ages compared to those who started at later ages (National Research Council, 2001, p. 151).

Intensity of treatment in intervention programs with young ASD students is not simply measured in terms of hours of participation (Wolery & Garfinkle, 2000), but in the amount of functional, developmentally appropriate, and high-interest opportunities to actively respond. However, the National Research Council recommended active engagement in intensive instructional programming for a minimum of the equivalent of a full school day, five days a week, on a full-year basis, according to appropriateness of age and developmental level (p. 219).

Specific curricula were identified as effective in early intervention programs for children with autism. The research on research-based interventions for early intervention programs with ASD students identified the need for a curriculum focused on social interaction; play and communication; specialized services, including speech-language

and occupational therapy; family involvement; consistent and ongoing communication between team members; a capacity to address the child's behavioral challenges; specialized and ongoing training for interventions specific to children with ASD; and staff support (National Research Council, 2001).

Overall, several methods were identified as core components of effective, research-based program elements. Terminology may have differed between studies, particularly because some of the literature reviews contained studies that dated back to the 1970s. The literature reviews agreed unanimously on some components while for others only one or more of those essential elements were the same. The literature makes it clear, though, that no one intervention can be used to the exclusion of others and that educators and parents need to ask pertinent, relevant questions when selecting appropriate options based on a child's unique characteristics. "It is clear that the best programs are those that incorporate a variety of multidisciplinary best interventions based on individual needs" (Simpson, 2004).

Personnel Preparation Literature Review for Early Intervention Teachers of Students with Autism

According to the research-based interventions literature, core components of effective programs are critical to the outcomes of young children with ASD. Because teachers implement these core educational components, this section will review literature on personnel preparation for early intervention teachers of children with autism. The research focuses on three areas: (a) teacher shortages, (b) teacher training, and (c) potential barriers to using research-based interventions.

Rivkin et al. (2005, as cited in Wiliam, 2006) indicated that the teacher is the most important influence on student achievement, and Hanushek (2004, as cited in Wiliam, 2006) found that students who had the best teachers learned at twice the rate of students with average teachers. These findings point to the importance of early intervention teachers embracing researched-based interventions in order to increase child outcomes. Moving these teachers toward innovative intervention is essential.

The result of the increase in the number of young children with ASD is a need for trained school personnel who can provide a holistic, family-centered, and collaborative means to work effectively with parents in developing appropriate, individualized IEPs. Once a student is identified as having ASD, the child's team must make program decisions regarding goals, interventions, and location in a collaborative manner. Schools without a process to make these decisions systematically may find themselves in costly litigation or being asked to pay for expensive treatment programs (Feinberg & Beyer, 1998 and Yell & Drasgrow, 2000, as cited by Ruble & Dalrymple, 2002). The process and procedures to make these essential and appropriate decisions require team members knowledgeable in autism, research-based interventions, and a systematic problem-solving approach to program planning.

Teacher shortages.

Simpson (2004) highlights overwhelming research of a shortage of teachers and other professionals who are qualified to serve the needs of students with disabilities, and that there is every reason to believe this trend will continue. This shortage of qualified professionals to educate children and youth with special needs, including those with ASD, is a significant challenge facing the field of special education. Simpson points out

that in the case of students with ASD, personnel require a foundation in basic general *and* special education skills; specialty skills in the area of autism, including an understanding of their students' individual characteristics; and skills and knowledge in assessment, diagnosis, and evaluation. Many of the skills necessary for teaching children with autism must be explicitly taught, modeled, and practiced in field placement with students with ASD. However, this specific training often conflicts with trends toward noncategorical and cross-categorical teacher training and generic teacher licensure.

Locating certified teachers in special education has always been challenging. If there is a shortage in general special education, that shortage is even more serious in the area of ASD (National Research Council, 2001). Not only is there concern about the preparation of special education teachers and early interventionists, but also for the preparation of related service personnel such as psychologists, speech pathologists, occupational therapists, physical therapists, behavior analysts, and other professionals who work with programs that treat ASD children. The NRC report states that there has been relatively little written on the personnel preparation for providing interventions for children with ASD.

Both nationally (Ludlow et al., 2005) and in the state of Minnesota, a shortage of ECSE teachers exists, and nowhere is the shortage more severe than in rural school districts (p. 1). Early intervention teachers are considered Low Incidence Disabilities teachers. Students with low incidence disabilities represent less than 1% of the school population (U.S. Department of Education, 2002). Critical shortages of these teachers have been documented since 1998 and theirs has been among the top 20 shortage areas from 1998 to 2005 (Ludlow et al., 2005). Data were not available for 2006 and 2007.

A shortage of qualified early intervention teachers will continue to threaten the access to needed services as well as the quality of educational programs for young students with disabilities. When personnel are hired for early intervention positions without the knowledge of and training in appropriate developmental skills sequences, teaching methods, and interventions, programs for children and families can suffer. “State policy makers are beginning to recognize that no matter how progressive their early intervention service systems may be, they will not be effective unless there are competent and qualified personnel to implement them” (Striffler & Fire, 1999, p. 50).

Teacher training.

The training and background of special education and early intervention personnel varies in terms of working with young children with ASD. Although backgrounds may provide strong instruction in some aspects of development and education relevant to autism spectrum disorders, there may be little or no instruction in other areas of ASD. Teachers may have received solid training in general special education or early childhood special education but have had little or no instruction in important strategies specific to the needs of ASD students (National Research Council, 2001, p. 186).

“Some have called for the development of programs focused on autism as distinct from severe disabilities, in recognition of the unique needs of these students” (Scheuermann, et al., 2003). Because programs to prepare personnel in low-incidence disabilities require specialized or intensive training, they are often expensive so colleges and universities have been slow to develop them and may fail to maintain them when resources are scarce.

In 1986, amendments to federal law extended the right to education to children with disabilities from ages 3 to 6 and provided incentives for states to also serve children from birth to age 3. Minnesota was one of the states that began serving children birth to 3 in 1986 and the passage of legislation (M.S. 125A.25) in 1987 mandated ECSE services for that population. The rapid growth of early intervention services combined with the dearth of personnel preparation programs at the time resulted in an inadequate pool of trained teachers. Because so many early intervention teachers were hired before programs were available, institutions of higher education were immediately faced with the challenge of training them in place.

“Scientifically based research on instructional interventions will not affect students’ academic achievement unless such interventions are actually used in classrooms” (Yell, Drasgow, & Lowrey, 2005, p. 138). At times, teachers may adopt, or be forced by well-intentioned, ill-informed school district officials to adopt, unproven interventions. Furthermore, their teacher-training programs may have relied more on ideology than science. For teachers to determine which educational interventions are research-based and which teacher-training programs and professional development activities will prepare them to use research-based methods is to become an educated consumer able to distinguish among fad, ideology, and science (p. 138). Teacher trainers, leaders, and coordinators must be connected to research in their fields and prepare their students and colleagues to discriminate between research-based interventions and testimonials or unproven methods and interventions.

As stated previously, young children with ASD must receive programming in their natural environment to the greatest degree possible. For a child birth to age 3, this

generally means the child's home or child care site. Children ages 3 to 5 typically receive programming in a center-based location. Minnesota ECSE licensure requirements call for teachers to complete two student-teaching experiences, one with children birth to age 3 and one with children ages 3 to 5.

Research has indicated that although many teachers in mainstream schools are firmly committed to inclusive principles, they do not feel they have the necessary training and support to provide for such students adequately (Humphrey & Parkinson, 2006). Hurth et al. (1999) remind teachers that young children with ASD are children first of all, and in some ways their development follows the same patterns as children without ASD. While some effective strategies that work with other children with disabilities work for children with ASD, in many other areas young children with ASD demonstrate developmental patterns that differ in rate, content, and sequence. Early intervention programs for children with ASD need to reflect what is known of early development in autism and requires adjustment of interventions to ensure programming is appropriate for children with autism.

Results found in the National Research Council (2001) report indicate that most teachers receive relatively little, if any, formal instruction in research-based interventions for children with autism (p. 186). It further states that the scarcity of specialized preparation in autism at institutes of higher learning may be attributable to the low incidence of this disorder compared to other disabilities. "Models for transferring a broad range of research findings on best interventions for children with autism to current public school teachers have received little attention in the literature" (Lerman et al., 2004, p. 511).

Potential barriers to using research-based interventions.

The reality for teachers is that limited time is available for them to participate in continuing education or for qualified consultants or other continuing professional educators to provide comprehensive instruction for them. Standard intervention in schools may be to provide little class-release time for teachers, and continuing education is restricted to a handful of didactic workshops covering a variety of topics throughout the school year. Professionals with little expertise in behavioral interventions or research-based interventions may lead workshops on autism. “Moreover, didactic instruction alone is unlikely to lead to more effective teaching interventions among workshop participants” (Lerman et al., 2004, p. 511).

Hurth et al. (1999) recognize the need for studies of early intervention with autism to examine administrative factors that support effective interventions, such as education, training, and supervision of personnel and child/teacher ratios. Lerman et al. (2004) state that efforts to transfer research findings on autism into public schools would benefit from further evaluation and improvement of teacher preparation programs. Odom et al. (2005) stress that factors leading to adoption of effective interventions in typical school systems under naturally existing conditions need to be determined, and that research would require investigation into organizational factors that facilitate or impede adoption of innovative interventions in local contexts.

The Roberts and Prior (2006) review of research recommendations for model inclusive programs for children with autism indicates the need for adequate teacher planning time, including time for collaborative consultation. Moreover, this report recommended the availability of paraprofessional and teacher in-service training that

would be continuous, provided in both autism and collaborative consultation, and provided for general educators in group and individual formats, on a needs basis. This study recognized the importance of a positive school climate and focused on the principal as being central to the overall tone or attitude of the school with regard to children with disabilities.

Woods and Wetherby (2003) recommend that personnel may need additional training in techniques to use with adults to make parent-implemented interventions maximally effective for early intervention with children with ASD. Among future needs listed by these authors is improved personnel training across the wide range of medical, educational, and social service personnel that are important to children with ASD and their families. Schwartz et al. (2004) add that as more school-based programs for children with autism are developed, teachers must receive both the adequate and technical support needed to maintain the quality of the program.

Conclusions drawn by the National Research Council (2001) found that personnel preparation remains one of the weakest elements of effective programming for children with ASD and their families. Strategies to build on the knowledge of teachers as they acquire experience with young children with ASD and ways of keeping skilled personnel within the field are critical. In order to effect proactive change, knowledge about ASD needs to be provided to both general and special education administrators, as well as to specialized providers with major roles in early intervention. Findings concerning change in educational and other opportunities suggest administrative attitudes and support are paramount in improving schools.

Summary of findings on personnel preparation for early intervention teachers of ASD students.

Although personnel need to use research-based interventions with young children with autism, teacher shortages and insufficient training in research-based interventions have been noted in the literature (National Research Council, 2001). Potential barriers to the implementation of effective interventions include the lack of planning and collaboration time, expertise available, administrative support, and effective instruction among others.

Existing Policies in the State of Minnesota

As teachers of young children with autism learn about research-based interventions, it is also imperative for them to become fully aware of state policies, rules, and regulations that effect programming for their students, as well as resources that can support teachers in their quest for knowledge to improve their intervention. Such policies include Special Education Eligibility Criteria, the proposed ASD competencies, the status of ASD licensure, the existence and focus of the Minnesota Autism Network, existing ASD Certificate Programs, and Minnesota Staff Development Rules. Awareness of policies advances understanding about eligibility identification, statewide resources and networks for technical support, resources to build skill and knowledge capacity, and information tailored to parents, administrators, and others. Each of these policy domains is discussed in turn.

Special education criteria for ASD.

Under the Minnesota criteria, a clinical or medical diagnosis is not required for a child to be eligible for special education and related services. A student must meet

educational eligibility criteria in Minnesota Rules (M.R.) 3525.1325 for Autism Spectrum Disorder. The criteria include the provision of a multidisciplinary team to determine that a pupil is eligible and in need of special education through an educational evaluation that addresses three core features: (a) qualitative impairment in social interaction as documented by two or more behavioral indicators, (b) qualitative impairment in communication, and (c) restricted repetitive or stereotyped patterns of behavior, interest, or activities. Subitems are listed in each of the three core features; a child must demonstrate patterns of behavior in at least two of the subitems and the behavior must be considered atypical for the child's age. Substantiation must be provided through multiple sources, such as parent interviews, checklists, observations, and assessments. The team that determines eligibility and educational programming must include at least one professional with experience and expertise in the area of ASD, given the complexity of this disability and the specialized intervention methods.

Criteria for early childhood special education.

In Minnesota, "ECSE must be available to pupils from birth to seven years of age who have a substantial delay or disorder in development or have an identifiable sensory, physical, mental, or social/emotional condition or impairment known to hinder normal development and need special education" (Minnesota Rules [M.R.] 3525.1350). Two separate sets of criteria exist for children who are birth through age 2 years and 11 months (birth to 3) and ages 3 through 6.

The criteria for children birth to 3 allows a team to determine eligibility for early childhood special education services if: (a) the child meets the criteria of one of the

disability areas such as Autism Spectrum Disorders (described in the following section), or (b) the child meets one of the criteria for Developmental Delay.

The criteria for Developmental Delay are as follows: the child has a diagnosed physical or mental condition or disorder that has a high probability of resulting in developmental delay, regardless of whether the child has a demonstrated need or delay; or the child is experiencing a developmental delay that is demonstrated by a score of 1.5 standard deviations or more below the mean, as measured by appropriate diagnostic measures and procedures, in one or more of the following areas:

- Cognitive development
- Physical development, including vision and hearing
- Communication development
- Social or emotional development
- Adaptive development

The criteria for 3 through 6 years of age provides a team to determine that a child is eligible for special education when (a) the child meets one of the categorical disabilities (described in the next section), or (b) the child meets one of the criteria for developmental delay. For this group, it is the same as described above, except that the child must demonstrate a delay in two or more areas of development.

In the author's experience, it is not uncommon for some children who are later found to be eligible under the criteria for ASD to first be identified under the Developmental Delay criteria. This may happen because of the team's lack of knowledge or experience in the early identification of autism, concerns surrounding parental acceptance of autism as a potential cause of developmental delays, or concerns over early

identification and thus, labeling a child younger than age 2 as having autism. When ASD children are served under different and possibly erroneous eligibility criteria, data tracking of ASD incidence may become negatively skewed.

Special education criteria for all disability areas.

In all, there are 14 categories of special education eligibility in the state of Minnesota. They are as follows:

- Developmental Delay (M.R. 3525.1350), a category used specifically for children ages birth to 6 years, 11 months
- Autism Spectrum Disorders (M.R. 3525.1325)
- Deaf-Blind (M.R. 3525.1327)
- Deaf and Hard of Hearing (M.R. 3525.1331)
- Developmental Cognitive Disability (M.R. 3525.1333)
- Emotional or Behavioral Disorders (M.R. 3525.1329), with separate criteria for children who are pre-kindergarten
- Other Health Disabilities (M.R. 3525.1335)
- Physically Impaired (M.R. 3525.1337)
- Severely Multiply Impaired (M.R. 3525.1339)
- Specific Learning Disability (M.R. 3525.1341)
- Speech or Language Impaired (M.R. 3525.1343)
- Traumatic Brain Injury (M.R. 3525.1348)
- Visually Impaired (M.R. 3525.1345)

- Developmental Adapted Physical Education (M.R. 3525.1352), excludes ECSE children ages birth to 3 years and those whose identified disability is Speech/Language

(See http://education.state.mn.us/MDE/Learning_Support/Special_Education/index.html for complete information regarding eligibility requirements.)

Proposed competencies.

The *Competencies for Special Education Teachers Working with Students with ASD* (September 2003) were developed in 2003 in collaboration with the Teacher Competency Work Group for ASD, the Low Incidence Disabilities Regional Projects, and the Minnesota Autism Project and Network, through a grant from the Minnesota Department of Education/Special Education Policy.

The purpose of the competencies is to assist in building the specific knowledge and skills of staff who provide special education and related services for children with ASD. Although the competencies are not a requirement for personnel, they have been deemed essential competencies based on an examination of current research and on ratings by teachers, consultants, administrators, parents, and university faculty across the state, and national experts with extensive experience in ASD. The ASD competencies in Minnesota are promising practices that have been organized using the professional standards model established by the Council for Exceptional Children.

Through the Minnesota Autism Project, it has been recognized that the increasing identification of students with ASD has created a growing demand for highly qualified staff to educate these students. This increase in demand combined with the scarcity of teacher preparation curriculum, coursework, and programs that address ASD provided an

impetus for the development and adoption of these specialized competencies. In 2005, the Minnesota Autism Project developed the *ASD Professional Development Record*, a format for teachers to maintain a personal record of progress toward building proficiency in working with children with ASD. The record contains specific areas of competencies, the date a competency was achieved, and the method of achievement (courses, workshops, or activities in which each was mastered). This record organizes competencies into either knowledge or skills.

Autism Spectrum Disorder licensure.

Currently in Minnesota there is no teacher licensure for serving students with ASD. Any licensed special education teacher can serve as case manager for a student who meets ASD eligibility. In June 2007, the Autism Society of Minnesota presented to the Board of Teaching the rationale for a license in autism for pre-K through grade 12 educators. The appearance before the Board of Teaching was the culmination of analysis and fieldwork by the Autism Society of Minnesota (AUSM). Included in their analysis was research in available undergraduate courses in ASD, the autism certificate programs, in-service programs through the Autism Network, the ASD competencies, and input gathered from special education directors in Minnesota. The Board of Teaching, after hearing the presentation, recommended that the request be further studied to determine all issues, possible outcomes, and openness of stakeholders. AUSM will continue to advocate improving teacher preparation and in-service (AUSM, August 2007).

Minnesota Autism Network.

The goal of the Minnesota Autism Network, an ongoing Low Incidence Special Education Project, is to build capacity of local districts and regions to provide a full array

of educational services to students with Autism Spectrum Disorders. A critical element in achieving this goal is the development of an accessible, statewide network of specially trained staff. To achieve this end, the Minnesota Autism Network provides advanced training for staff from all 11 of the Governor's Planning Regions. Staff on these Regional Teams then provide and facilitate technical assistance and training to local districts.

The Minnesota Autism Network consists of members who serve as Autism Resource Specialists and Early Childhood Representatives. Approximately 60 special education staff representing the full spectrum of ages (birth to 21 years) and a wide range of experiences and expertise serve on the network. Formed in 1992, the network projects are supported by federal, IDEA funds for Low Incidence Disabilities through the Minnesota Department of Education.

The Autism Resource Specialists are strategically located in each of the 11 Governor's Planning Regions in Minnesota. These positions provide support and training to teachers of children with autism within each respective region. At the state level, an Autism Consultant provides leadership, guidance, and expertise from the Minnesota State Department of Education.

Autism Spectrum Disorders certificate programs.

As mentioned previously, there is no specific licensure in Minnesota for ASD at this time. A growing number of higher education institutions in the state, however, have developed ASD certificate programs at the graduate level to assist educators in learning more about students with ASD: Hamline University, University of Minnesota, University of St. Thomas, University of Minnesota-Duluth, St. Cloud State University, Southwest Minnesota State University, and others.

Minnesota staff development.

In Minnesota, the legislation guiding staff development in public schools is the *Minnesota Staff Development Statute (2005), Chapter 122A.60*. The legislation intends to require schools and districts to implement a site-based process for both educational goals and staff development opportunities that will best help meet these goals. Providing teachers and other school district staff with professional growth and development opportunities, its function is to support them in giving high-quality educational experiences to students and ultimately help achieve the fundamental goal of improving student learning. Elements of effective staff development included in the legislation's recommendations are: a focus on research-based strategies, opportunities to improve intervention and skills over time, the use of student data as part of daily work, enhancing content knowledge and instructional skills, alignment with state and local academic standards and the alternative teacher professional pay plan, the provision of opportunities to foster collaboration and build professional relationships, and mentoring (Minnesota Statutes, 2005).

Summary of existing policies in Minnesota.

Some policies in place in Minnesota affect teachers of young children with ASD. These policies affect special education program eligibility, technical support, and staff development. Although no teacher certification specific to ASD exists in Minnesota at this time, attempts are being made to build teacher proficiency for those serving children with autism through the development of ASD teacher competencies, ASD licensure, and ASD certificate programs. These efforts are optional for teachers. Further, it should be noted that all higher education institutions offering ASD certificate programs are located

primarily in the eastern corridor of Minnesota, which offers little assistance to outstate Minnesota teachers.

Professional Development Literature Review

The literature reviewed here thus far reveals a need for personnel working in early intervention programs with ASD students to possess knowledge and skills in core components of research-based interventions in order to improve student outcomes. ASD competencies and certificate programs have been developed in the state of Minnesota to assist in building awareness of and proficiency in working with young students with autism. Teacher shortages and lack of training for some teachers has created challenges for school districts. For many early intervention teachers who have worked in their field for several years, the increase in ASD students has resulted in frustration due to the lack of specialized interventions that appropriately address their individual needs.

A gap appears to exist between teacher knowledge/skills and the research-based literature. So, the question presents itself, “What is the most effective method of delivering training to early intervention teachers in the field?” The following section of this literature review will investigate effective models of delivering professional development to teachers working with this unique population of students. In the literature search for professional development and personnel training for teachers of young children with autism, several approaches surfaced: distance education, technology-mediated consultation, online mentoring, interactive staff development, professional learning communities, and reflective intervention.

Distance education.

Jung, McCormick, and Jolivet (2004) explain that early intervention teachers in rural settings face many barriers as they strive to provide effective, appropriate services in natural environments for infants and toddlers with disabilities. Prior to federal legislation (P.L. 102-119, Sec. 303.18) passed in 1991 that requires service to occur in the child's natural environment, infants and toddlers were often brought to a center or clinic to receive services. The center-based model allowed early intervention teachers to serve a large number of children each day. When legislation changed, programming for these young children moved to the homes and communities where they lived.

Rural school districts often cover large geographic areas, so early intervention service providers sometimes struggle to provide adequate service given the amount of travel time involved in moving from one student to another. Teacher shortages are greater in rural areas and the availability of specialists trained in low incidence disabilities, particularly in the field of autism, are almost nonexistent (Cegelka & Alvarado, 2000 and Carr, 2000, as cited in Zahn & Buchanan, 2002). A 1997 needs survey indicated that 76% of teachers working with children with ASD in Wyoming felt unprepared to do so (Zahn, 2000, as cited in Zahn & Buchanan, 2002).

To address the needs of professionals teaching children with autism, the U.S. Department of Education, Office of Special Education funded a statewide program in Wyoming, *ATTAIN: An Autism Training Initiative for Frontier Areas*. Two week-long summer institutes taught the use of video equipment, the development of video portfolios, a variety of issues related to ASD, assessment procedures, interventions, and provided hands-on opportunities to intervention with video training exercises for ASD children and

families. Distance education courses were then offered during the school year and participants met twice per semester to share videos and projects. The ATTAIN program also included audio teleconferencing and compressed video sessions.

Results indicate that while distance delivery systems provide an effective and efficient means of conveying new information, the staff felt these modes of delivery alone may not have been ideal for teaching and monitoring the acquisition of competencies in working with ASD students. The ATTAIN project provided an alternative to traditional distance education interventions with its use of video, which helped overcome the limitation of direct observation by providing alternative on-site observation of the field experiences of teachers in training. Overall, the success of the ATTAIN project influenced the development of similar training programs currently offered through the University of Wyoming.

Videoconferencing technologies permit experts and educators in remote geographic areas to see and hear one another simultaneously, to observe classroom interventions, and to consult with parents. Although availability and reliability varies widely, the use of telecommunications allows for consultation and sharing of expertise to assist children in remote locations, particularly children with low incidence disabilities who have intensive or unique program needs (Rule, Salzberg, Higbee, Menlove, & Smith, 2006).

Technology-mediated consultation.

Rule et al. (2006) report on a case study of technology-mediated consultation to assist students in rural areas. Videoconferencing was conducted to allow a specialist to interact with classroom personnel to help them develop and implement programs for a

young child with autism. Sessions were arranged such that the consultant could observe the child as classroom staff implemented the agreed-upon teaching procedures. In this study, technology glitches at times prevented two-way conversations between consultant and school staff, however the child made significant progress during the consultation timeframe. The study revealed that although this method of consultation with personnel serving a child with autism was beneficial, the costs must be considered, technology must be tested in advance, technical support is essential and must be available, and a clear understanding of all parties must be well established prior to implementation.

Online mentoring.

School districts are hiring an increasing number of limited-licensed teachers who are not fully certified for their teaching position to help eliminate critical personnel shortages in special education (Billingsley, 2004 and Knapczyk, Chapman, Rodes, & Chung, 2001, as cited in Knapczyk, Hew, Frey, & Wall-Marencik, 2005). Because these teachers are generally employed full time in special education programs and are often scattered geographically, they are isolated from other teachers. Providing adequate supervision and other types of professional support taxes program personnel and resources.

Knapczyk et al. (2005) investigated the use of online mentoring with 26 limited-licensed teachers participating in a practicum with students with emotional/behavioral disorders. Results indicate mentoring offers the possibility of providing these teachers with professional guidance and support that otherwise might not be readily available to them and can be a valuable, effective tool. Mentors were defined as “anyone who has sufficient background and expertise in a practicum teacher’s certification area and is

readily available to answer questions, brainstorm teaching activities, plan interventions, provide feedback, and give other forms of guidance” (Ensher et al., 2003, as cited in Knapczyk et al., 2005, p. 208).

Challenges were identified in the online mentoring study as effectiveness appeared to be dependent on mentors who were able to provide consistent, task-oriented, and timely feedback. The authors of the study also stated that mentors must be sensitive to the teacher’s ability to respond to questions and make supplemental postings online so as not to become overwhelmed by demands. Moreover, practicum teachers must be sensitive to the expectations placed on mentors. The limitations portion of this study mentioned that no comparison online mentoring approach was used and only a single online mentoring design was used. The authors indicated that Indiana and other states are now requiring limited-license and first-year teachers to work under a mentor teacher as a condition of their employment. One difficulty schools, particularly rural schools, experience with this approach is an insufficient number of fully certified special education teachers or other staff mentors to provide high-quality professional development.

Professional Learning Communities.

The National Staff Development Council’s *Standards for Staff Development* (2001) states that “staff development that has as its goal high levels of learning for all students, teachers, and administrators requires a form of professional learning that is quite different from the workshop-driven approach” (p. 8). Sparks and Hirsch (1997) explain that when teachers participate in traditional staff development their attendance does not

ensure their learning. Further, what they learn may not be meaningfully applied in their classroom intervention.

Sparks and Loucks-Horsely (1989, as cited in Scanlon, Gallego, Duran, & Reyes, 2005) state that training is the most widely implemented staff development model and although it is the least costly, several shortcomings ultimately affect its effectiveness: (a) lack of common purpose as the basis for participation, as participants often arrive at the workshop unaware of the topic so have no investment, (b) little or no opportunity for teachers to intervention implementation procedures, exchange feedback with colleagues, or discuss implementation with the staff developer, and (c) lack of opportunity for genuine collegial relationships because most training sessions are conducted in a unidirectional manner with an expectation of exact replication of the demonstrated procedure (p. 41).

Desimone, Porter, Garet, Yoon, and Birman (2002) conducted a longitudinal study that replicated and extended cross-sectional national findings and provided research of the link between focusing on specific teaching interventions in professional development and having teachers use those specific classroom interventions. That link increased teachers' use of those interventions in the classroom. Their longitudinal data indicate that:

professional development is more effective in changing teachers' classroom intervention when it has collective participation of teachers from the same school, department, or grade; and active learning opportunities, such as reviewing student work or obtaining feedback on

teaching; and coherence, for example, linking to other activities or building on teachers' previous knowledge. (p. 102)

It is interesting to note that Desimone et al. (2002) also found that active learning opportunities for teachers increased the effect of the professional development on teachers' instruction (p. 81).

Borko (2004, as cited in Wiliam, 2006) states that research on teacher learning shows that professional learning communities (PLCs) provide the most effective process for teacher change. Louis and Kruse (1995) describe PLCs as having five elements: shared norms and values, focus on student learning, reflective dialogue, deprivatization of intervention, and collaboration. Hord (2004) also organized the characteristics of PLCs into five themes: supportive and shared leadership, shared values and vision, collective learning and application of learning, supportive conditions, and shared intervention. Further studies of PLCs have determined that when teachers are involved in a collaborative process to examine teaching instruction and are provided an opportunity to engage in dialogue with other teachers, student achievement increases more quickly than when teachers are not involved in this type of process (Darling-Hammond, 1995).

Reflective intervention.

York-Barr, Sommers, Ghore, and Montie (2006) discuss reflective intervention and the continuous learning process. As an individual, some ways of reflecting alone include "journaling, reviewing a case, reading professional literature, developing and reviewing a teaching portfolio, exercising, and observing or listening to one's own intervention through use of videotapes or audiotapes" (p. 21). The authors suggest group

reflection may involve personal risk, however, when it becomes part of educational intervention within a small group. Yet, the members can benefit in the following ways:

- Enhanced learning and resources for learning about interventions, given the expanded number of individuals, each of whom brings varied experiences and expertise in life, learning, and education.
- Increased professional and social support, given the expanded network of collegial relationships.
- More effective interventions for individual students or groups of identified students, given shared purpose, responsibility, and expertise among members of a group.
- Emerging sense of hope and encouragement that meaningful and sustained improvements in intervention can occur, given that members in a group are working and learning together.
- Improved climate and collegiality, given greater understanding of our own and others' experiences and perspectives about our shared place of work (p. 22–23).

York-Barr et al. suggest small group reflection can occur through a variety of means, including study groups, grade-level or content-area meetings to review and design instructional and assessment procedures, and case-study reviews (p. 22–23).

Summary of professional development literature.

A review of the literature for training options for early intervention teachers of ASD students presented six potential methods, although no studies were found specific to training ASD early intervention personnel. Each of the methods that did surface present potentially viable options and implementation prospects. Of the methods researched, the benefits of PLCs in affecting teacher intervention and increasing student achievement are

clearly indicated. As the need for training early intervention teachers of students with ASD grows, the establishment of PLCs should be considered as an option for building teacher competencies in schools.

Summary and Conclusions

ASD is a lifelong neurodevelopmental disorder with a prevalence rate in the United States of 1 in 110 births (Centers for Disease Control and Prevention, 2009). It is the fastest-growing developmental disability in this country, and has an annual growth of between 10% and 17%. This increase has significant implications for school districts in Minnesota because the special services required for this population of students are specific and intense.

Attention on autism is being focused on at both state and federal levels. The passage of the Combating Autism Act of 2006 and the declaration by the University of Minnesota in 2007 of the goal to become one of the nation's top autism research centers are just two examples of the growing importance of research on autism and the promotion of research-based interventions.

The research reviewed for this study found evidence that strong consensus exists about the need for early intervention teachers of children with ASD to use research-based interventions. Research-based intervention evolved in the field of education amid concerns that effective, research-based interventions were not being used in schools. As NCLB dictates, educators must be pointed toward tools that will allow them to make meaningful changes through the use of scientifically based research (Yell, et al., 2005).

The specialized instruction needs of young ASD students has created challenges for early intervention teachers, who have had little or no specialized training in the

unique disabilities of these children. Both parents and professionals have fallen prey to unproven interventions when little or no guidance, expertise, or knowledge of scientifically based approaches existed.

In the research-based literature review, seven scholarly studies revealed consensus about core components of effective programming. Parent involvement and structured teaching were universally supported by all the literature reviews. Also supported were intervening as early as possible, ensuring treatment intensity, and implementing curricula tailored for children with ASD. Most significantly, it should be noted that no one single intervention should be used to the exclusion of others, and that educators and parents need to investigate and ask pertinent questions when selecting appropriate options based on individual needs.

A review of the literature regarding personnel preparation for early intervention teachers of ASD children revealed gaps between what teachers know and what they need to know. Teacher shortages exacerbate challenges faced by early intervention teachers, who need to acquire special skills even when established in existing teaching positions. Foundations in basic general and special education interventions are insufficient for meeting the needs of young ASD students (Simpson, 2004) because special skills must be explicitly taught, modeled, and practiced. While this may be true, the National Research Council (2001) report indicates that most teachers receive little formal instruction in research-based interventions for children with autism. Combined with teacher shortages and lack of training, early intervention teachers have limited time available for them to participate in continuing education and for qualified consultants to provide comprehensive instruction for them. The National Research Council (2001) study

concluded that personnel preparation for working with young ASD children remains one of the weakest elements of effective programming.

Although no teacher licensure to work with ASD students exists in the state of Minnesota, Autism Certificate Programs exist at several universities in the state. ASD competencies have been developed and proposed in Minnesota to provide guidance and outline proficiencies needed for teachers to build capacity in working with this unique population. Both the ASD competencies and the ASD certificate programs are optional for teachers. Coursework for the certificate program can be expensive, as well as geographically inaccessible to many teachers.

In a review of the professional development literature, five options for delivering training to early intervention teachers of ASD students were discussed: distance education, technology-mediated consultation, online mentoring, professional learning communities, and reflective. All options provide opportunities for dissemination of valuable information, however to build the capacity of ASD teachers in school districts, it appears that the most beneficial approach is to implement ASD professional learning communities, which would facilitate collaborative learning and reflection to increase competencies. Research indicates strong support for increased teacher skills and student achievement through this method. School district personnel could build a strong support system within their own system for setting goals for shared learning that could result in positive changes for their students with autism.

To summarize, this literature review revealed a gap between what teachers of young children with autism know and what they need to know for effective programming. Scholars indicate that research-based interventions need to be

implemented in programs, yet barriers exist that prevent these essential components from being implemented. This gap presents a challenge and serves as an impetus for further research on early intervention programs with autism in Minnesota, specifically with regard to research-based intervention implementation. Therefore, the following study was proposed to add to the knowledge base of professionals and policy makers in the state.

Proposed Study

Due to increased accountability as a result of NCLB and the need for teachers of young children with autism to implement research-based interventions, school districts must have access to research regarding intervention practice. A considerable amount of knowledge about research-based interventions for supporting the growth and development of young children exists, but little is known about the degree to which interventions are being implemented consistently and effectively. Further, little is known about where, when, how, and who provides early intervention teachers with their training in ASD in Minnesota. There appears to be a gap in the literature regarding professional development for early intervention teachers.

By accessing early childhood special education teachers through a statewide listserv, this study attempted to discover the interventions employed by early intervention teachers with regard to personnel preparation for working with children with ASD. This study adds to the research base on professional development through inquiry about the degree to which training is needed, geographic gaps in training in the state of Minnesota, and preferred training models.

Research Questions

- 1) To what extent do currently practicing Early Childhood Special Education teachers implement research-based interventions with children with Autism Spectrum Disorders?
- 2) What learning methods have supported Early Childhood Special Education teachers in their knowledge of research-based interventions for children with ASD?
- 3) What learning methods are preferred by early intervention teachers in advancing their knowledge of ASD?
- 4) What factors have been barriers for Early Childhood Special Education teachers in accessing training in the area of Autism Spectrum Disorders?

Chapter 3

Methodology

This chapter describes the methodological design of this descriptive research study that employed survey methods. Based on the research questions identified, a survey method was chosen to investigate the current status of information, knowledge, and implementation of research-based interventions for young children with Autism Spectrum Disorders (ASD) by Early Childhood Special Education (ECSE) teachers. ECSE teachers, ECSE coordinators, autism consultants, and Directors of Special Education in Minnesota were surveyed. Furthermore, information was investigated regarding how training and information about research-based interventions for young children with ASD have been received. In this chapter, the methodology is described in full detail, including instrumentation, sampling, data collection, data management, and data analysis plans. The issue of methodological integrity also is addressed. The research questions guiding this study were:

- 1) To what extent do currently practicing Early Childhood Special Education teachers implement research-based interventions for children with Autism Spectrum Disorders?
- 2) What learning methods have supported Early Childhood Special Education teachers in their knowledge of research-based interventions for children with Autism Spectrum Disorders?
- 3) What learning methods are preferred by early intervention teachers in advancing their knowledge of Autism Spectrum Disorder interventions?

- 4) What factors have been barriers for Early Childhood Special Education teachers in accessing training in the area of Autism Spectrum Disorders?

Research Design

A descriptive study utilizing a quantitative design was identified as the best way to gather information about the current status of information and knowledge among ECSE teachers about research-based interventions for students with ASD. Surveys can be useful in revealing the current status of a target variable (Thomas, 2003), thus an online survey was used to provide breadth of information. “The purpose of a typical survey is to collect information from a sample and generalize it to a larger population” (Patten, 2005), and that was the objective of this study. Using four separate respondent groups provided more in-depth information about perceptions of early intervention program interventions from those who observe it through different lenses. Variety between respondent groups was sought.

Survey

An online survey was used to assist the researcher in answering the questions set out at the beginning of this chapter.

Instrumentation

The survey was developed through analysis of the research literature, previous surveys conducted statewide in Minnesota (2007), plus a review of several surveys conducted for research in autism, special education, and medical fields (Heidgerken, Geffken, Modi, & Frakey, 2005; Shah, 2001; Marvin, LaCost, Grady, & Mooney, 2003; Schwartz & Drager, 2008; and Campbell, 2006). Literature reviewed for this study

indicated a number of key features of research-based interventions for young children with ASD:

- parent/family involvement
- structured teaching
- earliest possible start to intervention
- intensity of treatment
- specific curricula

Several studies pointed to various explanations for why ECSE teachers do not implement research-based interventions. Among them were:

- limited time to participate in continuing education
- little formal training in research-based interventions for autism
- little planning time
- personnel preparation is varied and one of the weakest elements of effective programming
- inadequate technical support
- colleges slow to implement low-incidence disability coursework
- little attention has been focused on transferring research knowledge of research-based interventions for children with ASD
- scarcity of specialized preparation in ASD
- professionals with little expertise on research-based interventions conduct workshops
- teacher trainers/leaders/coordinators may not be connected to the research

- lack of administrative support for training and implementation of research-based interventions
- school officials ill-informed about appropriate programming for children with ASD
- teacher shortages translate into insufficient numbers of trained teachers

A survey conducted in Minnesota in April 2006 (Hoeg, Sievers, Keller, Kim, & Kiefer-O'Donnell, 2007) targeted service providers of birth to 3-year-old children with or suspected of having ASD. The purpose of that study was to gather descriptive information on early intervention interventions for children under the age of 4 with ASD in the state. The last, open-ended question of the survey asked respondents to identify their top learning interests regarding effective interventions for young children with Autism Spectrum Disorders. Results from the ECSE teachers showed the top suggestions as: 1) more time, 2) training for staff, and 3) training for parents/support group. An attempt was made in the proposed study of this research to expand the findings of this 2006 Minnesota survey item.

The survey used in this study was developed and administered through an online resource, SurveyMonkey.com. Components of the survey were subject to a review process that included a pilot study. The survey is included in Appendix E.

Sampling

An email database of all ECSE coordinators (N=110), Directors of Special Education (N=101), and ASD consultants (N=36) in Minnesota was available through the Minnesota State Department of Education website and provided a finite number of respondents in the survey populations. The survey sample included all potential respondents in the email database for each of those three groups. The response rates for

the groups were: ECSE coordinators (n=60), 55%; Directors of Special Education (n=40), 40%; and autism consultants (n=18), 50%.

Since a database of all ECSE teachers in Minnesota did not exist, a separate email was sent to the ECSE coordinators with a request that each coordinator forward the ECSE teacher survey to three ECSE teachers in their respective school district who served children ages 3 to 5. Since there were 110 ECSE coordinators in the sample, the projected sample size of ECSE teachers was then calculated at 330 possible respondents.

Completed surveys from the ECSE teachers numbered 118, for a response rate of 36%, although the number of ECSE coordinators who actually forwarded the survey on to ECSE teachers was unknown. The ECSE teacher group (n=118) and the combined total of the three other surveyed groups (n=118) yielded a total number of 236 participant responses.

Dillman's (2007) completed sample size formula (p. 206) was used to arrive at the number of completed surveys needed for 95% confidence and no more than 5% error. In this case, the formula indicated a minimum of 366 (n=366) completed surveys were needed. In an effort to better understand the range of possibilities in the necessary number of completed surveys, the researcher calculated completed sample sizes at the 95% confidence level for both 3% and 5% error rates for the entire population of ECSE coordinators, the population of autism consultants, the population of Directors of Special Education, and the population of ECSE teachers. Table 1 summarizes the results of these calculations. The entire group needed to generate 469 (n=469) completed surveys for a 3% error rate, whereas only 366 were needed to maintain a 5% sampling error. In order to have similar levels of reliability (3% and 5%) in each of the sub-groups, nearly all the

surveys needed to be completed for the sub-groups with smaller populations (i.e., ECSE coordinators, Directors of Special Education, and regional autism consultants) compared to the larger number of ECSE teachers. While having enough survey responses to use the 3% error rate was preferable, the researcher used 95% confidence interval with a 5% sampling error.

Table 1
Completed Sample Sizes for 95% Confidence Intervals

Subgroup to be surveyed	Surveys Sent	Surveys Received	3% Sampling Error	5% Sampling Error
ECSE Teachers	330	118	254	177
ECSE Coordinators	110	60	100	86
Regional Autism Consultants	24	40	23	23
Directors of Special Education	101	16	92	80
Totals	555	234	469	366

The actual number of responses to the surveys was 236 (n=236), which was well-below the number of completed surveys needed to maintain 95% confidence with no more than 5% error. Thus, due to the number of responses received in this study, the researcher could not confidently make conclusive generalizations regarding the data.

Data Collection, Management, and Analysis

The purpose of this survey was to collect perspectives from multiple sources regarding intervention interventions employed by ECSE teachers in Minnesota who serve children with ASD. Each survey contained 17 forced-choice questions and one open-ended question. A pilot survey was conducted in February 2009 to assist in clarifying survey items and to estimate the potential time commitment of respondents. The pilot survey was administered to eight ECSE teachers in Region 6 and resulted in modifications to the final survey product actually administered. Thus, the final survey

product was not a standardized instrument, but one developed by the author for use in this particular research.

The survey was administered online toward the end of the 2008–09 school year. Survey items were developed to specifically address the four major areas of inquiry reflected in the research questions: 1) current implementation of effective interventions, 2) past learning methods related to ASD, 3) preferred learning methods related to ASD, and 4) barriers that prevent ECSE teachers from accessing training in effective interventions related to ASD. Parallel forms of the survey were developed for each of the four respondent groups (i.e., ECSE teachers, ECSE coordinators, Directors of Special Education, and ASD consultants), each with 17 forced-choice questions and one open-ended question. The open-ended question asked respondents to identify the top learning interests regarding effective interventions for young children with ASD. The purpose of the open-ended question was to gauge respondents' perspectives on effective interventions and to allow for input that may not have been revealed by options in the forced-choice questions.

To analyze the open-ended responses, each response was reviewed and coded by one of the five research-based categories (i.e., structured teaching, specific curricula, parent/family, early start, and intensity) identified in the literature review. Responses not coded in one of those five areas were then coded "professional development" or "other." The "other" category responses were coded by a topic closely related to the response, for example, "behavior."

The survey was an online, web-based survey, using SurveyMonkey.com as a host and to collect the data. The survey contained a welcome page to secure consent, one

complete page containing the entire survey with a right vertical scroll bar, and a thank you page. Demographic questions, as well as questions addressing the research questions were used. In conjunction with the creation of the web-based survey, an email database was created for the sole purpose of receiving research data. Once the survey was sent, with the responding time period of one month specified, a reminder notice was emailed two weeks later to encourage a higher response rate. In the case of the autism consultant group, a third reminder was emailed in order to encourage representation from all regions in the state.

In Minnesota at the time of the survey, there were approximately 101 Directors of Special Education, 24 autism consultants, and 110 ECSE coordinators, providing a finite number of respondents in the survey population. The survey was emailed with a cover letter explaining its importance. A database did not exist for ECSE teachers in the state. Therefore, a separate email was sent to ECSE coordinators requesting that the link to the ECSE teacher survey be forwarded to three ECSE teachers who serve children with ASD ages 3 to 5 within their respective district. In mid-June 2009, the survey website was closed and the data downloaded to a Microsoft Excel file.

Email surveys allowed a larger audience to be reached with a reasonable budget. An item analysis was conducted for each question and a report of the percentage of respondents in each category was possible. The data were disaggregated by region, urbanicity, and profession. Background data obtained from the survey were presented via descriptive statistics. The number and percentage of responses within each response category of every closed question on the survey was reported as well. The data were then

loaded into a Statistical Package for the Social Sciences (SPSS) program for analysis of variables using an independent sample t-test.

Methodological Integrity

Educational research concerns center on the validity and reliability of results. Two forms of validity exist, external and internal. According to Howell (2002), internal validity refers to the integrity of the study while external validity is defined as the degree to which the results of one study can be generalized to other groups.

The survey instrument used in this research study was not a standardized instrument, but one that had been constructed by the author for use in this particular case. Limiting error was central in the development of the survey. Dillman (2007) described the four sources of survey error that limit this kind of survey design. “Measurement error” can occur when a respondent’s answer to a survey question is inaccurate or inexact. In this survey, expert review of the survey by the researcher’s committee members, piloting of the survey, and following item-writing guidelines set forth by Dillman (2007) and Patten (2001) helped limit measurement error.

“Sampling error” can occur when a researcher attempts to survey only some, and not all, of a given population (Dillman, 2007). In this study, the survey was sent to all people in the targeted populations identified, with the exception of the ECSE teachers. Dillman (2007) went on to explain that “coverage error” can occur when the list from which a sample may be drawn does not include all elements of a population, which could present bias against those unable to be included in the survey. For this study, the survey was sent to all ECSE coordinators, all autism consultants, and all Directors of Special Education, so coverage error was minimized. One source of coverage error that the

researcher could not control was the distribution of the survey to the ECSE teachers through the ECSE coordinators. There were limited ways to ensure the researcher's email was forwarded on to the ECSE teachers. There was no guarantee the ECSE coordinators would themselves complete the survey, and those same coordinators may not have forwarded the email on to three ECSE teachers as requested. Moreover, with an email survey, some computer firewalls and security systems may not have allowed the researcher's email to reach the intended respondents.

According to Dillman (2007) "non-response error" occurs when a significant number of people in the survey sample do not respond to the survey and have different characteristics from those who do respond. Through careful survey item construction following Dillman's (2007) guidelines, the researcher attempted to limit non-response error. According to Dillman (2007), the opening item in a survey, if poorly constructed, would be a source of non-response. By developing an inviting cover email and writing a first question that applied to every respondent and was easy to answer, the researcher hoped to reduce survey non-response. Moreover, the researcher attempted to make the entire survey respondent-friendly to diminish non-response.

Survey Categories

Simpson (2005) was used as the primary basis for determining interventions included in the list of options considered scientifically based interventions, promising interventions, and those interventions with limited supporting information. Simpson et al. (2003) evaluated and categorized 33 interventions and treatments commonly used with children and youth with ASD. The Simpson et al. (2003) study defined scientifically based interventions as those that have had significant and convincing empirical efficacy

and support (p. 9). Interventions considered promising were described as those that had efficacy and utility with individuals with ASD (p. 9). Interventions with limited supporting information lacked objective and convincing supporting research but had undecided, possible, or potential utility and efficacy (p. 9).

Thirteen of Simpson's listed interventions were included in this survey. The scientifically based interventions identified by Simpson (2005) were referred to as research-based interventions for the purpose of this study; they were: Applied Behavior Analysis (ABA), Discrete Trial Training (DTT), Pivotal Response Training, and Learning Experiences – An Alternative Program for Preschoolers (LEAP). Interventions used in the survey that Simpson (p. 146) called promising interventions were: Incidental Teaching, Picture Exchange Communication System (PECS), Augmentative/Alternative Communication, Assistive Technology, Social Stories, and Sensory Integration (p. 146). Those interventions considered as having limited supporting information for intervention by Simpson (p. 146) and that were used in this survey were: Floor Time, Relationship Development Intervention (RDI), and Music Therapy.

Other interventions included as survey options were those the National Research Council (2001) listed as its recommended interventions (i.e., parent/family, early start to intervention, and intensity of treatment). Five additional commonly used interventions were also included—visual schedules, picture activity schedules, data collection, speech/language therapy, and occupational therapy—as options to gauge perception of implementation with young ASD children.

The first question of the survey inquired about the implementation of 24 specific interventions: “For each of the following interventions, please indicate the extent to

which you believe ECSE teachers in your district(s) implement the following interventions with young children with Autism Spectrum Disorder (ASD)?” Each was rated on a scale of 1 to 3, with (1) representing regularly, (2) sometimes, and (3) rarely or never. The interventions were situated in random order in the survey so that respondents would not be cued to any pattern of category. No place in the survey was there mention of research-based interventions, but the term effective intervention was used.

Once the online survey was closed, the data were downloaded into an Excel spreadsheet for organization. Descriptive analyses were performed yielding frequencies, means, modes, and percentages. Each of the interventions was coded by one of five categories that corresponded to research-based research from the literature review: structured teaching, specific curriculum, parent/family, early start to intervention, and treatment intensity. The data were then transferred to SPSS for further analysis.

Data Analysis Strategies

To begin the analysis, data were downloaded from the electronic survey directly into an Excel spreadsheet, then transferred into SPSS for statistical analysis. Descriptive information was reported in frequencies, percentages, means, modes, and ranges for each survey item. Responses from all participants who answered a particular question were averaged to obtain a mean response for each item on the survey. When participants chose not to answer an item on the survey, the average was calculated using the number of participants who did answer that item. The response rate was calculated by dividing the number of people who completed the online survey by the number of people who were sent the survey. An independent sample, two-tailed t-test was conducted to compare means of variables in order to determine statistical differences.

Summary

The purpose of this study was to determine factors that influence ECSE teachers of ASD students in using effective interventions. A quantitative design used an online survey to gather information from four separate groups, including ECSE teachers, ECSE coordinators, autism consultants, and special education directors. Input from a variety of sources added depth to the study.

Chapter 4

Data Analysis

Introduction

The purpose of this study was to determine factors that influence the implementation of research-based interventions by early intervention teachers of students with Autism Spectrum Disorders (ASD) in Minnesota. This study was framed around four research questions:

- 1) To what extent do currently practicing early intervention teachers implement research-based interventions for children with ASD?
- 2) What learning methods have supported early intervention teachers in their knowledge of research-based interventions for children with ASD?
- 3) What learning methods are preferred by early intervention teachers in advancing their knowledge of ASD?
- 4) What factors have been barriers for early intervention teachers in accessing training in the area of ASD?

To answer these four questions, data collection methods were planned, survey questions were developed, four slightly different survey instruments were tailored toward the different survey respondent groups, and the data were prepared for analysis.

Results of the survey research data analysis were reported in this chapter. Demographic information was presented first to provide basic information about survey respondents. Early Childhood Special Education (ECSE) teachers were the focus because survey questions and results were central to teacher intervention. All respondent group

demographic data were referenced in Table 2. Following the demographic data, five major study areas were described: implementation of intervention by role, implementation of intervention by region, implementation of intervention by urbanicity, professional development, and results from the survey's open-ended questions.

Concluding summary discussion will end the chapter.

Demographics

Demographic questions on the survey provided data about the intervention experiences and educational background of each respondent. Data about regions of Minnesota and urbanicity of respondents regarding where they were employed also were collected. Data are presented in Table 2 in descriptive form with frequencies and percentages. Exactly one-half of the respondents surveyed were ECSE teachers, 25% were ECSE coordinators, 17% were special education directors, and 8% were ASD consultants.

Descriptive data about all four respondent groups are shown in Table 3. Reported here, however, is a summary of only the ECSE teachers, because the primary aim of the study was to understand more fully the characteristics, interventions, and learning needs of the professionals who interact directly with children. Nearly all (n=114, 98.3%) ECSE teacher respondents reported holding a current ECSE license and 66% reported having a Master's degree. Fifty-one percent of the responding teachers had been in their current position for less than six years while 49% reported working the their position more than seven years. Fifty-five percent reported having taken three or fewer ASD college credits, and 78% reported knowing about an ASD certificate program but had not pursued that

option. Only 8.5% had engaged in a certificate program while 9% reported to have completed a certificate program.

Table 2
Survey Respondent Regions and Urbanicity

Respondent Characteristics	ECSE Teachers	ECSE Coordinators	Special Education Directors	ASD Consultants
	n=118 f (%)	n=60 f (%)	n=40 f (%)	n=16 f (%)
Region of Minnesota				
1 and 2 (Northwestern MN)	8 (6%)	8 (14.5%)	3 (8%)	2 (12.5%)
3 (Northeastern MN)	3 (2%)	2 (4%)	2 (5%)	1 (6%)
4 (West Central MN)	7 (6%)	3 (5%)	3 (8%)	4 (25%)
5 and 7 (Central MN)	18 (15%)	10 (18%)	4 (7%)	2 (12.5%)
6 and 8 (Southwestern MN)	17 (15%)	8 (14.5%)	6 (11%)	4 (25%)
9 (South Central MN)	4 (3%)	2 (4%)	1 (1%)	0 (0%)
10 (Southeastern MN)	5 (4%)	5 (9%)	2 (5%)	2 (12.5%)
11 (Metro Twin Cities)	54 (47%)	17 (30%)	17 (45%)	1 (6%)
Urbanicity				
Rural	22 (19%)	19 (33%)	12 (30%)	10 (63%)
Small Town in Outstate	28 (24%)	17 (30%)	8 (20%)	5 (31%)
2 nd - and 3 rd -Ring Suburb	45 (38%)	10 (18%)	11 (28%)	1 (6%)
1 st -Ring Suburb	21 (18%)	8 (14%)	8 (20%)	0 (0%)
Urban	2 (2%)	3 (5%)	1 (5%)	0 (0%)

Note. N = number of respondents; f= frequency of response; % = percentage of respondents

About half the ECSE teachers reported being very knowledgeable (51%) about ASD interventions. ECSE teachers from Minnesota's Region 11, the Suburban Metro area surrounding the cities of Minneapolis and St. Paul, accounted for 53 of the 51%. Regions 5 and 7 (Central Minnesota) and Regions 6 and 8 (Southwest/West Central Minnesota) each accounted for the next highest percentages of respondents who considered themselves very knowledgeable. By urbanicity, only two of the 118 ECSE teachers reported being from an urban area of the state. Because only two urban ECSE teachers responded, data largely represent respondents from rural/town/small cities (n=50, 43%) and first-, second-, and third-ring suburbs (n=66, 56%). Urbanicity respondent group results are displayed in two aggregated categories, Greater Minnesota, which includes the rural/town/small city response options, and Suburban Metro, which includes first-, second-, and third-ring suburb and urban areas.

Table 3
Respondent Education and Knowledge of ASD Interventions

Respondent Characteristics	ECSE Teachers n=118 f (%)	ECSE Coordinators n=60 f (%)	Special Education Directors n=40 f (%)	ASD Consultants n=16 f (%)
ECSE Licensure				
Yes	114 (98.3%)	38 (63%)	10 (25%)	6 (37.5%)
No	2 (1.7%)	22 (37%)	30 (75%)	10 (62.5%)
Highest Degree				
Bachelor's	37 (31%)	9 (15%)	1 (2.5%)	6 (37.5%)
Master's	78 (66%)	37 (62%)	15 (37.5%)	9 (56.3%)
Education Specialist	3 (3%)	11 (18%)	17 (42.5%)	1 (6%)
Doctorate	0 (0%)	3 (5%)	7 (17.5%)	0 (0%)
Years in Current Position				
<1	4 (3.4%)	0 (0%)	1 (2.5%)	0 (0%)
1–3	32 (27.1%)	14 (23.3%)	8 (20%)	1 (6.3%)
4–6	24 (20.3%)	5 (8.3%)	9 (22.5%)	4 (25%)
7–9	9 (7.6%)	8 (13.3%)	8 (20%)	1 (6.3%)

10–15	20 (16.9%)	14 (23.3%)	8 (20%)	4 (25%)
16–20	15 (12.7%)	4 (6.7%)	3 (7.5%)	3 (18.8%)
21–24	8 (6.8%)	10 (16.7%)	0 (0%)	1 (6.3%)
25+	6 (5.1%)	5 (8.3%)	3 (7.5)	2 (12.5%)
<hr/>				
Number of ASD Credits				
0	18 (15.3%)	14 (23.3%)	11 (27.5%)	2 (12.5%)
1–3	37 (31.4%)	21 (35.0%)	7 (17.5%)	2 (12.5%)
4–6	26 (22.0%)	13 (21.7%)	12 (30.0%)	1 (6.3%)
7–10	19 (16.1%)	1 (1.7%)	2 (5.0%)	3 (18.8%)
11>	18 (15.3%)	11 (18.3%)	8 (20.0%)	8 (50.0%)
<hr/>				
ASD Certificate Program				
Didn't Know of Program	5 (4.2%)	0 (0%)	0 (0%)	9 (0%)
Aware, Not Pursued	92 (78%)	53 (88%)	39 (97.5%)	10 (62.5%)
In Process of Completing	10 (8.5%)	3 (5%)	0 (0%)	3 (18.8%)
Have Completed	11 (9.3%)	4 (7%)	1 (2.5%)	3 (18.8%)
<hr/>				
Knowledge of ASD Interventions				
Not at all Knowledgeable	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Not very Knowledgeable	2 (1.7%)	2 (3.3%)	1 (2.5%)	0 (0%)
Somewhat Knowledgeable	50 (42.4%)	28 (46.7%)	21 (52.5%)	1 (6.3%)
Very Knowledgeable	60 (50.8%)	24 (40%)	15 (37.5%)	14 (87.5%)
Extremely Knowledgeable	6 (5.1%)	6 (10%)	3 (7.5%)	1 (6.3%)
<hr/>				
<i>Note.</i> N = number of respondents; f= frequency of response; % = percentage of respondents				

In summary, the majority of the 118 ECSE teacher respondents were fully licensed in ECSE, had completed a graduate program, and had less than 6 years experience in their current position. Few of the ECSE teachers reported taking ASD college credits and most were aware of, but had not pursued, an ASD certificate program. Just over half the ECSE teachers perceived themselves to be at least very knowledgeable about ASD interventions. ECSE teacher respondents reflected all 11 regions of

Minnesota, with the Suburban Metro area providing highest representation. Only two of the 118 teachers described themselves as from an urban area. The suburbs were the most highly represented, followed by small towns and rural areas, respectively.

Implementation of Interventions by Role

Once the data were collected and organized, frequency, mean, and modal values were reported on all items for each of the four surveyed respondent groups (i.e., ECSE teachers, ECSE coordinators, directors of special education, and ASD consultants). Descriptive statistics were used to determine which interventions had the highest perceived level of implementation by ECSE teachers. Interventions were then ordered from the highest reported frequency of use to the lowest, based on the ECSE teacher responses. The ECSE teacher results were considered to be the most valid because of their daily proximity to intervention compared to the less proximal and less frequent connections of the other three respondent role groups. ECSE teacher results are, therefore, reported first in each category and then followed by the results of ECSE coordinators, directors of special education, and ASD consultants. The means and modes for all items across all four respondent roles are located in Table 4.

Table 4

Implementation of Intervention by Role

Intervention	Dimension of Intervention	ECSE Teachers	ECSE Coordinators	Special Ed. Directors	ASD Consultants
		n=118 X (mo)	n=60 X (mo)	n=40 X (mo)	n=18 X (mo)
Visual Schedules	Structured Teaching	2.88 (3)	2.95 (3)	3.00 (3)	2.81 (3)
Picture Activity Schedule	Structured Teaching	2.76 (3)	2.96 (3)	2.90 (3)	2.88 (3)
Incidental Teaching	Structured Teaching	2.64 (3)	2.53 (3)	2.53 (3)	2.44 (3)
Data Collection	Structured Teaching	2.52 (3)	2.58 (3)	2.73 (3)	2.07 (2)
PECS	Structured Teaching	2.41 (3)	2.72 (3)	2.70 (3)	2.13 (2)
Physical classroom organizers	Structured Teaching	2.33 (3)	2.63 (3)	2.75 (3)	2.38 (2)
ABA ¹	Structured Teaching	2.20 (2)	1.93 (2)	1.92 (2)	2.00 (2)
Discrete Trial Training ¹	Structured Teaching	2.07 (2)	2.13 (2)	2.17 (2)	2.06 (2)
TEACCH	Structured Teaching	1.95 (2)	2.09 (2)	2.19 (1/3)	2.19 (2)
Speech/Language	Specific Curriculum	2.93 (3)	2.96 (3)	3.00 (3)	2.88 (3)
OT	Specific Curriculum	2.80 (3)	2.91 (3)	2.95 (3)	2.88 (3)
Sensory Integration	Specific Curriculum	2.70 (3)	2.67 (3)	2.67 (3)	2.56 (3)
Assistive Technology	Specific Curriculum	2.58 (3)	2.63 (3)	2.60 (3)	2.31 (3)
Social Stories	Specific Curriculum	2.48 (3)	2.75 (3)	2.68 (3)	2.50 (3)

Augmentative/Alter. Comm.	Specific Curriculum	2.14 (2)	2.24 (2)	2.28 (2)	2.06 (2)
DIR/Floor time Approach	Specific Curriculum	1.93 (1)	1.96 (2)	2.00 (2)	1.50 (1)
Music Therapy	Specific Curriculum	1.82 (1)	1.64 (3)	1.54 (1)	1.50 (2)
RDI	Specific Curriculum	1.70 (1)	1.52 (3)	2.00 (2)	1.43 (2)
LEAP ¹	Specific Curriculum	1.45 (1)	1.37 (3)	1.68 (1)	1.17 (1)
Parents Trained in Spec. Skills ¹	Parent/Family	1.97 (2)	2.07 (2)	1.82 (1)	2.06 (2)
Regular Parent Group Mtgs. ¹	Parent/Family	1.59 (1)	1.75 (3)	1.56 (1)	1.62 (1)
Home Visits ¹	Parent/Family	1.55 (1)	1.55 (3)	1.67 (1)	1.64 (1)
Identifies/Evaluates Early ¹	Early Start	2.56 (3)	2.60 (2)	2.80 (3)	2.69 (3)
Intensity of Service (25 hrs.) ¹	Treatment Intensity	1.48 (1)	1.39 (3)	1.43 (1)	1.36 (1)

Note. 1 = researched-based interventions; n = number of respondents; X = mean or average; mo = mode or most frequent response; Scale: intervention implemented rarely/never = 1, intervention implemented sometimes = 2, intervention implemented regularly = 3

Structured teaching.

Nine specific interventions were coded in the category of structured teaching: visual schedules, picture activity schedules, incidental teaching, data collection, Picture Exchange Communication (PECS), physical classroom organizers, Applied Behavior Analysis (ABA), Discrete Trial Training (DTT), and Treatment and Education of Autistic & Related Communication for Handicapped Children (TEACCH). Of those nine, only two, ABA and DTT, were identified in the literature as research-based interventions.

Using a scale of 1/low to 3/high, respondents were asked to rate the frequency with which ECSE teachers implemented each specific intervention. Items with resulting means between 1.0 and 1.4 were rated as low frequency of intervention; means between 1.5 and 2.4 were rated as medium; and means between 2.5 and 3.0 were rated as high. The most frequently implemented intervention was reported to be visual schedules, with an average of 2.88 and a mode of 3. Also considered high frequency interventions were picture activity schedule, incidental teaching, data collection, and PECS. Interventions with a medium rating were physical classroom organizers, ABA, DTT, and TEACCH.

Of the nine structured teaching interventions, two of the research-based interventions were reported by ECSE teachers to be at the lowest levels of implementation. All four respondent groups reported higher levels of implementation of interventions considered promising but not research-based compared to implementation of actual research-based interventions. Interventions identified as promising were incidental teaching and PECS.

ECSE coordinators and directors of special education reported similar ratings as ECSE teachers, but with a slightly different order. Both groups perceived implementation

of physical classroom organizers as more frequently implemented than did the ECSE teachers. ASD consultants perceived visual schedules and picture activity schedules to be implemented at a high level and all other structured teaching interventions at a medium level. As stated above, each of the three other respondent groups, like the teachers, rated implementation of the two research-based interventions as the lowest among all interventions.

Specific curriculum.

The 10 interventions in the specific curriculum category were: speech/language therapy; occupational therapy (OT); sensory integration (SI); assistive technology; social stories; augmentative/alternative communication; Developmental, Individual Differences, Relationship-Based (DIR) Floortime; music therapy; Relationship Development Intervention (RDI); and Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP). Of these 10 interventions, only LEAP was identified as research-based in the literature review.

Using the same 1/low to 3/high scale, four specific curriculum interventions were reported to be implemented at a high level of frequency: speech/language therapy, occupational therapy, sensory integration, and assistive technology. ECSE teachers reported implementing five interventions at the medium level: social stories, augmentative/alternative communication, DIR Floortime, music therapy, and RDI. ECSE teachers reported LEAP being implemented at the lowest frequency level of all 10 options in the specific curriculum category. In fact, ECSE teachers rated LEAP as the least frequently implemented of all interventions on the survey. ECSE coordinators, directors of special education, and ASD consultants had similar ratings as ECSE teachers

with minimal variation in rank order of items. Interventions considered promising and even those with limited supporting information were rated higher than the research-based intervention.

Parent/Family.

In the parent/family category, three interventions were specified in the survey: parents are provided opportunities to be trained in specialized skills to teach their ASD child, parent group meetings are held regularly, and home visits are conducted in addition to center-based programming for 3- to 5-year-olds with ASD. Applying the same 1/low to 3/high scale, all three of these research-based interventions were reported by all respondents to be implemented with medium frequency.

Early start to intervention.

Only one survey response option was provided for rating in the category of early start to intervention which reflects the need to begin intervention as soon as a child is identified as ASD. All respondent groups reported this intervention as being highly implemented. Of all the research-based interventions across all survey categories, early start to intervention was reported to be the most frequently implemented by all respondent groups.

Treatment intensity.

Only one survey item was provided in the category of treatment intensity: children identified as ASD receive a minimum of 25 hours or more per week of service, as stated on the Individualized Education Plan (IEP). This intervention had one of the overall lowest ratings of all interventions on the survey. ECSE teachers, along with the other three groups of respondents, reported a low level of implementation despite its

being identified as a research-based intervention (National Research Council, 2001). All four respondent groups rated treatment intensity as one of the least frequently implemented interventions in the entire survey, indicating this research-based intervention is seldom implemented throughout the state.

Summary.

Results about the frequency with which research-based interventions were implemented were similar among all respondent groups. Further, across all five intervention categories, the only research-based intervention reported to be implemented at a high level by all four respondent groups was early identification of ASD.

In the structured teaching category, all groups rated the two research -based interventions as being implemented at a medium level, although the means and modes were two of the lowest of all nine survey items in that category. The only research-based intervention listed in the specific curriculum category, LEAP, was rated as the least frequently implemented intervention across all respondent groups. Consistent reporting across groups was also found in the parent/family category, in which three items were rated as being implemented with a medium frequency. Finally, among all four surveyed groups, treatment intensity was rated at a low level of implementation.

Results identified speech/language therapy and visual schedules, both of which are viewed as promising but not research-based interventions, as the most frequently implemented interventions on the survey by all four respondent groups. Minimal variation was apparent in ratings across all response groups for interventions identified on the survey. In summary, with the exception of identifying and evaluating early, research-

based interventions were rated at the bottom of those that ECSE teachers in Minnesota say they are implementing.

Implementation of Interventions by Region

Frequencies, means, and modes were reported for each intervention by region (Table 5). Comparisons across regions were made cautiously, as some regions had only a few ECSE teachers responding (perhaps only three or four) while the metro region had 53 responding ECSE teachers. The same rating scale as described above was used to determine the level of implementation as low, medium, or high. For reference, a map of Minnesota's Economic Development Regions is available in Appendix G.

Because of the considerable variation in the number of respondents from each region, it is questionable whether a comparison among regions can be made. Forty-five percent of the 118 respondents were from the metro area, while the next highest percentage, 15%, was from Regions 5 and 7 (West Central Minnesota). The range of regional response rate percentages was 2.5% (n=3) from Region 3 to 45% from Region 11 (n=53). The non-metro regions of Greater Minnesota (Regions 1 through 10) had a response rate of 55% of ECSE teachers; however, there were not significant consistencies across the collective Greater Minnesota regions to allow conclusions about regional differences. An observation made in the specific curriculum category found that regions along the western border of Minnesota had the lowest implementation of research-based interventions in the state.

Table 5

Implementation of Intervention by Region—ECSE Teacher Responses Only

Intervention	Intervention Dimension	Regions 1 & 2	Region 3	Region 4	Regions 5 & 7	Regions 6 & 8	Region 9	Region 10	Region 11
		f=8 ² X (mo)	f=3 ² X (mo)	f=7 ² X (mo)	f=18 ² X (mo)	f=17 ² X (mo)	f=4 ² X (mo)	f=5 ² X (mo)	f=53 ² X (mo)
Visual Schedules	Structured								
	Teaching	2.88 (3)	3.00 (3)	2.43 (3)	2.94 (3)	2.82 (3)	3.00 (3)	3.00 (3)	2.89 (3)
Picture Activity Schedule	Structured								
	Teaching	2.75 (3)	3.00 (3)	2.43 (3)	2.80 (3)	2.50 (3)	2.75 (3)	2.60 (3)	2.83 (3)
Incidental Teaching	Structured								
	Teaching	1.88 (2)	3.00 (3)	1.86 (2)	2.61 (3)	2.65 (3)	3.00 (3)	2.60 (3)	2.68 (3)
Data Collection	Structured								
	Teaching	2.13 (2)	2.67 (3)	2.57 (3)	2.67 (3)	2.29 (3)	2.75 (3)	3.00 (3)	2.55 (3)
PECS	Structured								
	Teaching	2.25 (2)	3.00 (3)	2.43 (3)	2.39 (3)	2.29 (2)	2.50 (2/3)	2.4 (3)	2.47 (3)
Classroom organizers	Structured								
	Teaching	2.13 (2/3)	3.00 (3)	2.57 (3)	2.50 (3)	2.12 (3)	2.25 (3)	2.60 (3)	2.26 (3)
ABA ¹	Structured								
	Teaching	1.86 (1)	1.67 (2)	2.00 (1/2/3)	2.11 (2)	1.94 (1/2)	2.25 (3)	2.20 (3)	1.88 (2)
Discrete Trial Training ¹	Structured								
	Teaching	2.14 (2)	2.33 (2)	2.29 (2/3)	2.11 (2)	1.80 (1)	2.50 (2/3)	2.60 (3)	2.73 (2/3)
TEACCH	Structured								
	Teaching	1.57 (1)	2.33 (2)	2.00 (2)	1.88 (2)	1.60 (1)	2.00 (2)	2.50 (3)	2.08 (2)
Speech/Language	Structured								
	Specific Curriculum	2.88 (3)	3.00 (3)	2.71 (3)	2.94 (3)	2.94 (3)	3.00 (3)	3.00 (3)	2.94 (3)
OT	Structured								
	Specific Curriculum	2.63 (3)	3.00 (3)	2.57 (3)	2.83 (3)	2.82 (3)	3.00 (3)	2.80 (3)	2.75 (3)
Sensory Integration	Structured								
	Specific Curriculum	2.50 (2/3)	3.00 (3)	2.71 (3)	2.83 (3)	2.53 (3)	3.00 (3)	2.80 (3)	2.62 (3)

Assistive Technology	Specific Curriculum	2.38 (2)	2.67 (3)	2.57 (3)	2.78 (3)	2.18 (2)	2.4 (3)	2.80 (3)	2.64 (3)
Social Stories	Specific Curriculum	2.13 (2)	2.67 (3)	2.00 (3)	2.61 (3)	2.29 (2)	3.00 (3)	2.40 (2)	2.57 (3)
Aug./Alter. Comm.	Specific Curriculum	1.88 (2)	1.67 (2)	2.17 (2)	2.56 (3)	1.80 (2)	2.50 (2/3)	2.00 (2)	2.17 (2)
DIR/Floor time	Specific Curriculum	1.43 (1)	2.00 (2)	1.86 (1)	2.00 (1/3)	1.50 (1)	2.75 (3)	2.20 (3)	2.04 (2)
Music Therapy	Specific Curriculum	1.63 (1)	1.67 (1)	2.00 (2)	1.75 (1)	1.59 (1)	2.25 (3)	1.75 (1)	1.86 (2)
RDI	Specific Curriculum	1.50 (1)	1.00 (1)	1.50 (1/2)	1.79 (1)	1.08 (1)	2.25 (3)	2.25 (3)	1.85 (2)
LEAP ¹	Specific Curriculum	1.17 (1)	1.00 (1)	1.60 (1)	1.18 (1)	1.00 (1)	2.00 (1/3)	1.00 (1/2)	1.66 (1)
Parent Training ¹	Parent/Family	2.25 (2)	1.67 (2)	1.86 (2)	1.88 (2)	1.69 (1/2)	1.75 (1)	1.60 (2)	2.16 (20)
Parent Groups ¹	Parent/Family	1.63 (1)	1.33 (1)	1.57 (1)	1.38 (1)	1.25 (1)	1.33 (1)	1.00 (1/2)	1.76 (1)
Home Visits ¹	Parent/Family	1.38 (1)	1.00 (1)	1.29 (1)	1.63 (1)	1.25 (1)	1.67 (1)	2.40 (3)	1.63 (1)
Early Identification ¹	Early Start	2.50 (3)	2.00 (2)	2.00 (2)	2.61 (3)	2.53 (3)	2.25 (3)	2.40 (3)	2.70 (3)
Intensity (25hrs.) ¹	Treatment Intensity	1.57 (1)	1.67 (1)	1.50 (1)	1.31 (1)	1.63 (1)	2.00 (2)	1.40 (1)	1.36 (1)

Note. ¹Research-based interventions; ²Number of respondents per region, although for specific interventions some respondents indicated "don't know"; X=mean or average; mo=mode or most frequent response; Scale: intervention implemented rarely/never=1, intervention implemented sometimes=2, intervention implemented regularly=3.

A cursory review suggests the intervention with the highest level of implementation across regions was early start to intervention. Structured teaching research-based interventions were rated mostly at the medium level of implementation in all areas of the state except for the South Central/Southeast/Metro regions. The research-based intervention with the highest level of implementation was DTT. LEAP, the only research-based intervention in the specific curricula category, was rated at the lowest level of implementation of all of the interventions listed, behind promising interventions and those interventions with limited support. Parent/family as a research-based intervention had a low level of implementation across regions, as did treatment intensity.

Implementation of Interventions by Urbanicity

To determine whether variations existed among the 118 ECSE teacher respondents regarding the size of the urban area in which young children with ASD were served, five categories were designated in the survey: rural, town/small city in Greater Minnesota, second- or third-ring Suburban Metro, first-ring suburban, and urban. Urban ECSE teacher representation was found to be very low (n=2) and under-represented compared to the other four urbanicity categories. For purposes of reporting and comparison, rural and towns/small cities in outstate Minnesota were combined into one category, Greater Minnesota, and, first-, second-, and third-ring Suburban Metro and urban were combined into another category, Suburban Metro (Table 6).

An SPSS independent sample, two-tailed t-test was conducted to compare means of the two urbanicity groups in relation to implementation of the eight identified research-based interventions on the survey. In six of the eight identified research-based interventions (ABA, parent training provided, regular parent group meetings, treatment

intensity, and DTT), a t-test failed to reveal a statistically significant difference in implementation between Greater Minnesota and Suburban Metro ECSE teachers, as Table 7 reflects. Thus, the null hypothesis that the mean of both groups would be the same for these six research-based interventions was accepted ($p < .05$).

The null hypothesis was rejected in three of the research-based interventions on the independent sample t-test: LEAP, home visits, and early identification of children with ASD. The mean (M) score and standard deviation (SD) for the research-based intervention, LEAP, for teachers in Suburban Metro districts ($M=1.57$, $SD=.75$) was higher than those in Greater Minnesota ($M=1.24$, $SD=.56$). This difference was statistically significant, $t(89) = -2.17$, $p < .05$. The mean for home visits for Suburban Metro district teachers ($M=1.69$, $SD=.781$) was higher than for Greater Minnesota districts ($M=1.35$, $SD=.64$). This difference was statistically significant, $t(106) = -2.453$, $p < .05$. Finally, the early identification mean for Suburban Metro ECSE teachers was higher for Suburban Metro districts ($M=2.68$, $SD=.47$) than for Greater Minnesota districts ($M=2.40$, $SD=.639$). The statistically significant difference was $t(116) = -2.71$, $p < .05$.

Table 6
Implementation of Intervention by Urbanicity—ECSE Teacher responses only

Intervention	Greater Minnesota (Rural/Town/Small City) X (mo)	Suburban Metro (1st, 2nd, 3rd ring Suburb/Urban) X (mo)
Structured Teaching		
Visual Schedules	2.80 (3)	2.94 (3)
Picture Schedules	2.61 (3)	2.85 (3)
Incidental Teaching	2.54 (3)	2.67 (3)
Data Collection	2.36 (3)	2.63 (3)
PECS	2.34 (2)	2.46 (3)
Physical Organizers	2.28 (3)	2.37 (3)
Discrete Trial Training ¹	2.02 (2)	2.11 (3)
ABA ¹	1.92 (1)	1.97 (2)
TEACCH	1.79 (1)	2.06 (2/3)
Specific Curriculum		
SLP	2.90 (3)	2.96 (3)
OT	2.78 (3)	2.79 (3)
SI	2.69 (3)	2.65 (3)
Assistive Technology	2.50 (3)	2.65 (3)
Social Stories	2.32 (3)	2.60 (3)
Aug./Alt. Communication	2.04 (2)	2.34 (2)
DIR/Floor Time	1.77 (1)	2.05 (2)
Music Therapy	1.67 (1)	1.94 (1)
RDI	1.45 (1)	1.85 (2)
LEAP ¹	1.24 (1)	1.57 (1)
Parent/Family		
Parents Trained in Skills ¹	1.79 (2)	2.11 (2)
Parent Group Mtgs. ¹	1.43 (1)	1.85 (1)
Home Visits ¹	1.13 (1)	1.69 (1)
Early Start to Intervention		
Identifies/Evaluates Early ¹	2.40 (3)	2.68 (3)
Treatment Intensity		
Intensity of Service (25 hrs.) ¹	1.56 (1)	1.42 (1)

Note. ¹Research-based interventions; X=mean or average; mo=mode or most frequent response; Scale: intervention implemented rarely/never=1, intervention implemented sometimes=2, intervention implemented regularly=3

Table 7

Results of t-test for Research-based Intervention Implementation by Urbanicity

Research-based Intervention	Urbanicity	N	Mean	Standard Deviation	Levene's Test for Equality of Variances Significance	t	Df	t-test for Equality of Means Significance (2-tailed)
ABA	Greater MN	48	1.92	0.82	0.221	-0.36	113	0.719
	Suburban Metro	67	1.97	0.76		-0.36	96	0.723
LEAP	Greater MN	33	1.24	0.56	0.001	-2.17	89	0.032
	Suburban Metro	58	1.57	0.75		-2.35	82	0.021
Parent Training	Greater MN	48	1.79	0.68	0.767	-2.33	110	0.022
	Suburban Metro	64	2.11	0.74		-2.36	105	0.020
Home Visits & Center-based	Greater MN	46	1.35	0.64	0.012	-2.45	106	0.016
	Suburban Metro	62	1.69	0.78		-2.53	105	0.013
Regular Parent Group Meetings	Greater MN	47	1.43	0.72	0.006	-1.79	109	0.076
	Suburban Metro	64	1.70	0.87		-1.85	107	0.068
Early Identification	Greater MN	50	2.40	0.64	0.001	-2.71	116	0.008
	Suburban Metro	68	2.68	0.47		-2.59	86	0.011
Treatment Intensity	Greater MN	45	1.56	0.79	0.193	0.93	105	0.352
	Suburban Metro	62	1.42	0.71		0.92	89	0.360
DTT	Greater MN	47	2.02	0.74	0.122	-0.57	111	0.569
	Suburban Metro	66	2.11	0.81		-0.58	104	0.563

Summary.

An independent sample, two-tailed t-test analysis of results by urbanicity indicates no differences in level of implementation for five of the identified research-based interventions (ABA, parent training provided, regular parent group meetings, treatment intensity, and DTT). The research-based interventions found to have a higher level of implementation for Suburban Metro Minnesota ECSE teachers than for Greater Minnesota teachers were LEAP, home visits, and early identification of children with ASD.

Implementation of interventions and ASD Training

An SPSS independent sample, two-tailed t-test was conducted to compare means of two groups by the number of ASD course credits taken in relation to implementation of the eight identified research-based interventions on the survey. The two ASD credits groupings were: equal to or less than three credits taken and equal to or greater than seven credits taken. This test was performed in an effort to discover whether the number of ASD credits taken by ECSE teachers raised the level of implementation of research-based interventions. The t-test results failed to find a statistically significant difference in means between the two groups in implementation of any of the research-based interventions.

An independent sample, two-tailed t-test was conducted to find whether there was a difference in the implementation of the eight research-based interventions based on participation in an ASD certificate program. The two ASD certificate groups were: not aware or aware and not participated in an ASD certificate program and in process or completed an ASD certificate program. The t-test results failed to reveal a statistically

reliable difference between the ASD certificate groups in the level of implementation of any of the research-based interventions (Table 8).

Table 8

Results of t-test for Research-based Intervention Implementation and Number of ASD Credits Taken

Research-based Interventions	Number of ASD Credits Taken	N	Mean	Standard Deviation	Levene's Test for Equality of Variances Significance	t	Df	t-test for Equality of Means Significance (2-tailed)
ABA	Equal to or < 3 credits	56	1.84	0.76	0.988	-0.78	88	0.436
	Equal to or > 7 credits	34	1.97	0.80		-0.77	67	0.443
LEAP	Equal to or < 3 credits	44	1.50	0.76	0.275	0.33	67	0.742
	Equal to or > 7 credits	25	1.44	0.65		0.35	57	0.731
Parent Training	Equal to or < 3 credits	54	1.98	0.77	0.628	-0.29	85	0.769
	Equal to or > 7 credits	33	2.03	0.73		-0.30	70	0.767
Home Visits & Center-based	Equal to or < 3 credits	52	1.52	0.75	0.945	-1.12	84	0.266
	Equal to or > 7 credits	34	1.71	0.76		-1.12	70	0.268
Regular Parent Group Meetings	Equal to or < 3 credits	54	1.56	0.84	0.828	-0.50	86	0.615
	Equal to or > 7 credits	34	1.65	0.81		-0.51	72	0.613
Early Identification	Equal to or < 3 credits	57	2.58	0.50	0.011	0.89	91	0.376
	Equal to or > 7 credits	36	2.47	0.65		0.84	62	0.406
Treatment Intensity	Equal to or < 3 credits	53	1.47	0.70	0.513	0.74	82	0.463
	Equal to or > 7 credits	31	1.35	0.71		0.73	62	0.466
DTT	Equal to or < 3 credits	55	1.98	0.78	0.466	-0.45	86	0.655
	Equal to or > 7 credits	33	2.06	0.83		-0.44	65	0.660

Professional Development

Three survey questions aimed to garner perspectives about how ECSE teachers in Minnesota learned about effective interventions to implement for young children with ASD. The first question sought opinions about prior learning methods viewed as supportive of ECSE teachers learning about ASD interventions. The second question inquired about learning methods that would be preferred by ECSE teachers for learning about effective ASD interventions in the future. Lastly, the third professional development question asked teachers to identify barriers they faced in accessing professional learning opportunities in the area of ASD.

Preferred previous methods for learning about ASD interventions.

To determine the extent to which specific methods of prior learning had been supportive of ECSE teachers learning about effective interventions for young children with ASD, 13 professional learning methods were identified on the survey (see Table 9 for a complete listing.) Note that parallel versions were constructed for the three other respondent groups. Each of the 13 professional learning methods was rated on a 1/low to 3/high scale: (1) not at all, (2) somewhat, and (3) quite a bit.

Interestingly, results indicate there was very little difference in perspectives across the four respondent groups regarding previous learning methods viewed as supportive of ECSE teachers learning about ASD interventions. The top-rated method reported by ECSE teacher-respondents was classroom experience with ASD children, followed by classroom experience with children with other disabilities. The next most highly rated forms of professional learning rated by ECSE teacher-respondents were: workshops/in-service trainings, learning with other colleagues, and key intervention

recommendations from an autism consultant. The top five learning methods were the same across all four respondent groups, with only a slight variation in rank. Also consistent across all four respondent groups was the learning method rated as least supportive, tele-video conference training.

An independent sample, two-tailed t-test was also conducted to investigate differences between responses of ECSE teachers in Greater Minnesota and the Suburban Metro about previous learning methods of ASD interventions. In 12 of the 13 previous learning methods, there was no significant difference between the urbanicity groups (Table 9). However, the intervention of visiting model programs as a previous learning method revealed a statistically reliable difference between the means of ECSE teachers in Greater Minnesota ($M=1.72$, $SD=.713$) and the Suburban Metro ($M=2.02$, $SD=.66$). The mean difference of visiting model programs for the Suburban Metro group was higher and statistically significant, $t(94.8) = 2.20$, $p < .05$.

Preferred future methods for learning about ASD interventions.

The second professional development survey question sought to identify methods that would be desirable for future learning about ASD interventions. Nine learning methods were provided on the survey and can be seen in Table 10. Each of the nine learning methods was rated using a 1/low to 3/high scale: (1) least desirable, (2) somewhat desirable, and (3) most desirable.

ECSE teacher responses to this question indicate the top-rated preferred learning method as learning with other colleagues. The next four highest rated preferred learning methods, high to low, were: workshops/in-service trainings, mentoring by an autism teacher, visiting model programs, and recommendations from specialists. The top five

items as rated by ECSE coordinators were the same as the ECSE teachers. Similarly, directors of special education and ASD consultants had four of these five rated as highly desirable, although with a slightly different order. Tele-video conference training was ranked as the least desirable learning method by all four respondent groups.

An independent sample, two-tailed t-test was conducted to determine whether there were differences in preferred learning methods of ECSE teachers by urbanicity (Table 11). A t-test failed to reveal a statistically reliable difference in the means between the two groups of ECSE teachers in Greater Minnesota and the Suburban Metro for eight of the nine methods. The intervention of taking university courses as a preferred learning method did reveal a statistically reliable difference between the means of ECSE teachers in Greater Minnesota ($M=2.08$, $SD=.53$) and the Suburban Metro ($M=2.29$, $SD=.58$). The mean difference for the Suburban Metro group was higher and statistically significant, $t(110) = 2.10$, $p<.05$.

Table 9

Results of t-test of Previous Professional Development Experience and Urbanicity

Previous Professional Development Experience	Urbanicity	N	Mean	Standard Deviation	Levene's Test for Equality of Variances Significance	t	Df	t-test for Equality of Means Significance (2-tailed)
Experience with Disabilities	Greater MN	50	2.82	0.438	0.164	-0.664	116	0.508
	Suburban Metro	68	2.87	0.341		-0.640	90	0.524
Experience with ASD	Greater MN	50	2.82	0.523	0.050	-0.957	116	0.340
	Suburban Metro	68	2.90	0.352		-0.903	81	0.369
Workshops/In-services	Greater MN	50	2.72	0.454	0.473	-0.363	116	0.717
	Suburban Metro	68	2.75	0.436		-0.361	103	0.719
Reading	Greater MN	50	2.42	0.499	0.161	-1.290	115	0.201
	Suburban Metro	67	2.55	0.585		-1.320	113	0.190
PLC	Greater MN	43	1.44	0.629	0.179	-4.090	102	0.000
	Suburban Metro	61	1.97	0.657		-4.120	93	0.000
Colleagues	Greater MN	50	2.60	0.535	0.011	-1.330	116	0.188
	Suburban Metro	68	2.72	0.452		-1.300	95	0.200
Visit Model Programs	Greater MN	47	1.72	0.713	0.036	-2.220	108	0.028
	Suburban Metro	63	2.02	0.660		-2.200	95	0.031
Speech Recommendations	Greater MN	49	2.47	0.680	0.896	0.790	115	0.430
	Suburban Metro	68	2.37	0.689		0.790	104	0.429
ASD Consultation	Greater MN	49	2.45	0.580	0.654	-1.290	115	0.202
	Suburban Metro	68	2.59	0.579		-1.280	104	0.202
Tele-video Conference	Greater MN	42	1.40	0.587	0.824	0.400	99	0.688
	Suburban Metro	59	1.36	0.609		0.410	90	0.686
Mentor	Greater MN	46	1.54	0.690	0.371	-2.570	109	0.012
	Suburban Metro	65	1.92	0.816		-2.650	106	0.009

Undergrad Coursework	Greater MN	48	1.71	0.617	0.683	-1.470	110	0.143
	Suburban Metro	64	1.89	0.669		-1.490	105	0.139
Graduate Coursework	Greater MN	47	2.21	0.720	0.476	-2.320	110	0.022
	Suburban Metro	65	2.51	0.616		-2.270	89	0.026

Table 10

Professional Development—Desired Future Learning Methods for ASD Interventions in Rank Order by ECSE Teacher Respondents Only

Desired Future Learning Method for ASD Interventions	ECSE Teachers	ECSE Coordinators	Special Education Coordinators	ASD Consultants
	n=118	n=60	n=40	n=18
	X (mo)	X (mo)	X (mo)	X (mo)
1. Learning with other colleagues	2.80 (3)	2.90 (3)	2.85 (3)	2.69 (3)
2. Workshops/in-service trainings	2.76 (3)	2.86 (3)	2.52 (3)	2.81 (3)
3. Mentoring by an autism teacher	2.73 (3)	2.77 (3)	2.85 (3)	2.56 (3)
4. Visiting model programs	2.67 (3)	2.53 (3)	2.55 (3)	2.44 (2)
5. Recommendations from specialists	2.51 (3)	2.42 (2)	2.25 (2)	2.31 (2)
6. Site-based Professional Learning Community (PLC)	2.24 (2)	2.40 (2)	2.33 (2)	2.38 (2)
7. University coursework	2.20 (2)	2.07 (2)	2.05 (3)	2.06 (2)
8. Independent reading & research (mostly books & journals)	1.81 (2)	1.84 (2)	1.80 (2)	1.88 (2)
9. Tele-video conference training	1.75 (2)	1.96 (2)	1.88 (2)	1.88 (2)

Note. n=number of respondents; X=mean or average; mo=mode or most frequent response; Scale: Least desirable=1, Somewhat desirable=2, Most desirable=3

Table 11

Results of t-test of Future Professional Development Experience and Urbanicity

Future Professional Development Experience	Urbanicity	N	Mean	Standard Deviation	Levene's Test for Equality of Variances Significance	t	Df	t-test for Equality of Means Significance (2-tailed)
University Courses	Greater MN	50	2.08	0.528	0.010	-2.07	116	0.041
	Suburban Metro	68	2.29	0.575		-2.10	110	0.038
Workshops/In-services	Greater MN	50	2.74	0.487	0.393	-0.45	116	0.650
	Suburban Metro	68	2.78	0.452		-0.45	101	0.650
ASD Teacher	Greater MN	50	2.68	0.471	0.050	-1.02	116	0.310
	Suburban Metro	68	2.76	0.427		-1.00	100	0.320
Professional Learning Community	Greater MN	50	2.02	0.685	0.249	-3.17	116	0.002
	Suburban Metro	68	2.40	0.602		-3.11	97	0.002
Collegial Learning	Greater MN	50	2.80	0.404	0.813	-0.12	116	0.910
	Suburban Metro	68	2.81	0.396		-0.12	105	0.910
Specialist Recommendations	Greater MN	50	2.48	0.646	0.061	-0.46	116	0.650
	Suburban Metro	68	2.53	0.532		-0.44	93	0.660
Visit Model Programs	Greater MN	50	2.62	0.530	0.253	-0.88	116	0.380
	Suburban Metro	68	2.71	0.520		-0.88	105	0.380
Tele-video Conference	Greater MN	50	1.78	0.764	0.112	0.46	116	0.650
	Suburban Metro	68	1.72	0.643		0.45	95	0.660
Readings	Greater MN	50	1.86	0.639	0.346	0.66	116	0.510
	Suburban Metro	68	1.78	0.666		0.67	108	0.510

Comparison of previous and preferred methods of professional development.

Table 12 presents a ranking of responses by ECSE teachers comparing the desirability of previous and preferred future methods for learning about ASD interventions.

Table 12

Comparison of Past and Desired Future Professional Learning Methods in Rank Order by ECSE Teacher Respondents Only

Past professional learning method ¹	n=118 X (mo)	Desired future professional learning method ²	n=118 X (mo)
1. Experience in the classroom with ASD children	2.86 (3)	1. Learning with other colleagues	2.80 (3)
2. Experience in the classroom with children with other disabilities	2.85 (3)	2. Workshops/in-service trainings	2.76 (3)
3. Workshops/in-service trainings	2.74 (3)	3. Mentoring by an autism teacher	2.73 (3)
4. Learning with other colleagues	2.67 (3)	4. Visiting model programs	2.67 (3)
5. Recommendations—autism consultant	2.53 (3)	5. Recommendations from specialists	2.51 (3)
6. Independent reading & research (mostly books & journals)	2.50 (3)	6. Site-based Professional Learning Community (PLC)	2.24 (2)
7. Recommendations from speech/language pathologist	2.40 (3)	7. University coursework	2.2 (2)
8. Graduate coursework	2.38 (3)	8. Independent reading & research (mostly books & journals)	1.81 (2)

9. Site-based Professional Learning Community (PLC)	2.14 (2)	9. Tele-video conference training	1.75 (2)
10. Visiting model programs	1.89 (2)		
11. Undergraduate coursework	1.81 (2)		
12. Mentor or supervisor	1.77 (1)		
13. Tele-video conference training	1.38 (1)		

Note. ¹Scale for past learning methods: Not at all=1, Somewhat=2, Quite a bit=3; ²Scale for desired future learning methods: Least desirable=1, Somewhat desirable=2, Most desirable=3; n=number of respondents; X=mean or average; mo=mode or most frequent response

Whereas the top past learning method, as rated by ECSE teachers, was experience in the classroom with ASD children, the top future learning method was learning with other colleagues. Workshops/in-service trainings were in the top three responses for both previous and future methods of professional learning. An interesting finding was that ECSE teachers rated mentoring as 12th of 13 options for the previous learning method of ASD interventions and third in the preferred future method of professional development. Visiting model programs was ranked 10th of 13 previous professional development learning methods by ECSE teachers and 4th of nine preferred future methods of professional development. These findings provide insight into what ECSE teachers perceive their preferred learning methods to be for ASD intervention training. In both the previous and future methods of professional development, tele-video conference training was ranked last of all options provided. By contrast, most of the past and future learning methods viewed as supportive or desirable involved in-person, close-to-intervention context interaction. Workshops/in-services, learning with other colleagues, and mentoring are examples of the most desired learning methods.

Barriers to ASD intervention training.

The third professional development question on the survey sought to determine barriers for ECSE teachers in accessing ASD training. Six potential barriers were listed on the survey for which respondents were asked to rate the extent to which each was a barrier. A 1/low to 3/high scale was used: (1) not a barrier, (2) somewhat a barrier, and (3) large barrier. Results are presented in Table 13. The 118 ECSE teachers identified inability to take time away from the classroom as the top barrier to accessing ASD intervention training. The second most frequent barrier reported by ECSE teachers was cost of training, followed by shortage of staff development funds, distance from training, inability to take time away from personal life/family, and administrative support.

Table 13

Barriers to ASD Intervention Training

Extent to which the following factors are a barrier for ECSE teachers in accessing training in the area of ASD	ECSE Teachers n=118 X (mo)	ECSE Coordinators n=60 X (mo)	Special Education Directors n=40 X (mo)	ASD Consultants n=18 X (mo)
1. Inability for time from classroom	2.48 (3)	2.42 (3)	2.30 (2)	2.5 (3)
2. Cost of training	2.47 (3)	2.18 (2)	2.00 (2)	2.5 (2)
3. Shortage of training funds	2.26 (3)	1.96 (2)	1.73 (2)	2.19 (2)
4. Distance from training	1.97 (2)	1.91 (2)	1.95 (2)	2.25 (3)
5. Inability for time from personal life/family	1.96 (2)	2.04 (2)	2.05 (2)	1.94 (2)
6. Administrative support	1.86 (2)	1.37 (1)	1.30 (1)	1.69 (1)

Note. n=number of respondents; X=mean or average; mo=mode or most frequent response; Scale: Not a barrier=1, Somewhat a barrier=2, Large barrier=3

ECSE coordinators, directors of special education, and ASD consultants also rated not being able to take time away from classroom as the top barrier for ECSE teachers in

accessing ASD intervention training. For the majority of the six barriers listed in the survey, ratings similar to the ECSE teachers' were reported by the three other respondent groups. All four respondent groups ranked administrative support as the lowest factor for ECSE teachers in accessing preferred learning opportunities to advance their ASD interventions.

Further analysis was conducted using an independent sample, two-tailed t-test to discover a difference in barriers between ECSE teachers in Greater Minnesota and the Suburban Metro (Table 14). The analysis concluded that a t-test failed to reveal a statistically significant difference between the two groups, thus in each of the six barriers, the null hypothesis was accepted, $p > .05$.

Open-ended Question Responses

One open-ended question was included in the survey, "What would YOU identify as the top learning interests regarding effective interventions for young children with Autism Spectrum Disorders?" All respondents were asked to offer their own perspective, unlike previous items for which coordinators, directors, and consultants were asked their view about ECSE teachers. Responses were sorted first by respondent group (Table 15). Within each group, responses were categorized into survey cluster areas. Responses that did not clearly fit into those areas were placed in the category of "other" with emergent themes used to cluster like items.

Table 14

Results of t-test for Barriers in Accessing Professional Development and Urbanicity

Future Professional Development Experience	Urbanicity	N	Mean	Standard Deviation	Levene's Test for Equality of Variances Significance	t	Df	t-test for Equality of Means Significance (2-tailed)
Shortage of Funds	Greater MN	50	2.18	0.80	0.163	-1.05	116	0.295
	Suburban Metro	68	2.32	0.68		-1.03	95	0.308
Administration	Greater MN	50	1.74	0.72	0.463	-1.58	116	0.117
	Suburban Metro	68	1.96	0.74		-1.59	107	0.116
Distance	Greater MN	50	2.44	0.61	0.733	6.88	116	0.000
	Suburban Metro	68	1.63	0.64		6.93	109	0.000
Training Costs	Greater MN	50	2.56	0.50	0.155	1.45	116	0.149
	Suburban Metro	68	2.41	0.58		1.49	113	0.140
Inability to Take Time from Classroom	Greater MN	50	2.48	0.65	0.884	-0.04	116	0.965
	Suburban Metro	68	2.49	0.64		-0.04	105	0.965
Inability to Take Time from Personal Life	Greater MN	50	2.06	0.82	0.733	1.20	116	0.235
	Suburban Metro	68	1.88	0.78		1.19	103	0.238

Table 15

Open-ended Responses—Top Learning Interests Regarding Effective Interventions for Young Children with ASD

ECSE Teachers		ECSE Coordinators		Special Ed Directors		ASD Consultants		Total
N=78 respondents to question		N=40 respondents to question		n=24 respondents to question		N=13 respondents to question		155
n=132 total responses		n=82 total responses		n=42 total responses		n=25 total responders		281
X=1.69 responses/respondent		X=2.05 responses/respondent		X=1.75 responses/respondent		X=1.92 responses/respondent		
R=1–5 responses/respondent		R=1–6 responses/respondent		R=1–5 responses/respondent		R=1–6 responses/respondent		
f (%)		f (%)		f (%)		f (%)		
Structured Teaching	n=16	Structured Teaching	n=15	Structured Teaching	n=4	Structured Teaching	n=7	42
PECS	n=3	PECS	n=3			PECS	n=1	
TEACCH	n=3	TEACCH	n=2	TEACCH	n=1	TEACCH	n=1	
ABA	n=3	ABA	n=2	ABA	n=1	ABA	n=2	
Specific Curricula	n=26	Specific Curricula	n=10	Specific Curricula	n=5	Specific Curricula	n=3	44
RDI	n=10	RDI	n=4	RDI	n=2	RDI	n=2	
Sensory Integration	n=9	Sensory Integration	n=2	Social Stories	n=3			
Parent/Family	n=6	Parent/Family	n=7	Parent/Family	n=3	Parent/Family	n=3	19
Early Start	n=4	Early Start	n=1	Early Start	n=1	Early Start	n=1	7
Intensity of Service	n=0	Intensity	n=1	Intensity	n=0	Intensity	n=0	1

Professional Development Training for staff	n=24	Professional Development	n=3	Professional Development	n=3	Professional Development	n=2	32
Workshops	n=10							
	n=4							
Other	n=56	Other	n=45	Other	n=26	Other	n=9	136
Behavior	n=12 (21%)	Behavior	n=11(24%)	Behavior	n=5 (19%)	Behavior	n=3 (33%)	31 (23%)
Social Skills	n=13 (23%)	Social Skills	n=9 (20%)	Social Skills	n=4 (10%)	Social Skills	n=2 (22%)	28 (21%)
Inclusion	n=10 (18%)	Inclusion	n=9 (20%)	Inclusion	n=4 (10%)			23 (17%)
Interventions	n=8 (14%)	Interventions	n=8 (18%)	Interventions	n=6 (23%)			22 (16%)

Note. N=number of respondents; n=number of responses; f=frequency of response; %=percentage of response; X=mean or average number of responses/respondent; R=range of number of responses/respondent.

Response rates to the open-ended question for each of the four respondent groups were as follows: ECSE teachers, 66% (78 of 118); ECSE coordinators, 67% (40 of 60); directors of special education, 60% (24 of 40); and ASD consultants, 72% (13 of 18). ECSE coordinators supplied the highest frequency of responses per respondent group at 2.05. ASD consultants provided 1.92 responses per respondent, directors of special education provided 1.75 and ECSE teachers supplied an average of 1.69 responses per respondent. The range of responses per respondent was between one and six for ECSE coordinators and ASD consultants, and between one and five responses per respondent for ECSE teachers and directors of special education.

The top learning interests regarding effective interventions for young children with ASD were coded first by the five research-based intervention categories: structured teaching, specific curriculum, parent/family, early start to intervention, and treatment intensity. The number of responses per intervention in each of the five areas was tallied and reported (see Table 15) by frequency and percentage. Responses not coded in one of the research-based intervention categories were coded as either professional development or other. In the other category, consistent topics were identified across respondent groups, and some responses were singular in nature. Each response was listed in rank order of highest frequency by category and reported by number and percentage. ECSE teacher responses and the three other respondent group response results were similar. All responses to the open-ended question may be viewed in Table 15.

ECSE teacher responses.

Seventy-eight (66%) of the 118 ECSE teachers answered the open-ended question with a total of 132 responses. Specific curriculum was the research-based intervention category with the most frequent responses by ECSE teachers as the top learning interest. Respondents named seven interventions in this category, with RDI the most frequent response and sensory integration the second most frequent. LEAP, the only research-based intervention listed in this category, was named only twice in the 132 ECSE teacher responses. The top learning interventions suggested by ECSE teachers were not research-based interventions. This was also true of the other respondent groups.

Structured teaching was the category with the second-highest rate of response, at 12% (n=16). In this category, PECS, TEACCH, and ABA were named by three ECSE teacher respondents (18.5%) and DTT was named by one respondent. In the three other

research-based intervention categories, six ECSE teachers (5%) named parent/family as a top learning interest and four named early start to intervention (3%). No respondents named intensity of treatment (0%).

The top learning interest by ECSE teachers in the category of professional development was training for staff, followed by workshops. In the other category, four ASD top interest areas were revealed: social skills, behavior, inclusion, and interventions. Overall, the most frequent open-ended learning interest responses by ECSE teachers were as follows: social skills (n=13), behavior (n=12), training for staff (n=10), inclusion (n=10), and RDI (n=10).

Summary of open-ended responses.

A total of 281 responses to the open-ended question were gathered and coded as role, research-based category, professional development, and other. Response rates by role ranged from 60% to 72%. Although some research-based interventions were identified by each respondent group, the highest frequency of responses of top learning interests for each of the four groups were not research-based interventions. Three of the four respondent groups (ECSE teachers, ECSE coordinators, and directors of special education) did not have a research-based intervention among the top four responses. Only ASD consultants had one research-based intervention (parent/family interventions) among the top four.

In summary, when respondents were asked to identify the top learning interests regarding effective interventions for children with ASD, the majority of responses across roles were not research-based interventions. Although the open-ended question allowed for independent respondent input, responses aligned with the overall responses to the

survey's forced choice questions and did not identify research-based interventions as top learning interests. Furthermore, the most frequent topics identified in the category "other" (i.e., behavior, social skills, inclusion, and interventions) were issues that research-based interventions target to improve student progress.

Summary

This chapter presented the results of the data collected to examine the extent to which ECSE teachers in Minnesota implemented research-based interventions for young children with ASD and the extent to which professional development influenced their intervention. ECSE teachers were able to identify barriers to accessing ASD training. Also presented were demographic characteristics of the respondents.

For the first research question, the data revealed that currently practicing ECSE teachers in Minnesota implement research-based interventions for children with ASD at a low frequency level. Interventions considered promising and those with limited support were found to be more frequently implemented than those determined to be research-based. Early start to intervention was found to be the research-based intervention with the highest frequency of implementation by ECSE teachers in Minnesota. Similar results were found across all respondent groups. Open-ended question responses aligned with forced-choice questions to indicate the top ASD learning interests of practitioners were not research-based interventions.

Statistical analysis performed in the area of implementation of research-based interventions by urbanicity revealed there was no difference in implementation of five of eight research-based interventions. There was a statistical difference discovered in three of the eight interventions based on urbanicity: LEAP (-2.17, $p < .05$), home visits (-2.453,

$p < .05$), and early identification (-2.71, $p < .05$) – whereby Suburban Metro teacher means were higher than those of Greater MN teachers.

The second research question sought to identify learning methods that have supported early intervention teachers in their knowledge of research-based interventions for children with ASD. The top rated method by ECSE teachers was experience in the classroom with other ASD children. A statistical analysis was conducted to discover whether previous learning methods differed by urbanicity, but no difference was found in 12 of 13 methods offered in the survey. One method, visiting model programs, was found to be statistically significant in that ECSE teachers in the Suburban Metro group were found to have higher mean scores of having used that learning method (2.20, $p < .05$).

The third research question revealed that early intervention teachers would prefer to learn with other colleagues and participate in workshops/in-services in the future. A statistical analysis conducted by urbanicity groups revealed no difference in eight of nine preferred learning methods. Only one learning method, university courses, had a statistically significant difference by urbanicity (2.10, $p < .05$).

In response to the last research question, the leading barrier found to prevent early intervention teachers from accessing training in the area of ASD was the inability to take time away from the classroom, followed closely by the cost of training. Further analysis discovered no significant difference in barriers identified by ECSE teachers in Greater Minnesota and those identified by Suburban Metro teachers.

Overall, this study has shown that ECSE teachers rarely implement interventions found to be most effective for young children with ASD. ECSE teachers identified methods that would support future learning about ASD interventions, and those future

methods differed from previous learning methods. This study revealed that ECSE teachers perceive taking time away from the classroom is the largest barrier to obtaining ASD training. Across the four respondent groups, no significant differences were discovered.

Statewide survey results across regions and urbanicity were obtained. Only two urban ECSE teachers responded to the survey, so urban and suburban respondents were combined into a Suburban Metro group and rural and town/small city were combined into a Greater Minnesota group. Results of the study revealed infrequent implementation of research-based interventions for young children with ASD across the state of Minnesota. These findings may indicate a statewide need for further training to increase ECSE teacher skills with ASD students. The interpretation of the results and conclusions will be presented in Chapter 5.

Chapter 5

Conclusions

This study was framed around four research questions:

- 1) To what extent do currently practicing early intervention teachers implement research-based interventions for children with Autism Spectrum Disorders (ASD)?
- 2) What learning methods have supported early intervention teachers in their knowledge of research-based interventions for children with ASD?
- 3) What learning methods are preferred by early intervention teachers in advancing their knowledge of ASD?
- 4) What factors have been barriers for early intervention teachers in accessing training in the area of ASD?

This chapter begins by reviewing the purpose and significance of the study. Next, the chapter presents a summary of findings, interpretation of the data, limitations of the study, and implications for intervention. Finally, the chapter offers recommendations for further research.

Purpose and Significance of the Study

The purpose of this study was to determine current interventions and professional development interests of early childhood special education (ECSE) teachers of students with ASD in Minnesota. Research-based interventions found to be effective for young children with autism were identified in Chapter 2. These effective interventions were compiled, along with other commonly implemented interventions used with young

children with autism, in an effort to discover which were most frequently implemented by ECSE teachers— research-based interventions versus interventions with little or no research-based support.

Because ECSE teachers have varied backgrounds and training in working with young children with ASD, the researcher sought to collect information about past learning methods that had supported their knowledge of ASD interventions. Future learning methods were targeted to discover preferred modes of learning by ECSE teachers, and barriers to training access were believed to be important to discern what factors prevent teachers from learning about effective interventions. The four research questions were developed to provide insight and to inform school district personnel and policymakers in planning and constructing professional development opportunities for ECSE teachers.

The research study was accomplished by collecting perspectives through an online survey of four different professional roles: ECSE teachers, ECSE coordinators, directors of special education, and ASD consultants in Minnesota. The four professional roles offered varying degrees of proximity to teaching intervention, however the influence on professional development opportunities for ECSE teachers was considered potentially significant. ECSE teacher responses were considered most valid because their work is in direct proximity to children. ECSE coordinators and ASD consultants often provide technical assistance and learning opportunities for ECSE teachers, while directors of special education provide oversight and global perspective on services and interventions for special education teachers.

The problem motivating the research was the concern that many ECSE teachers of young children with ASD in Minnesota were using interventions with little or no research to support their effectiveness. Interventions identified as effective for ASD students were not being implemented, and thus, children with ASD were not being provided opportunities for programming to best meet their unique needs and learning potential.

Summary of the Findings

Implementation of research-based interventions.

The study sought to obtain perspectives on implementation of research-based interventions by early intervention teachers in Minnesota. The research-based interventions were categorized by five distinctive areas: 1) structured teaching, 2) specific curricula, 3) parent/family, 4) early start to intervention, and 5) treatment intensity. A descriptive survey research design was conducted using an independent sample, two-tailed t-test to reveal any significant difference between implementation levels of ECSE teachers practicing in Greater Minnesota school districts and those in the Suburban Metro area.

Of all the interventions listed on the survey, the top three implemented interventions for young children with ASD were found to be: speech and language therapy, visual schedules, and occupational therapy. All were considered promising interventions, but not research-based. As stated previously, the top implemented research-based interventions rated on the survey by ECSE teachers was early start to intervention. Interventions with the lowest level of implementation for young children with ASD on the survey were: Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP), intensity of service, and home visits for children

receiving center-based programming. Each of these three lowest-rated interventions was considered a research-based intervention. Thus, interventions considered promising and those with limited support were rated higher than research-based interventions.

No regional comparisons could be made due to low a response rate from some regions. It was discovered, however, that all regions reported early start to intervention as the highest implemented research-based intervention. By urbanicity (i.e., Greater Minnesota and Suburban Metro areas), an independent sample, two-tailed t-test was conducted to compare means of the two urbanicity groups in relation to the implementation of the eight research-based interventions in the survey. Based on the results of the t-test, the null hypothesis was accepted (no significant difference in means) for five of the interventions: Applied Behavior Analysis (ABA), parent training provided, regular parent meetings, treatment intensity, and Discrete Trial Training (DTT). For three of the interventions, the null hypothesis was rejected (significant difference in means): LEAP, home visits in addition to center-based programming, and early start to intervention.

In summary, the t-test findings relative to implementation of research-based interventions by urbanicity indicates that the mean ratings of LEAP, home visit, and early start to intervention interventions were at a significantly lower level of implementation by ECSE teachers in Greater Minnesota compared to ECSE teachers in the Suburban Metro area. For the other research-based interventions surveyed, it could be concluded that a t-test failed to reveal a statistically reliable difference between urbanicity groups.

Professional development.***Previous learning methods.***

To determine the extent to which previous learning methods had been supportive of ECSE teachers learning effective interventions for young children with ASD, 13 learning method options were offered for rating. Little rating difference was found across the four respondent groups. ECSE teachers rated the following the top two methods of supportive past learning methods: classroom experience with ASD children and classroom experience with other children with disabilities. Of the 13 methods provided on the survey, tele-video conference training was rated the lowest by all four respondent groups.

An independent sample, two-tailed t-test was conducted to identify any difference between previous professional development learning methods rated by ECSE teachers in Greater Minnesota and those in the Suburban Metro area. Of the 13 methods, only visiting model programs had a significantly higher mean ($p < .05$) for Suburban Metro teachers compared to those in Greater Minnesota. There was no statistically reliable difference between the two groups on the other 12 learning methods.

These results indicate what ECSE teachers have called supportive for their learning about effective interventions for young ASD children in the past. The t-test analysis indicates that ECSE teachers in the Suburban Metro area had a statistically higher preference for visiting model programs ($p < .05$) than teachers in Greater Minnesota. This finding could reflect the fact that teachers in the Suburban Metro area have greater access to visiting model programs than teachers in Greater Minnesota.

Future learning methods.

To determine professional learning methods preferred by ECSE teachers for acquiring knowledge of effective interventions for young children with ASD in the future, nine learning method options were provided on the survey. The top two preferred future learning methods by the 118 ECSE teacher-respondents were: learning with colleagues and workshops/in-service training. The two highest-rated future professional development method options indicate a preference for collegial, in-person learning. The learning method rated the lowest of the nine options was tele-video conference.

Analysis was conducted using an independent sample, two-tailed t-test to look at potential differences between ECSE teachers in Greater Minnesota those in the Suburban Metro. The t-test indicated a difference between the means of the two groups in relation to university coursework ($p < .05$) as a professional learning method. ECSE teachers in the Suburban Metro had a higher mean than the Greater Minnesota group, and the difference was statistically significant. For the eight other learning methods there was no statistical difference between the two groups.

These findings provide insight into what ECSE teachers have perceived to be supportive for their learning about effective interventions for young ASD children and what methods would be preferred in the future. Collegial learning and workshops/in-services were rated as the top two preferred methods of learning. The t-test analysis indicates that ECSE teachers in the Suburb an Metro area have a statistically higher preference for taking university coursework ($p < .05$) than teachers in Greater Minnesota. This finding could reflect the fact that teachers in the Suburban Metro area have easier access to universities than teachers in Greater Minnesota.

Barriers to ASD training.

The study also investigated barriers that prevent ECSE teachers from accessing training in effective intervention for young ASD students. Six potential barriers were identified as options for the survey. The top barriers identified by ECSE teachers as preventing access to ASD training were the inability to take time away from the classroom and the cost of training. The option rated as the lowest barrier was administrative support.

A t-test was conducted to discover whether barriers differed for ECSE teachers practicing in Greater Minnesota versus the Suburban Metro. It was concluded that a t-test failed to reveal a statistically significant difference between the two groups by urbanicity—no difference was found.

Open-ended question responses.

A review of the open-ended question responses found that the majority of replies aligned with the forced-choice answers. The top-rated learning interventions suggested by ECSE teachers were not considered research-based interventions. Some research-based interventions were identified by each of the four respondent groups; however, the most frequent responses were not research-based interventions. Only the ASD consultant group had one research-based intervention in the top four responses (parent/family), while the three other respondent groups (including ECSE teachers) did not offer even one research-based intervention in the top four most frequent responses. It was observed that the most frequent topics listed in the “other” category were related to problems that research-based interventions target to improve student engagement.

Policy considerations and possible implications.

The results of this study suggest numerous policy considerations and possible implications for professional development targets related to training in effective interventions for young children with ASD in Minnesota. The considerations and implications are presented for three levels: federal and state policy, professional development, and ECSE teachers.

Implications for federal and state policy.

One area of focus at the federal and state policy levels would be for some agreement on a definition of the term “research-based intervention.” The current debate continues with little or no uniformity on a definition. Without a common designation, debate may continue over how to identify these important interventions, thus slowing the process of providing actual training in effective interventions for young ASD children. Because some research-based interventions are seldom or never implemented, policymakers need to be aware of the complexities in order to collect further data and to emphasize the need for implementation of effective interventions.

For many of the research-based interventions identified in this study, implementation of those interventions is, in fact, complex and can be expensive for school districts. The interventions themselves may be time-consuming and rely on extensive ongoing training and follow-up by the teachers who implement them. Because the top barrier to obtaining training identified in this study was teachers’ inability to take time away from the classroom, a challenge exists for practitioners and school district administrators who want to use such effective interventions. Trends and issues from other states need to be examined in order to contribute to the findings. Leadership is needed at

the federal and state levels to further emphasize research-based intervention implementation.

Currently, no teacher licensure exists for ASD; and, ASD certificate programs are optional. Higher education training is variable, so teacher training is often inadequate in this specific field. Training monies have been depleted, so few statewide efforts are able to be implemented in Minnesota at this time. It should be recognized that the Minnesota First Signs Project was successful in influencing the implementation of early start to intervention through a statewide campaign. This hortatory example could provide a model for other research-based intervention initiatives. This research study found that early start to intervention was the most frequently implemented research-based intervention by ECSE teachers in Minnesota, and that could be a result of the accomplishments of the Minnesota First Signs Project.

Implications for professional development.

This study found that research-based interventions are rarely implemented for young children with ASD in Minnesota. Interventions considered promising and those with little or limited research support are implemented more frequently than research-based interventions. These findings have implications for future professional development in the state. If young children with ASD are to achieve their greatest potential, interventions shown to be effective should be used in teaching them. The need for training in research-based interventions is indicated. A look at the success of the model used by the Minnesota First Signs of Autism Project, which trained personnel statewide in early identification of young children with autism, would be warranted. This

study found that early start to intervention was the most frequently implemented research-based intervention in the survey.

Results of this study also indicate the need to look at how ECSE teachers have obtained training in the past, what the preferred future learning methods are, and to examine the barriers that exist for ECSE teachers to access training in effective interventions for young children with ASD. Teachers in this study reported gaining knowledge of effective interventions through working with other children with ASD and those with other disabilities. These same ECSE teachers rated learning with colleagues and attending workshops/in-services—collegial learning in a person-to-person approach—as their preferred methods of learning about effective interventions in the future. These findings could inform those who establish trainings for ECSE teachers. Knowledge of preferred learning methods could potentially increase participation by ECSE teachers.

Because the largest barrier identified by the ECSE teachers surveyed was the inability to take time away from the classroom, insight was gained regarding why teachers have not accessed training. These implications point to the need for problem-solving systems to provide flexible scheduling that allows teachers to access learning opportunities for effective interventions on an ongoing basis. Prioritizing training in effective interventions will need to be emphasized from the top down, from the federal and state levels to the local level.

Many research-based intervention trainings are lengthy, time-consuming, and expensive for school districts to implement. More than teacher involvement would be required—administrative support would be needed, as would acknowledgement of

ongoing commitment to the implementation of effective interventions. Emphasis on learning opportunities for ongoing training with incentives for staff to attend would be needed.

Comparison of ECSE teacher results by urbanicity found a difference in the means of teachers employed in Suburban Metro districts versus those in Greater Minnesota. In relation to past learning methods, Suburban Metro districts had a significantly higher mean for visiting model programs than the Greater Minnesota cohort. Further, the Suburban Metro group had a significantly higher mean for taking university courses as a preferred learning method. In each case, implications are that ECSE teachers in the Suburban Metro area have closer proximity to model programs and universities than teachers in Greater Minnesota. This proximity may provide an unseen advantage to those teachers practicing in a community with higher population, if they access those learning methods for their professional development.

Implications for ECSE teachers.

This study found that ECSE teachers in Minnesota comparatively less frequently implement research-based interventions for young children with ASD. ECSE teachers were also found to implement interventions with limited research support more frequently than research-based interventions. This knowledge points to the need for a greater emphasis on educating ECSE teachers about what research-based interventions are. ECSE teachers will need leadership and support for encouragement, knowledge, and implementation strategies. Training in effective interventions should be targeted using the top preferred learning methods identified in this study: learning with colleagues and workshop/in-services. Establishment of ECSE teacher cadres or learning communities

could be an approach to build ongoing knowledge and follow-up of intervention implementation.

Implications for further research.

This study provided only a glimpse of the topics investigated. It would be recommended that the study be replicated on a larger scale in order to determine the validity of the results. In order to generalize findings of this study, a greater survey return rate would be required with even distribution from all regions of Minnesota. The study should be replicated in other states to determine similarities and differences in the implementation rate of research-based interventions and professional development concerns. A qualitative study that would examine nuances of research-based implementation could provide a more robust study and add a greater level of significance to the findings. One means of achieving this would be to combine a survey with interviews of ECSE teachers for purposeful and incidental insight.

A study to determine the exact time and expense commitment of each of the research-based intervention approaches would assist in district/regional/state efforts to provide training in the respective interventions. School districts have limited financial resources, so discovering the costs of implementation of research-based interventions could belie some of the reasons the interventions may not be implemented. This type of study might also identify some of the private research-based intervention approaches that exist, whereby parents privately contract services that may be quite expensive. Because at times private approaches have been regarded in direct competition with public school programs, further study to compare costs, implementation design, and parent involvement aspects would be interesting.

Overall, further research expanding the literature regarding research-based intervention implementation and professional development focus for teachers of young children with ASD is needed. Many potential areas of study are implicated.

Critique of the study.

Although this study adhered to standards of educational research, there were several limitations. This section will critique the study by discussing the limitation of the instrument and data collection. This section concludes with a discussion of the generalizability of the study.

Limitations of survey instrument.

The first limitation involves the survey instrument. The survey instruments were developed by the researcher for the purposes of this study, thus standardized instruments were not employed. The surveys may not have included important questions or issues that could have impacted results. This was the first time these surveys had been administered to the four separate respondent groups targeted by the four surveys. Thus, there is the limitation that both the validity and the reliability of the instruments have not been established when measuring the perceptions of the respective respondents. Most questions on the surveys offered a three-point scale, which resulted in a smaller variation for statistical analysis than a five-point scale may have provided.

Despite these limitations, the survey instruments served the purposes of the study and could be used for other studies involving perceptions of implementation of interventions with young children with ASD and professional development acquisition.

Limitations of data collection process.

There were several limitations associated with the data collection process. First, the generalizability of the study is limited because data were collected only from public school districts in Minnesota. Second, the data collected were quantitative in nature. A mixed-method design—one that included qualitative data—could have provided more explanatory data and insights that may have provided for a richer explanation of the implementation of research-based interventions and the professional development aspects of Minnesota ECSE teachers regarding programming for ASD students.

A third limitation was that an ECSE teacher list was unavailable for the state, so reliance on ECSE coordinators to forward the survey to this important group was necessary. This may have resulted in a significantly smaller number of respondents to the ECSE teacher survey than if the teachers could have been surveyed directly. A fourth limitation to the data collection was that the survey was sent late in the school year, which is a busy time and may have decreased the number of respondents. A fifth limitation was the online nature of the survey. Although an online survey can be cost-effective and cover a large number of respondents, it can also be a limitation. Firewalls may prevent unknown emails from entering a school's system and an online survey may restrict less computer-savvy respondents from answering.

Summary

The purpose of this descriptive study was to examine current interventions and professional development interests of ECSE teachers of children with ASD. Specifically, this descriptive survey research examined the implementation of research-based interventions by ECSE teachers in Minnesota, and investigated past and future learning

methods and common barriers that the teachers experienced relative to professional development for teaching young children with ASD. To accomplish this goal, four separate online surveys were used to garner perspectives of four separate groups: ECSE teachers, ECSE coordinators, directors of special education, and ASD consultants in Minnesota.

The result of this study found that research-based interventions are seldom implemented by early intervention programs. An examination of the current professional development interests of ECSE teachers revealed that prior methods to learn about effective interventions for young children with ASD have been working with other children with autism and children with other disabilities. Preferred future learning methods identified by the ECSE teachers were discovered to be learning with colleagues and attending workshops/in-services. And, the greatest barrier to accessing this training named by teachers was the inability to take time away from the classroom.

Chapter 2 of this dissertation began with a quote by Simpson, et al. (2005), "... if basic elements of effective programming are not incorporated into interventions and treatments and programs are not based on objectively verifiable effective methods, children and youth with ASD will fail to achieve outcomes that fully reflect their capabilities." This study found that effective interventions are not being implemented for young children with ASD in Minnesota, thus these children may fail to achieve their potential. Information gleaned from this study regarding professional development interests may provide useful information to assist trainers and policymakers in using preferred learning methods to train ECSE teachers in those effective interventions.

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Appendix A

Consent Statement for the Pilot Administration of the *Early Childhood Special Education Services for Children with Autism Spectrum Disorder (ASD) Survey*

CONSENT STATEMENT

Pilot Administration of *Early Childhood Special Education Services for Children with Autism Spectrum Disorder (ASD) Survey*

You are invited to complete a survey regarding Early Childhood Special Education Services for Children with Autism Spectrum Disorders. You were selected as a participant because you are working in the field of early childhood special education. You are asked to read this form and ask any questions you may have before agreeing to complete the survey.

This pilot study is being conducted by a student as part of the requirements for a dissertation at the University of Minnesota. This pilot administration of the survey is important for learning about the techniques of using the pilot results for the improvement of the survey instrument prior to large-scale dissemination. The results will not be used in any report now or later.

Background Information

The purpose of this study is to determine factors that influence Early Childhood Special Education teachers of children with Autism Spectrum Disorders from utilizing effective interventions. The survey will address such issues as preservice training, in-service training, current teaching licensures, and preferred methods of receiving information.

Procedures

If you agree to participate, you will be asked to complete an online survey. The survey should take about 10 minutes to complete.

Risks and Benefits of Being in the Study

There are no immediate or expected risks for participation in the study. The survey is completely anonymous and confidential. Once your responses are entered into an electronic file, the original survey was destroyed.

Confidentiality

The records of this study were kept private. No reports were published or publicly available from the pilot study.

Voluntary Nature of the Study

Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you do decide to participate, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions

The researcher conducting this study is Maria Balbo, a doctoral student in the Educational Policy and Administration (EdPA) Department at the University of Minnesota.

If you have questions later, you may contact me at (320) 212-6856.

If you have any questions or concerns about this study and would like to speak with someone other than the researcher, please feel free to contact Research Subjects' Advocate line, D528 Mayo, 420 Delaware Street S.E., Minneapolis, MN 55455; telephone (612) 625-1650.

You may have a copy of this form to keep for your records.

Signature _____

Name: _____

Date: _____

Appendix B

Recruitment email to prospective participants (ECSE teachers)

Recruitment Email

Dear ECSE Colleague,

For over 30 years, I have worked as a professional in the field of Early Childhood Special Education. As we know, our profession has faced an increasing number of young students with Autism Spectrum Disorders (ASD), thus increasing challenges in providing appropriate services for their unique needs. The unique needs of young students with ASD have compelled me toward a more thorough examination of what training opportunities ECSE teachers have experienced.

The purpose of this study is to investigate interventions by Early Childhood Special Education teachers of students with Autism Spectrum Disorders in Minnesota from multiple perspectives in order to determine 1) factors that influence the implementation of interventions, 2) potential barriers to training in the implementation of specific interventions, 3) current learning methods, and 4) preferred learning methods.

Your response is extremely important and the information you provide is and will remain anonymous. Under no circumstances would either you or your district be identified. Further, the only people who will have access to the original survey data are the graduate student researcher, Maria Balbo, and her advisor, Dr. Jennifer York-Barr of the College of Education and Human Development at the University of Minnesota.

This survey should be completed by the **Early Childhood Special Education (ECSE) Teacher(s)** in your program who are responsible for serving 3-5 year old children with Autism Spectrum Disorder. If in the process of completing this survey you have any questions, please contact Maria Balbo at balb0005@umn.edu.

Full participation from districts across the state is needed to obtain an accurate profile. Your time and effort to support this statewide study are greatly appreciated. The survey should take approximately 12-15 minutes to complete. In order to garner multiple perspectives, four separate groups are being surveyed: Directors of Special Education, Regional Autism Consultants, ECSE Coordinators, and ECSE Teachers.

After you submit the survey, please send a separate email to Maria Balbo (balb0005@umn.edu) to be entered in a **drawing for a \$50.00 gift card from Barnes and Noble Booksellers**. Also, indicate whether you would like an executive summary of the study findings and provide an email address so that the summary can be sent to you electronically in spring of 2010.

Thank you in advance for your participation. To complete the survey, please go to the following link:

http://www.surveymonkey.com/s.aspx?sm=XsDI_2bSizM5gDqpxk0wyf8A_3d_3d

Maria Balbo, ECSE Coordinator, SWWC Cooperative – Willmar Office
Doctoral Candidate, University of Minnesota

Appendix C

Email consent form for prospective participant (ECSE teacher)

CONSENT FORM

Minnesota Early Childhood Special Education Services for Children with Autism Spectrum Disorders (ASD) Survey Early Childhood Special Education Teachers

You are invited to be in a research study to address the needs our profession faces in response to the increasing number of young students with Autism Spectrum Disorders; and, the challenge we face in providing appropriate services for their unique needs. You were selected as a possible participant because you are an Early Childhood Special Education Teacher of 3-5 year old students. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Maria Balbo, Doctoral Candidate in the Educational Policy and Administration Department at the University of Minnesota Twin Cities Campus.

Background Information

The purpose of this study is to investigate interventions by early childhood special education teachers of students with Autism Spectrum Disorders in Minnesota from multiple perspectives in order to determine 1) factors that influence the implementation of interventions, 2) potential barriers to training in the implementation of effective interventions, 3) current teacher learning methods, and 4) preferred teacher learning methods.

Procedures

If you agree to be in this study, we would ask you to complete an online survey that would take 10-15 minutes to complete and submit to the researcher.

Risks and Benefits of being in the Study

There are no immediate or expected risks for participation in the study. The study is completely confidential and anonymous. Respondents will not have human contact with the researcher. Once your responses are entered into an electronic file, the original survey will be destroyed.

The benefits to participation are to inform the education field of the status of implementation of research-based interventions for young children with Autism Spectrum Disorders so that professional development activities may better address gaps in training at the preservice and in-service levels. Overall, this research could influence the type of interventions young children with Autism Spectrum Disorders receive in the

future through the gain of further knowledge of intervention and emphasis on the need to utilize research-based interventions for more positive outcomes.

Compensation

You will have the opportunity to have your name entered in a drawing for a \$50.00 gift card from Barnes and Nobles Booksellers. To take part in the drawing, please send a separate email to Maria Balbo (mlbalbo@yahoo.com) to indicate your interest. Also, indicate whether you would like an executive summary of the study findings and provide an email address so that the summary can be sent to you electronically in the spring of 2009.

Confidentiality

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions

The researcher conducting this study is Maria Balbo. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Ms. Balbo at 320-693-6913, mlbalbo@yahoo.com; or, her advisor, Dr. Jennifer York-Barr, at the University of Minnesota at 612-625-6387, yorkx001@umn.edu. If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

Statement of Consent

I have read the above information. I have asked questions and have received answers. I consent to participate in the study and completion of the survey will imply consent.

Appendix D

Email request for ECSE coordinators to forward survey to ECSE teachers

Email request for ECSE Coordinators to forward survey to ECSE Teachers

Dear ECSE Coordinator,

Last week I sent a survey to you to complete entitled *MN Early Childhood Special Education Services for Children with Autism Spectrum Disorders (ASD)*. If you have already taken the time to complete the survey, I very much appreciate your input. If not, you still have time to do so.

Right now I am emailing you, as an ECSE Coordinator, to request your assistance by forwarding this email to **three** ECSE Teachers of 3-5 year old children in your district or cooperative. The names and contact information of ECSE Teachers who work in Minnesota is not available on any list serve or publicly available list, thus I must access the teachers through ECSE Coordinators. Since the ECSE Teachers are an essential group from whom to obtain information about interventions, I am hoping you will assist in this effort.

The attachment includes a letter of invitation and a link to the survey for the ECSE Teachers to complete. It is designed to be completed by ECSE Teachers of 3-5 year old children. A high response rate will result in a more accurate profile of the learning needs and intervention interventions of ECSE Teachers of ASD students in Minnesota.

Thanks so much for your assistance.

Maria Balbo, M.Ed., ECSE Coordinator, SWWC Service Cooperative – Willmar Office
Doctoral Candidate, Department of Educational Policy and Administration, University of Minnesota
balb0005@umn.edu

Appendix E

Early Childhood Special Education (ECSE) Services for Children with Autism Spectrum Disorders Survey – ECSE Teacher Survey

**Early Childhood Special Education Services for
Children with
Autism Spectrum Disorder (ASD)
Survey
Early Childhood Special Education Teachers**

Start Here



**Implementation of Interventions for
Pre-Kindergarten Students with ASD**

Do you currently or have you served pre-Kindergarten children who have a categorization of Autism Spectrum Disorder?

- Yes, please proceed with the following survey.
 No, end survey now.

1. For each of the following interventions/interventions, please indicate the extent to which YOU implement the following intervention with young children with Autism Spectrum Disorders (ASD):

ASD Intervention/ Intervention	Intervention is implemented regularly	Intervention is implemented sometimes	Intervention is implemented rarely/never	Don't know level of implementation
Picture Activity Schedules	○	○	○	○
Physical classroom organizers such as color-coded materials, finished boxes, & timers.	○	○	○	○
Picture Exchange Communication System (PECS)	○	○	○	○

Data Collection – take data to assess if teaching strategies are effective, modify as needed, & use to measure skill development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visual Schedules	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applied Behavior Analysis (ABA) - the application of behavior learning principles & theory to change behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incidental Teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASD Intervention/ Intervention	Intervention is implemented regularly	Intervention is implemented sometimes	Intervention is implemented rarely/never	Don't know level of implementation
Augmentative/Alternative Communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
DIR/Floor Time Approach (Developmental, Individual-Difference, Relationship-Based)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social Stories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Occupational Therapy Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speech and Language Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sensory Integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assistive Technology – any item, piece of equipment or product used to increase, maintain, or improve a child's functional capabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Music Therapy – use of music interventions to address physical, emotional, cognitive, and social needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relationship Development Intervention (RDI)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning Experiences: An Alternative Program for Preschoolers and Parents (LEAP)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parents are provided opportunities to be trained in specialized skills to teach their ASD child.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Home visits are regularly conducted in addition to center-based program for 3-5 year olds with ASD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regular parent group meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
District identifies & evaluates children for ASD as soon as ASD is suspected Children identified as ASD receive a minimum of 25 hours or more per week of service as stated on the IEP	<input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/>
Treatment & Education of Autistic & Related Communication for Handicapped Children (TEACCH)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Discrete Trial Teaching – technique “that involves breaking down learning activities & teaching one component at a time in a highly structured manner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Training & Resources for Autism Spectrum Disorders

2. Indicate the extent to which each of the following learning methods has supported your learning about effective interventions for young children with ASD for you as an ECSE teacher:

Learning method	Not at all	Somewhat	Quite a bit	Don't know if ECSE teachers have had this opportunity
Undergraduate coursework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experience in the classroom with children who have other disabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experience in the classroom with ASD children	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workshops/in-service trainings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent reading & research (mostly books & journals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site-based Professional Learning Community (PLC)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning with other colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visiting model programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendations from speech/language pathologist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendations from autism consultant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendations from occupational therapist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Tele-video conference training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentor or supervisor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Graduate coursework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. In your opinion, how desirable would each of the following methods of professional learning be to advance ECSE teaching interventions in the area of Autism Spectrum Disorder:

Preferred Professional Learning Method	Least desirable	Somewhat desirable	Most desirable
University coursework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workshops/in-service trainings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentoring by an autism teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site-based Professional Learning Community (PLC)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning with other colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visiting model programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tele-video conference training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent reading & research (mostly books & journals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendations from other specialists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. To what extent have the following factors been a barrier for ECSE teachers in accessing training in the area of Autism Spectrum Disorders:

Factors	Not a barrier	Somewhat a barrier	Large barrier
Shortage of staff development funds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Administrative support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distance from training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost of training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Inability to take time away from the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inability to take time away from my personal life/family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. What would you identify as your top learning interests regarding effective interventions for young children with Autism Spectrum Disorders?

Personal Training & Background

6. What is the highest degree you have received?

- Bachelors
- Masters
- Educational Specialist
- Doctorate

7. How many years have you worked as an **Early Childhood Special Education** teacher?

- 0
- <1
- 1-3
- 4-9
- 10-20
- 21+

8. Please indicate teacher licensures you currently hold by checking **yes or no** for each licensure area:

Licensure Area	Yes	No
Early Childhood	<input type="radio"/>	<input type="radio"/>
Early Childhood Special Education	<input type="radio"/>	<input type="radio"/>
Elementary	<input type="radio"/>	<input type="radio"/>
Speech & Language Pathologist	<input type="radio"/>	<input type="radio"/>
Other Special Education area	<input type="radio"/>	<input type="radio"/>

9. How would you describe your overall level of knowledge about interventions to use for children with Autism Spectrum Disorder?

- Not at all knowledgeable
- Not very knowledgeable
- Somewhat knowledgeable
- Very knowledgeable
- Extremely knowledgeable

10. Approximately how many coursework credits have you taken specifically focused on Autism Spectrum Disorder (Choose one):

- 0
- 1-3
- 4-6
- 7-10
- 11>

11. University-sponsored certificate programs are now available in the area of Autism Spectrum Disorder. Please indicate the extent to which you know about or have been involved with such a program: (Choose one)

- I did not know there was such a program
- I am aware, but have not pursued an ASD certificate program
- I am in the process of completing an ASD certificate program
- I have completed an ASD certificate program

12. What title best describes your current position?

- Early Childhood Special Education Teacher
- Other, please specify

13. Including the current year, how many years have you been in your current position?

- <1
- 1-3
- 4-6
- 7-9
- 10-15
- 16-20
- 21-24
- 25+

14. In which location/region of Minnesota is the program by which you are employed located?

- Region 1 & 2 (Northwestern MN)
- Region 3 (Northeastern MN)
- Region 4 (West Central MN)
- Region 5 & 7 (Central MN)
- Region 6 & 8 (Southwestern MN)
- Region 9 (South Central MN)
- Region 10 (Southeastern MN)
- Region 11 (Metro Twin Cities Area)
- Don't know

15. What is the age group of Early Childhood Special Education students you currently serve?

- Only birth to age 3 years
- Only 3-5 years
- Birth to age 5 years
- Birth to age 7 years
- Other, please specify

16. Does the school district(s) you serve offer a program that serves pre-Kindergarten ASD students only? (Choose one)

- Yes
- No
- Some do, most do not
- Most do, some do not
- Other, please specify

17. The school district(s) where I work would be mostly considered:

- Rural
- Town/Small city in Greater MN
- 2nd or 3rd ring Suburban Metro
- 1st ring Suburban Metro
- Urban

Thank you page

Many thanks for taking the time to share your perspective.

If you would like to have your name entered into a drawing for a \$50 gift card in the amount of \$50 to Barnes and Noble Booksellers please send a separate email to Maria Balbo at balb0005@umn.edu. You may also receive an executive summary of the findings from this study by indicating your interest. Expect to see the summary in the spring of 2010.

Appendix F

Follow-up email to prospective participants to encourage response

Follow-up email to prospective participants to encourage response

Dear Colleague,

A few weeks ago, I had emailed a survey to you for the purpose of a research study I am conducting through the University of Minnesota to investigate interventions by Early Childhood Special Education (ECSE) teachers of students with Autism Spectrum Disorders. As an ECSE Coordinator myself, I am aware of the challenges teachers face in providing appropriate services for the unique needs of children on the autism spectrum.

Your response is extremely important, as I am garnering insights from four groups: ECSE Teachers, ECSE Coordinators, Directors of Special Education, and Autism Consultants. If you have already completed the survey, I thank you very much for taking the time. If you have not yet completed the survey, please consider taking 10 minutes out of your day while you enjoy a cup of coffee or other beverage to complete the survey.

Since this is a very hectic time of the school year, I am keeping the survey link open until **June 6, 2009**. I need to have representation from all regions of the state; and, your input can make a difference. After you submit the survey, please send a separate email to me at balb0005@umn.edu to be entered in a drawing for a \$50 gift card to Barnes & Nobles Booksellers and to receive an executive summary of the study results. One \$50 gift card will be given for each of the four groups being surveyed.

Thank you for your participation. To complete the survey, please go to the following link:

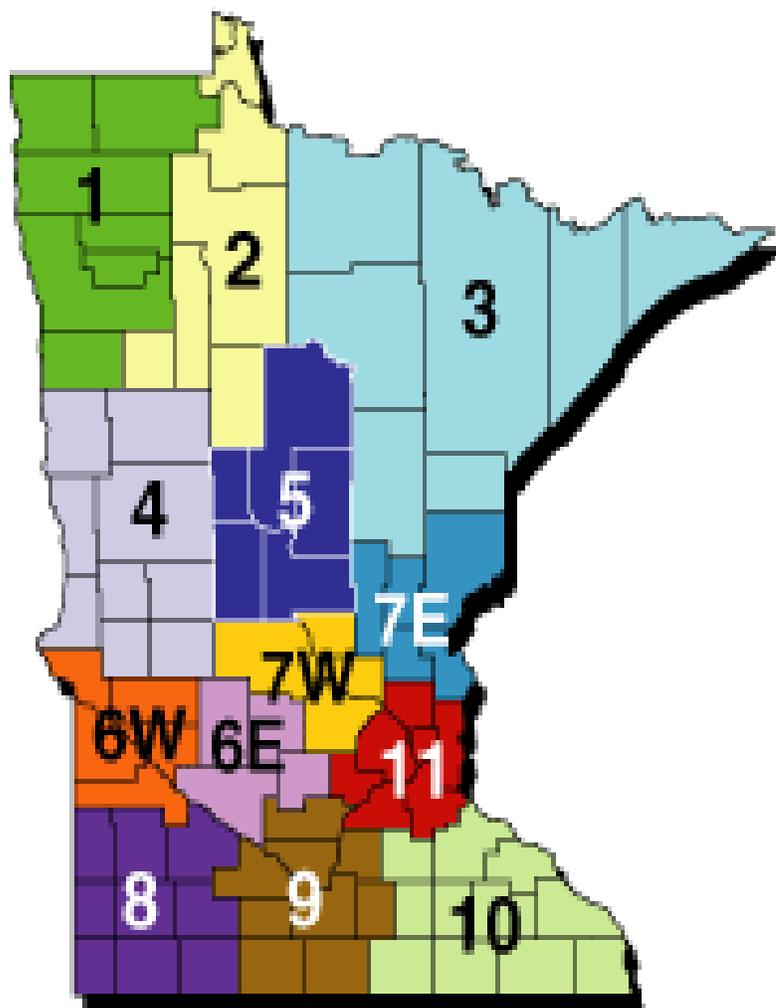
http://www.surveymonkey.com/s.aspx?sm=iMbcsmyfqgkt19bFpO9xIg_3d_3d

Maria Balbo, ECSE Coordinator, SWWC Service Cooperative – Willmar Office
Doctoral Candidate, University of Minnesota

Appendix G

Map of Minnesota Economic Development Regions

Map of Minnesota's Economic Development Regions



Source: <http://www.positivelyminnesota.com/assets/lmi/areamap/edr.shtml#edr7e>