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Using Coaching As A Professional Development Modality To Train Teachers In The Use Of Evidence-Based Practices For Students With Autism Spectrum Disorders.

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USING COACHING AS A PROFESSIONAL DEVELOPMENT MODALITY TO TRAIN TEACHERS IN THE USE OF EVIDENCE-BASED PRACTICES FOR STUDENTS WITH AUTISM SPECTRUM DISORDERS

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

by

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DEDICATION

I would like to dedicate this work to my father, Harvey Woodford Christian, Jr. "My precious child, I love you and will never leave you. During your trials and testings, when you saw only one set of footprints, it was then that I carried you."

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Mahone, Mary Christian, Judy Hollins, and Nancy Parrish thank you for your love, encouragement, and direction. Your fingerprints are all over my many success and accomplishments.

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ABSTRACT

USING COACHING AS A PROFESSIONAL DEVELOPMENT MODALITY TO TRAIN TEACHERS IN THE USE OF EVIDENCE BASED PRACTICES FOR STUDENTS WITH AUTISM SPECTRUM DISORDERS

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Education at Virginia Commonwealth University.

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Professional development for teachers currently working in the classroom is an important focus of educational programs and school systems. Continuous professional development is especially important for special education teachers to maintain current information related to strategies and supports that are effective in educating students with disabilities. The increase in identification of students with autism has forced many teachers to quickly adapt to working with a population of students they have limited experience in teaching through preservice education and previous classroom experience. Coaching is a popular method for professional development delivery to special education teachers currently working in the classroom. This delivery model is used to promote understanding and application of evidence based practices for students with autism to promote positive outcomes for teachers and students. Existing research demonstrates the effectiveness of coaching models to assist teachers in delivering instruction

using evidence-based practices to students with autism. The purpose of this study was to determine teachers' self-reported satisfaction and success with the National Professional Development Center (NPDC) coaching model. A nonexperimental survey research method was designed to investigate the relationship of the independent variables, participation in the NPDC coaching process, years of teaching experience, and the frequency of meeting with coach. The dependent variables examined in the study included the use of evidence-based practices with students and teachers' reported appraisal of the NPDC coaching model. In order to measure the effect of coaching on self-reported change in teacher practice, a survey was conducted with the 21 teachers currently involved in the NPDC coaching model implementation sites. While a causal relationship between coaching as a professional development mechanism and the use of evidence-based practices was not established, teachers communicated the social validity and impact that participation in the project had on their instruction. Teachers also reported increases in students' academic and behavioral skill development. The findings suggest that even though coaching can impact a teacher's practice, many other factors are involved in the development of a teacher's instructional skill set. Future research should continue to define the factors that influence teacher skill development, specifically around implementing evidence-based practices for students with autism spectrum disorders.

CHAPTER 1. INTRODUCTION

The increasing prevalence of autism spectrum disorder both throughout the nation and in Virginia has created an overwhelming need for services, supports, and trained professionals to work with individuals across the lifespan. Nowhere is this more relevant than in the provision of educational services for student with autism spectrum disorders. Public schools in Virginia have experienced an estimated 350 percent increase in students identified with autism spectrum disorders (Virginia Department of Education, 2011). This exponential increase in identification is an issue that has incited policy debates, created novel research initiatives, voiced the demands of an active advocacy community. All of these factors have led to increased attention to identify beneficial components of instruction that seek to address the hallmarks of autism spectrum disorder. Research has helped to identify evidence-based practices to be used with instruction to meet the needs of this unique population of students. Educational programs must include research based supports and strategies that can enable individuals with autism to gain the necessary skills and tools to be successful both inside and outside of the classroom. In recent years teachers and education staff have been called upon to work with this ever-growing population using these strategies and tools that have been proven to be effective. The challenge for schools has been the increasing need to educate and prepare their staff to work with students with autism spectrum disorders using effective practices and strategies. This study will seek to address the overwhelming demand of schools to support teachers and educational

staff as they strive to meet the instructional and behavioral needs of students with autism spectrum disorders.

Statement of the Problem

Teachers working with students with autism spectrum disorders (ASD) often face challenges in providing effective instruction for students who vary in ability, achievement, and functioning (Bolton & Mayer, 2008; Lerman, Vorndran, Addison, & Kuhn, 2004; Simpson, 2005). Students with autism spectrum disorders struggle with social skill development as well as receptive and expressive communication. Behavior is also an area of focus with many students displaying inappropriate, repetitive, and even self-injurious behaviors. Teachers require additional support to provide quality instruction for students with autism spectrum disorders across all areas of need. Professional development serves as a vehicle to provide teachers with support and training in order to meet the needs of these students.

The field of professional development has been challenged to provide training in order to effectively transfer successful principles to the classroom (Showers, 1994). Findings from research literature suggest that coaching, which involves supervision and feedback related to teacher behavior, is a method capable of changing teacher behavior and increasing teachers' use of evidence-based practices in instruction (Guskey & Sparks, 2002; Guskey & Yoon, 2009). The strength of support for coaching has become the impetus for the design of state and national level technical assistance resources and programs aimed at improving the educational outcomes of students with autism spectrum disorders (e.g., National Professional Development Center on Autism spectrum disorders [NPDC], National Autism Center [NAC]).

Training in evidence-based practices exposes educators to research-based approaches; however, effective staff development must include ongoing, embedded work within the

classroom environment specific to the students' characteristics and academic content (Russo, 2004). Joyce and Showers (1996, 2002) demonstrated that fewer than 15% of teachers implement new ideas learned in traditional staff development settings. Improvements in professional development are based on the need for teachers to be supported in the classroom environment in order to make lasting changes in instruction (Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Showers, 2002; Showers & Joyce, 1996; Rodriguez & Knuth, 2000). This study is designed to measure teachers' self-report of the coaching model's effectiveness, applicability in the classroom, and their increased use of evidence-based practices.

Rationale for the Study

Systematic reviews of general coaching literature demonstrate that coaching teachers on the use of evidence-based practices help them to incorporate these interventions into pedagogy and produce positive outcomes for teachers and students (Kretlow & Bartholomew, 2010; Ross, 1992). Data collected in the studies, however, demonstrate a weakness in the sustainability of interventions over time and challenges in use across settings. Data on generalization and maintenance of coaching indicate the limited ability of practices to create sustainable changes over time and in a variety of settings (Cook & Odom, 2013). The nature of the benefit of coaching for teachers and their practice in the classroom also remains unclear. Do teachers find coaching to be useful in improving their ability to serve students with disabilities, in general, and autism spectrum disorders, specifically?

Extensive literature reviews have been conducted within autism research to identify evidenced-based practices that are shown to be effective with students with autism spectrum disorders (NAC, 2007; NPDC, 2008). Research must be able to influence practice and, through professional development, better equip our teachers with the knowledge to implement evidence-

based practices. Existing evidence demonstrates that components of coaching can be effective; yet, the ability for these methods to work over time and across settings is affected by characteristics of the coaching models (Kretlow & Bartholomew, 2010; Ross, 1992).

Purpose of the Study

This study will focus on self-reported efficacy as an outcome of coaching for teachers according to the NPDC coaching model implementation. To address the purpose of this study, variables identified include: autism spectrum disorders, professional development, coaching, and evidence-based practices. The author developed the following research questions:

1. Is there a relationship between frequency of coaching sessions and the use of evidence-based practices with students involved in the NPDC project as reported by teachers?

2. Is there a relationship between teaching experience and increased self-efficacy of teachers on implementing evidence-based practices with students?

3. Do experienced teachers (more than a year of experience) report better outcomes for their students' skill development targeted by the NPDC project than first-year teachers?

4. What appraisals do teachers report of the professional development system used by the NPDC project?

5. Do teachers report using strategies learned by coaching to other students with and without disabilities outside of the NPDC project?

Definition of Terms

The following section contains key terms and their definitions applied to this study. The terms include autism spectrum disorders , coaching, evidence-based practice, individualized education program (IEP), professional development, and teacher. The definitions are provided for these terms and are used in subsequent chapters.

Autism spectrum disorders (ASD). Autism spectrum disorders are defined as a developmental disability with neurological and biological causes (American Psychiatric Association, 2000; Simpson, 2005).

Coaching. Coaching is a specific form of embedded, sustained professional development for practicing education professionals. NPDC coaching is specifically defined as a model including preobservation conference, observation, and postobservation conference (Joyce & Showers, 2002; NPDC, 2010).

Evidence-based practices (EBP). EBP refers to practices that have been shown, through research, to yield positive results for students when used with fidelity and have been identified through rigorous peer review as evidence-based practices (Simpson, McKee, Teeter, & Beytien, 2007). For the purposes of the study, EBP will be defined as the 24 evidence-based practices as identified by the NPDC (2010).

Individualized education program (IEP). An IEP is defined as a written statement for each eligible child with a disability that is developed, reviewed, and revised in a meeting in accordance with federal regulations (Individuals with Disabilities Education Improvement Act, 2004).

Professional development. For the purposes of this study, professional development is defined as continuing education that aims to increase a teacher's knowledge and practice of effective instructional strategies (No Child Left Behind, 2001).

Teacher. A teacher, as defined in this study, is a licensed educational staff member providing instruction to students and is most often a special education teacher and case manager. The selected teachers are also participating in the NPDC model classroom program and receiving support from the NPDC coaching contact.

Methodology

The present study employed a nonexperimental survey research design to investigate the relationship of the independent variable and the dependent variable. In order to measure the effect of coaching on self-reported change in teacher practice, teachers participated in a survey during and after participation in one of the NPDC coaching model implementation sites. The sample was based on a nonprobability technique known as purposeful sampling using teachers who participate in the NPDC model classroom implementation program with a maximum possible sample of 21. Independent variables included participation of the teachers in the NPDC coaching process, years of teaching experience, and time spent with a coach. Dependent variables were self-reported by survey participants and include use and implementation of evidence-based practices, perceived student skill development, appraisal of the NPDC coaching model, and generalization/transfer of strategies to students both within and outside the scope of the NPDC project.

The survey enabled teachers participating in the coaching model to self-report on the program's effectiveness and factors related to their implementation in the classroom. A focus of the survey was to determine the ability of the NPDC intervention to be generalized to other students and to determine if teachers deemed the model useful. The survey collected information such as years of classroom experience and time spent with the coach. Analysis of the data included descriptive statistics (measures of central tendency: mean, median, mode and range) and correlation statistics to analyze the relationship between variables.

Summary

Teachers working with students with autism spectrum disorders require additional support and instruction in evidence-based practices in order to effectively educate students in the classroom setting. While research has identified evidence-based practices that are effective, supporting teachers as they work to learn and implement practices is of the utmost importance. The use of coaching serves as a mechanism to work with teachers in improving instructional practice that will benefit students. Existing literature is limited with respect to how effective coaching is for teachers as well as the benefits of the model across students and settings. The present study attempts to add to the existing literature by addressing these limitations.

CHAPTER 2. REVIEW OF THE LITERATURE

The purpose of this chapter is to provide a review and synthesis of research literature related to the present study. First, overviews of related topics are presented including autism spectrum disorders, evidence-based practices, and professional development. Next, the methodology in conducting the review of research literature and findings will be presented. The review is organized based on the focus of coaching methodology and provides information based on relevant methodical concerns and study characteristics. Finally, a discussion of the findings as well as a conclusion and implications for future research will be provided.

Overview of Related Areas

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is classified as a developmental disability with neurological and biological causes (American Psychiatric Association, 2000; American Psychiatric Associate, 2013; Simpson, 2005). Individuals with autism spectrum disorders experience varying levels of deficits in social communication, social reciprocity, and repetitive behaviors. autism spectrum disorders presents as a spectrum of disorders that affects each individual differently. Individuals diagnosed with autism spectrum disorders may also have a tendency to experience comorbidity with other conditions/disabilities such as obsessive-compulsive disorders, intellectual disabilities and attention-deficit disorders (Simpson et al., 2007). The *2012 Centers for Disease Control Morbidity and Mortality Weekly Report* (Centers for Disease Control, 2012) currently cites the prevalence rate for autism as 1 in 88 children.

Children between the ages of 3 and 22 found to be educationally eligible as students with autism spectrum disorders receive services under Part B of the Individuals with Disabilities Education Act (IDEA). Service provision is determined based on evaluations, instructional information and goals and benchmarks for a student's progress in the Individualized Education Plan (IEP) or in early intervention settings the Individual Family Service Plan (IFSP). Typically, young children receive services in the home setting or in early educational programs. In the school setting, services and placement for students with autism spectrum disorders depend on the individual needs of the student. Physical placement ranges from full inclusion in the general education setting to self-contained classrooms, and a variety of combinations of these settings. Services for students include interventions and supports that enable them to access the curriculum (Kurth & Mastergeorge, 2010).

Entry into the school system may be the first opportunity for many children to receive services and interventions. In the school setting, those responsible for delivering services to students with autism spectrum disorders include teachers, paraprofessionals, speech language therapists, and other related service professionals. Recent federal legislation such as the Individuals with Disabilities Education Improvement Act (IDEIA, 2004) has mandated the use of effective educational practices as supported by professional research. In order for instruction to be effective for the population of students with autism spectrum disorders, personnel need to use identified evidence-based practices that have been shown to be effective for students with autism spectrum disorders (Simpson et al., 2007).

Evidence-Based Practices

Practices that have been shown, through research data, to yield positive results for students when used effectively and have been vetted by rigorous peer review are identified as

evidence-based practices (Simpson et al., 2007). Evidence-based practices are defined by the field through valid and reliable scientific research and have been the focus of educational change and development with the reauthorization of the Elementary and Secondary Education Act (No Child Left Behind [NCLB], 2002) and the recent adoption of the Individuals with Disabilities Education Improvement Act (IDEIA, 2004). The focus of NCLB and the IDEIA on the use of scientifically based research and evidence-based practices has issued a challenge to researchers to identify practices and discover a way to increase their correct use in the classroom environment (Simpson et al., 2007).

Research has demonstrated that there is no single universal intervention that is effective for every individual with autism spectrum disorders, but there is a collection of beneficial practices that can lead to positive outcomes when used with fidelity (Simpson, 2005; Simpson et al., 2007). Practices that are effective for students with autism cross a number of disciplines (speech/language pathology, occupational and physical therapy, etc.) given the wide range of needs of the individuals. Recent literature reviews (NAC, 2007; NPDC, 2010) focused on the identification of effective practices and have been conducted and adopted by national research groups such as the National Professional Development Center on Autism Spectrum Disorders (NPDC) (2010) and the National Autism Center (NAC) (2007). The NPDC has selected acceptance criteria for studies included in their list of evidence-based practices for students with autism. The criteria identify the type and number of independent studies necessary in order for a practice to be accepted. Table 1 identifies the specific qualifications that the studies must meet for inclusion as evidence-based. Currently, the NPDC has identified 24 practices that have been shown to be effective with children and youth with ASD (Appendix A).

The challenge is not only to continue to refine and discover effective practices, but also to find a mechanism to help educational professionals use these techniques and strategies in their work with students with autism. Research demonstrates that professionals working with students

Table 1

Criteria for Inclusion

Randomized or quasi-experimental design studies	Two group design studies
Single subject studies.	Three different investigators or research groups must have conducted five high quality single subject design studies.
Combination of study methodologies.	One high quality randomized or quasi-experimental group design study and three high quality single subject design studies conducted by at least three different investigators or research groups (across the group and single subject design studies).

Adapted from National Professional Development Center on Autism spectrum disorders (2010).

with autism may require additional training and instruction on how to work with the population effectively (NPDC, 2010; Simpson, 2005; Simpson et al., 2007). This instruction for many professionals happens through school-sponsored professional development. The next section will define professional development and examine the components for effective design and support of professionals as they acquire new skills and knowledge. Coaching serves as a way to support teacher learning of evidence-based practices for students with autism that can then support teachers as they work to change classroom instruction, practice, and environment (Kretlow & Bartholomew, 2010). Specifically, coaching serves as a way to link knowledge of evidence-based practices and teacher behavior and in turn creates positive outcomes for students with autism.

Professional Development

Professional development is defined as continuing education that aims to increase a teacher's knowledge and practice of effective instructional strategies (No Child Left Behind, 2001). As such, educational agencies dedicate expertise and resources to professional development to support their staff. Annually, public school systems across the country spend 20 billion dollars (National Center for Educational Statistics [NCES], 2008) on professional development aimed at improving student outcomes and producing highly qualified teachers. Chronic shortages of teachers, especially in special education, have caused professional development, and other on-the-job training methods, to become the primary means of training teachers in effective practices (NPDC, 2010). The consequences of a lack of professional development in education can lead to teachers being ineffective in the classroom and adversely affecting student performance. With such a national focus on the use of professional

development, future research needs to examine ways to ensure that efforts lead to increased student performance and skill development.

Effective professional development is defined as high quality by the 2001 No Child Left Behind Act (NCLB) if activities meet five specific criteria, including instruction related to evidence-based practices. According to NCLB other characteristics of high quality professional development include: activities that are sustained, intensive and content-focused; are aligned to state content standards; have resulted in an increase in teacher knowledge of content and effective practices; and evaluated regularly for effects on teacher and student achievement. In a literature review conducted by the U.S. Department of Education's (USDE), Institute of Education Science (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007) over 1,300 studies using professional development activities were reviewed and only nine met the highly rigorous criteria set out by NCLB. Among these nine studies, the common elements were professional development activities that employed workshops or summer institutes. These activities focused on content and employed intensive short-term sessions, and included follow-up activities in order to support teachers in utilizing the new skills and knowledge they had gained. The Institute of Education Science study demonstrated that it is important for quality professional development to be designed and executed and that barriers that impede practice must be decreased in order for teachers to take advantage of learning opportunities.

In order for professional development to be effective, obstacles must be minimized and the focus of activities should be clear for participants. A study conducted by the NCES (2008) identified a variety of factors as important to reduce barriers for teachers' effective participation in professional development opportunities. Teachers reported that the focus of professional development should be on quality teaching and then followed up in the classroom by data

collection and analysis of implementation. While instruction should focus on research-based practices it also needs to align with school practices in order to reduce confusion. Administrative and long-term support needs to be provided to teachers engaging in professional development to ensure fidelity and use over time (Klingner, 2004). Teachers also agreed that student outcomes needed to be the primary measure of successful implementation and that these data need to be shared to evaluate effectiveness. Successful professional development activities must seek to overcome these barriers as well as provide the skills and tools necessary for teachers to effectively instruct students.

Linking effective professional development to changes in student performance through research is difficult based on the lack of reliable study findings to support what many consider a common-sense ideal. A variety of environmental and practical factors affect professional development and student achievement (Showers, 1994; Showers & Joyce, 1996; Kretlow & Bartholomew, 2010). Figure 1 illustrates some of these factors and the interrelationships developed as a result. The curriculum and state/federal standards influence every aspect of education including informing content and instruction related to professional development. Professional development is designed to increase a teacher's knowledge base in relation to this content as well as effective instructional strategy. This change in teacher behavior is expected to alter instruction and make understanding content accessible for students by supporting learning in a variety of modalities that meet the needs of diverse learners. The impact of teacher behavior and instruction on student achievement helps to demonstrate the importance of enabling teachers to make informed choices about professional development activities. However, there are also limitations in being able to effectively link variables to student achievement due to confounding factors that can alter the measurement (Showers & Joyce, 1996; Kretlow & Bartholomew, 2010).

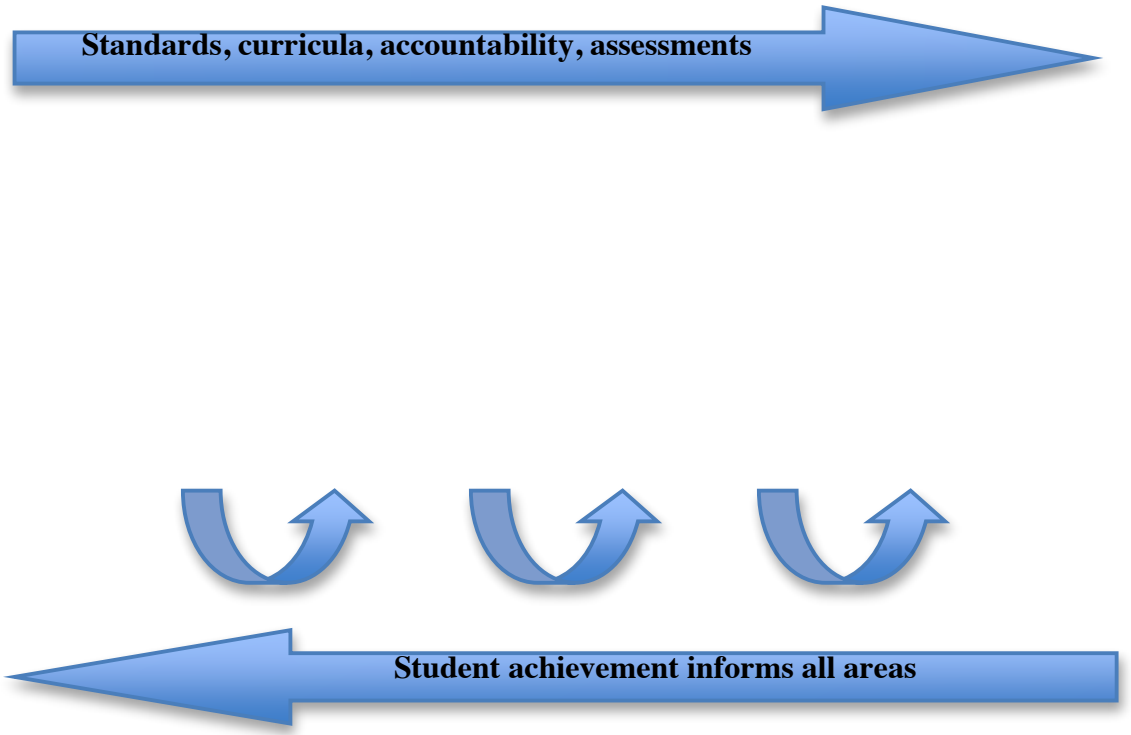

Figure 1. How professional development of teachers affects student achievement.

Adapted from "Reviewing the evidence on how teacher professional development affects student achievement," by Yoon, K. S., Duncan, T., Lee, S. W-Y., Scarloss, B., & Shapley, K., 2007. (Issues & Answers Report, REL 2007-No. 033), Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional assistance, Regional Educational Laboratory, Southwest.

Coaching. Professional development is essential for teachers working with students with autism. Increasing prevalence rates and lack of pre-service education and training in autism can leave teachers struggling to find meaningful ways to reach students in the classroom environment. Included in the group of educational professionals working with students with autism spectrum disorders are paraprofessionals. The use of paraprofessionals in the delivery of instruction to students with autism spectrum disorders has become more commonplace in the school setting given the need for individualized intervention and instruction (Leblanc, Ricciardi, & Luiselli, 2005). As a result of the significant support needs of students with autism spectrum disorders, teachers, and other educational professionals require information delivered in a way that not only increases their knowledge and understanding, but can also enable them to use interventions with fidelity in the classroom. One method of professional development that has been used to create sustainable change in classrooms with support provided to teachers is coaching (Joyce & Showers, 1996; Kretlow & Bartholomew, 2010). Coaching is largely defined as a job embedded sustained model for professional development using teacher observation (Denton & Hasbrouck, 2009) that focuses on ensuring quality implementation in the classroom setting.

The definition of coaching is a fluid principle that incorporates many terms and practices. The practice of coaching usually follows or is included in a training program and contains supervision and monitoring of professionals and feedback on implementation of instructional practices (Showers, 1994; Showers & Joyce, 1996). The difference between the simple tools of supervision, feedback, and coaching is that throughout the process of working with an individual in a coaching relationship progress and evaluation are based on teachers' authentic performance in the classroom (Kretlow & Bartholomew, 2010; NPDC, 2010). The feedback process can then

be influenced by what the coach has observed and the coach's instruction to the teacher becomes contingent on individual needs and skill development (Showers & Joyce, 1996, Kretlow & Bartholomew, 2010). Coaching became popular in literacy research and has evolved into a practice containing multiple models and methodologies for implementation (Onchwari & Keengwe, 2008). The rush of the professional development field to create alterative forms and practices has limited the amount of reliable research that has been conducted to identify components of effective coaching models and even determine a widely adopted definition; however, initial findings show that coaching can have a positive impact on teacher behavior change.

Coaching has provided an impetus to shift professional development from a piecemeal approach to a focused, job-embedded, long-term approach to developing skills in teachers. Long-term initiatives build capacity necessary to lay the foundation for change. Figure 2, derived from the seminal work of Joyce and Showers (1987, 2002), demonstrates their theoretical model for the progression of knowledge retention through levels of different professional development activities. Joyce and Showers work demonstrates that using various modes of training and follow-up can support retention of subject matter and enable it to grow from 5% to 90% with intensive supports for teachers (which is identified as coaching). Workshops and demonstration classrooms alone are not sufficient; coaching and feedback must be integrated in order to make professional development activities meaningful and result in changes in teacher behavior and practice.

Coaching has recently become the focus of national education initiatives (USDE, 2008) and is used as part of the methodology in many of the training and technical assistance projects and centers around the country. Current research highlights the lack of a consistent definition of

coaching as well as a dearth of empirical research related to the outcomes from the practice (Denton & Hasbrouck, 2009), specifically related to student outcomes. Recent research has

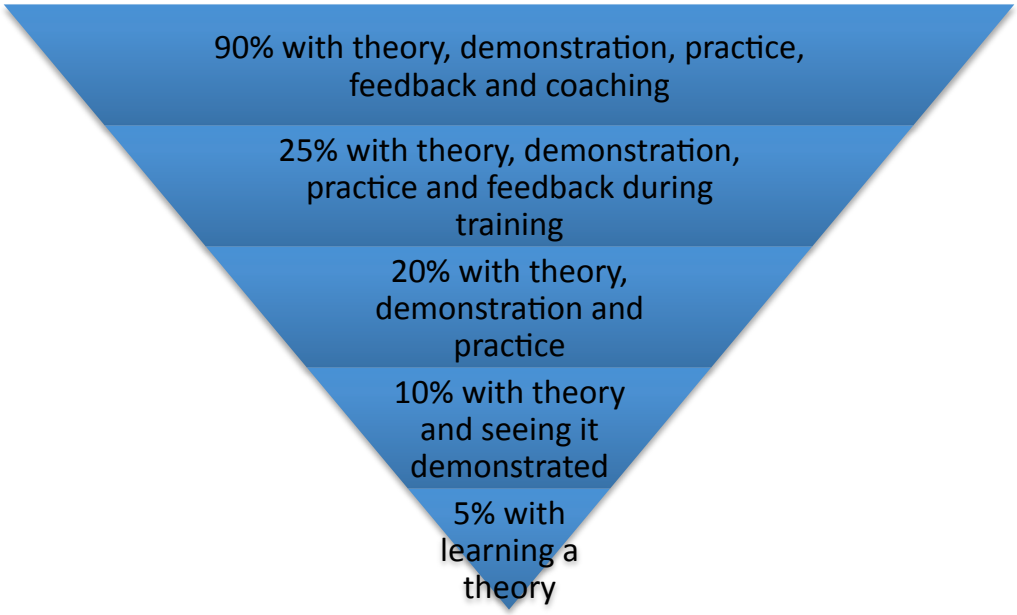

Figure 2. Retention rates for learning among teachers illustrating the effects of coaching.

Adapted from Joyce, B., Showers, B., & Bennett, B. (1987). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. *Educational Leadership, 45,* 77-87.
Joyce, B., & Showers, B. (2002). *Designing training and peer coaching: Our needs for learning*. Alexandria, VA: ASCD.

focused on the change in teacher behavior as a result of coaching (Guskey & Yoon, 2009; Kretlow & Bartholomew, 2010; McDougall et al., 2009; Ross, 1992). Coached teachers demonstrate long-term retention and a more effective use of strategies learned through instruction (Baker & Showers, 1984; Showers, 1982, 1994). Informal data collection surrounding coaching has shown other environmental changes in a school environment such as a more supportive system for collegial conversation surrounding instructional improvement and resource sharing (Joyce & Showers, 1988). However, these assertions have yet to be affirmed through the collection of empirical evidence (Kretlow & Bartholomew, 2010).

As stated previously, coaching can take a variety of forms for delivery. For example, coaching can be provided to teachers by a consultant, usually an expert in the field employed through an arrangement with a private business, a public agency or a college/university. Peer coaching is also means to deliver instructional support through the current personnel in a school. The use of peer coaching generally assumes a common training opportunity. Members of teams attend a training program and then work together in the classroom to take time to watch each other and discuss their shared observations (Joyce & Showers, 1988). Coaching is designed as a cyclical process intended to ingrain the teaching practices into current use and then, using observation and feedback, hone the ability of the user to implement with fidelity and generalize the skills into new situations. This process is ongoing: new practices and research continuously inform decisions and help the community of coaches grow and develop skills.

Coaching is a continuous process of development that enables professionals to use skills learned in a real world environment and receive feedback on implementation (Showers & Joyce, 1996). In comparison, professional development in-services, popular in many schools, lead to little change in teaching practice (Kretlow & Bartholomew, 2010). Research demonstrates that

effective teacher behavior change can be linked to change in students' performance and behavior. Utilization of coaching as a way to increase the teacher's use of evidence-based practices could provide a link to a change in student achievement (Kretlow & Bartholomew, 2010; Showers, 1994; Showers & Joyce, 1996).

A review of the research was conducted to examine the effects of coaching about evidence-based practices on the behavior of teachers and the skill development of students with autism spectrum disorders. The objective of this review is to provide an understanding of the research that has used coaching to help educate staff in developing teaching strategies that can positively affect students with autism spectrum disorders in the educational setting. The findings will contribute to knowledge and the practice of using coaching to help teachers work effectively with students with autism spectrum disorders.

Review of Research

Method

Studies included for review were identified in systematic searches and vetted using inclusion criteria, and then reviewed and summarized. Each included study was analyzed for a variety of coding variables (e.g., research design, independent and dependent variables, measurement, results). The purpose of the following section is to detail the search, vetting, and data extraction procedures.

Search procedures. Searches were conducted in two electronic databases, ERIC and Psych INFO, using the following Boolean search terms: autis*, staff, paraprofessional, teacher, therapist, training, supervision, coaching, and feedback. Publication year was restricted to between 2000 and 2012 since the addition of the disability category of autism spectrum disorders to the Individuals with Disabilities Education Act (IDEA) regulations took place in 1999 (IDEA

Regulations, 34 C. F. R. § 300-303 (1999)). This change resulted in the provisions of services within the public school system to individuals found eligible for services under the disability classification of autism spectrum disorders. With these developments it is safe to assume that literature on autism spectrum disorders and professional development was previously absent because of the lack of educational services provided. The electronic search identified 172 studies. Following initial vetting of the studies, an ancestral search of these studies was conducted to identify additional articles for inclusion. A total of 173 articles were reviewed for possible incorporation into the review.

Inclusion criteria. In order to be included in the review, studies had to meet three specific inclusion criteria. First, the study had to identify professional development as an experimental variable (e.g., training, coaching, supervision). Second, the study had to identify professionals working with young children or students identified with autism in an educational setting. For the purpose of this review, educational setting was defined as a public/private school, autism treatment center offering educational programming or educational-based therapeutic programs (e.g., early childhood visits, preschools). Finally, the study had to report findings from a primary experimental study (e.g., meta-analyses were not included). A total of 19 studies met the criteria and were included in this review. All of the selected studies were deemed acceptable using the American Educational Research Association (AERA) standards for quantitative and qualitative research (Howe & Eisenhart, 1990; American Educational Research Association, 2006).

Data extraction. The studies were reviewed and summarized with attention to the details within the coding system of the review (Appendix B) contains a sample coding matrix and the table containing all of the studies reviewed). The study components detailed and

collected are listed as follows: (a) participants, (b) setting, (c) design/method, (d) independent variable, (e) dependent variable, (f) measures, (g) initial and secondary findings, (h) limitations, (i) social validity, and (j) generalization and maintenance data. The resulting 19 studies were separated into four categories for summarization (i.e., clinical staff as participants, studies using distance technology, and studies measuring teacher and student change).

Results

Research staff as intervention agents. Three studies involved the delivery of coaching and interventions by research staff (e.g., graduate students, researchers) (Ganz, Flores, & Lashley, 2011; Machalicek et al., 2009; Weinkauf, Zeug, Anderson, & Ala'i-Rosales, 2010). Unlike other studies included in this review, which used authentic intervention agents, the use of research staff has limitations in generalizing to the greater population of educators and classroom settings. Each of the studies was conducted in the school setting (e.g., public and private placements) and targeted students 2-8 years old. Independent variables across studies were intervention packages implemented by staff in the educational setting with students. Dependent variables were indicators of students' skill development (e.g., increase in spontaneous verbal requesting) (Ganz et al., 2011) and staff's implementation fidelity of intervention protocol (e.g., behavior analysis component checklist) (Weinkauf et al., 2010). All of the studies used staff training and intervention packages that contained a skill checklist that enabled data collection on staff behavior (e.g., correct/incorrect implementation criteria).

For example, Machalicek et al. (2009) utilized videoconferencing equipment to provide supervision for staff and to collect data during delivery of a preference assessment. Graduate students worked with students as teachers participated as observers to learn the process. The first author served as supervisor and, during the preference assessment, completed the

implementation accuracy checklist while viewing the assessment via videoconference. Results show that research staff demonstrated 100% accuracy during the intervention after receiving feedback from the supervisor. A follow-up intervention phase was conducted after completion of the preference assessment to determine if the items identified as high preference were salient with all of the students. Each of the students chose to complete a task that was associated with the preferred items from the assessment versus neutral items. This study demonstrates the use of videoconferencing for professional development of research staff can result in positive student and staff outcomes.

Across all three studies there were limitations regarding the measuring of social validity and/or maintenance and generalization. Only Weinkauf et al. (2010) used a satisfaction questionnaire with trainees to determine the social validity of the intervention. Ganz et al. (2011) collected maintenance data during a follow-up session with a novel experimenter three weeks after the initial protocols. In these three studies, the lack of social validity measures and generalization/maintenance data limits the support behind the use of these interventions across time and authentic settings.

Studies using distance technology. Four studies utilized distance technology as an independent variable (Gibson, Pennington, Stenhoff, & Hopper, 2010; Goodman, Brady, Duffy, Scott & Pollard, 2008; Machalicek et al., 2009; Machalicek et al., 2010; Vismara, Young, Stahmer, Griffith, & Rogers, 2009). In the studies, technology was used either to deliver training or to monitor/record progress in the studies. Dependent variables focused on specific student behavior (e.g., instances of elopement, child communication behaviors) or on teacher implementation of the training model/package. The distance technology used included video teleconference (VTC) and bug-in-ear supervision (i.e., a Bluetooth device that the teacher wore

and the researcher spoke directly into). Studies were conducted in settings of early childhood home visits and the public school setting (grades K-8), and included students aged 2-12 years.

Vismara et al. (2009), a representative of this category of studies, used a pre/posttest between groups design to measure the effectiveness of live and distance training of community-based therapists to implement the Early Start Denver Model (ESDM). This experiment was the only study that included a comparison, where one treatment group received live training and other groups received training via VTC. Therapists with no prior experience in ESDM were trained in four early intervention community sites. Training sessions consisted of three phases: direct work with children, parent coaching, and implementation of fidelity systems. Five therapists received the training live and five therapists received training through distance education (video teleconferencing referred to as *telehealth technology*). Parents and their children who participated in the study were selected from the therapists' practice on sequential presentation basis. Participants included 29 children between the ages of 24-51 months with a diagnosis of autism spectrum disorders participated in the study. The training activities took place in the families' home in weekly one-hour treatment sessions. The dependent variable used to register increases in effective delivery was therapist and parent implementation of the training protocol. Results demonstrated that both live and telehealth training increased therapists' effectiveness in delivery of the ESDM, as well as their ability to teach the protocol to parents. Children participating in the study showed significant gains in social and communicative imitative and verbal behaviors on the Child Behavior Rating Scale (CBRS). Vismara and colleagues (2009) collected data on social validity of the intervention by conducting a self-satisfaction survey with therapists. Therapists rated the intervention as satisfactory and answered affirmatively when they were asked if they understood the feedback related to the training.

Results from the four studies demonstrated the effectiveness of using video teleconferencing. In experiments focused on training teachers (Goodman et al., 2008; Machailcek et al., 2010; Vismara et al., 2009) technology was used effectively to increase the ability of teachers to complete intervention protocols. Studies measuring student behavior change (Gibson et al., 2010; Vismara et al., 2009) were effective in decreasing negative student behaviors and increasing positive student behaviors via alterations in teacher behavior. Social validity and/or maintenance data were collected across all four studies to demonstrate durability of findings and a high degree of teacher satisfaction. The use of video teleconferencing enabled researchers to provide immediate feedback and distance education to professional populations difficult to reach by conventional professional development methods.

Studies measuring only teacher and paraprofessional change. Three studies evaluated the effects of interventions on behaviors of teachers (Bolton & Mayer, 2008; Leblanc et al., 2005; Suhrheinrich, 2011). The independent variable in these studies was training delivered via workshops and performance feedback/coaching provided in the classroom environment. The studies focused on teachers and paraprofessionals working with students diagnosed with autism spectrum disorders ages 1-13 years. Settings for the interventions were public schools and a community-based service agency. None of the studies collected data on change in student performance or skill development.

For example, the study conducted by Leblanc et al. (2005) was one of two studies in this category that evaluated the training of paraprofessionals. Leblanc et al. designed a scale to assess the effect of abbreviated performance feedback on the ability of three paraprofessional staff to implement discrete trial instruction to three students diagnosed with autism spectrum disorders. This study used a multiple baseline design to evaluate the paraprofessionals'

implementation of 10 discrete trial instructional skills. With the performance feedback delivered by the trainer, each of the paraprofessionals achieved 90-100% efficacy within four sessions. Leblanc et al. also had the paraprofessionals complete an acceptability rating scale anonymously. The coaching procedures used in the study were judged highly acceptable by the staff.

Across the three studies, coaching was found to improve the ability of a professional implementing behavioral interventions with students identified with autism spectrum disorders. Regarding the collection of generalization, maintenance, and social validity data, these measures were not reported in every study. Leblanc et al. (2005) had participants complete an Acceptability Rating Scale and found that procedures were judged as highly acceptable by staff participants. Leblanc and colleagues (2005) found that improved instruction was maintained up to 11 weeks post-training. Bolton and Mayer (2008) assessed generalization of the discrete trial teaching training in both the home and school environments as part of a multicomponent training package. Findings from this study suggest that evidence supports the use of such practices in teaching children with autism and a high level of treatment integrity across the intervention for greater periods of time.

Studies measuring staff and student change. The remaining nine studies focused on both teacher and student change (Dib & Sturmey, 2007; Howlin, Gordon, Pasco, Wade, & Charman, 2007; Kaale, Smith, & Sponheim, 2012; Lerman et al., 2004; Mazurik-Charles & Stefanou, 2010; Nigro-Bruzzi & Sturmey, 2010; Robinson, 2011; Ryan, Hemmes, Sturmey, Jacobs, & Grommet, 2008; Sarokoff & Sturmey, 2008). Students who participated in the studies were diagnosed with autism spectrum disorders and were between the ages of 2 and 12 years. Studies took place in separate and inclusive classrooms in public and private schools. This group of studies included two international studies: one from the United Kingdom (Howlin et al., 2007)

and the other from Norway (Kaale et al., 2012). Independent variables in the studies included staff training in specific practices (e.g., behavior skills training and Pictures Exchange Communication System [PECS]) and supervision in a variety of environments (school setting and role playing exercises). Dependent variables focused on student change and development of specific skills as a result of the training and support received by staff. Examples of the measures used to account for student development include teacher ratings of social skill development, frequency of child communicative initiations, student percent correct responses and improvement in target behaviors. For teachers, data were collected in training protocol fidelity and use of practices (e.g., discrete trial teaching, PECS).

For example, a study conducted by Howlin et al. (2007), measured the effect of PECS training offered to staff and parents on the development of student communication skills. Eighty-eight students were randomly assigned to one of two treatment groups or the control group. In the two treatment groups (one receiving immediate training and the other delayed two terms of baseline assessment), parents and staff received 13 hours of training in PECS. After training, data were collected in the school setting on the frequency of student communicative initiations, frequency of use of PECS symbols, and frequency of speech. For students in the two treatment groups, there was an increased rate of communicative initiations and PECS use as compared to students in the control group. However, there was no difference between groups in frequency of speech or scores on language tests. Limitations in the study included the lack of generalization and maintenance and treatment fidelity data.

The nine studies in this section focused on behavioral, communicative, and social skill development in students. Teacher-related data collected in the studies focused on the ability to implement training protocols and increase the effective use of specific practices. Social validity

measures collected across studies demonstrated general staff satisfaction with the training and coaching practices. While most of the studies demonstrated increases in student skill development, some studies failed to demonstrate development across all skills measured. For example, the inability of increased communicative frequency to generalize to language skills, spoken language, or language test scores for students in the Howlin et al. (2007) study was a declared weakness. However, studies in this section were able to demonstrate change in teacher behavior and practice from correct staff performance in delivering mands to students (Nigro-Bruzzi & Sturmey, 2010) to implementation fidelity of joint attention procedures (Kaale et al., 2012).

Discussion

Evaluation

In the studies reviewed, the coaching practices focused on two distinct levels of support for staff. The first level concentrated on information and resource sharing to become effective, while the second level required implementation of an intervention or practice with support. Studies that focused on sharing information and resources provided targeted training to participants and conducted follow-up activities geared towards developing the intervention with practice. For example, Bolton and Mayer (2008) focused on developing paraprofessionals' use of discrete trial teaching through group training and then used case study instruction and performance feedback within role-playing sessions to allow participants to practice their newly acquired skills. Sunhrheinrich (2011) held a 6-hour workshop on a university campus and held follow-up activities (e.g., individual coaching sessions) in the school environment. This level of support, providing training with follow up, was used predominantly with studies documenting

teacher change. This could mean that this design of professional development may contribute to greater teacher behavior change than changes in individual student performance.

The second focus of the coaching literature reviewed was the development of skills in implementation or the ability to perform interventions targeting specific skills in students. In the studies reviewed, the use of distance technology in teaching staff to implement interventions was a reoccurring theme. Gibson and colleagues (2010) use desktop videoconferencing to instruct staff in functional communication training. Findings from this study demonstrated that not only did staff become able to implement the intervention to fidelity but also the problem behavior (elopement) in the student participants was reduced. Other studies, which used live training in order to instruct staff, mentioned in their discussions the possibility of using distance technology in future research to produce more cost effective and widespread training opportunities.

The studies reviewed demonstrate that coaching can be effective in changing teacher behavior and practice and, at times, have an effect on student performance. Coaching components that were responsible for teacher change included interventions that combined training with practice application activities. Studies by Leblanc et al. (2005), Bolton and Mayer (2008), and Suhrheinrich (2011) all began with training aimed at increasing participants' understanding of the intervention. Bolton and Mayer (2008) used a group training design with an introduction to discrete trial teaching and then worked with paraprofessionals in the classroom to determine baseline data and provide feedback, case instruction, and specific follow up to help increase accuracy with implementation. Introductory training surrounding an intervention or concept in concert with coaching in authentic settings can increase a professional's ability to implement evidence-based instructional practices (Bolton and Mayer, 2008).

In comparison, the forms of coaching that were associated with change in student performance included increased focus in the quality of feedback within the classroom environment and the utilization of tools to monitor student performance. An effective component of the coaching process that reflected student change was the incorporation of modeling. Dib and Sturmey (2007) worked to reduce student stereotypy by improving teachers' use of discrete trial teaching. The implementation of the 4-step procedure was difficult for the teachers to implement to fidelity and so the authors incorporated specific modeling by working with the student participants in order to improve teachers' ability to deliver the intervention. Post-training, teachers' ability to use discrete trial teaching increased and student stereotypic behavior decreased. Another helpful component of studies that produced student progress was the use of student monitoring tools. For example, Mazurik-Charles and Stefanou (2010) completed 15-minute observations of teachers working with students. This continuous collection of student data helped teachers observe changes in their students and enabled the trainers to make data- based decisions to improve teacher implementation.

Limitations Of The Extant Literature

All of the studies reviewed reported limitations within their discussion of results. A consistent weakness was determining the relationship between teacher and student change. The ability of a change in teacher behavior to be clearly linked to student progress could not be clearly defined or measured. Many interfering factors can contribute to student change and additional studies should strive to control for outside variables that can affect data collection. The inability of studies to define negative effects on teacher and student change was also detrimental to the discovery of clear links between interventions and teacher and student change. In the studies reviewed, it is important to note that there were no negative results reported. This

"file drawer problem" is an issue when studies that did not demonstrate positive findings are left unpublished. Future research must address the limitations in the current literature by identifying factors of coaching that contribute to development in student performance and those which do not.

Throughout the discussion of the results, the literature search identified limitations in the collection of social validity measures and generalization/maintenance data. This difficulty in being unable to identify data that demonstrated success over time and in additional settings was a significant limitation in generalizing study results to the wider school setting. The dearth of data collected on social validity creates the concern that educational staff in the real world environment of ever increasing job responsibilities may not easily access the interventions used. These limitations can give shape to future research and encourage replication studies that build upon findings and account for the information that is needed to bridge the gap from research to practice.

Needed Research In The Area Of Coaching

The field must focus on studies that account for the limitations of previous work and create experiments focused on identifying the successful and unsuccessful components of coaching. Social validity measures in future coaching studies need to be increased in order to determine the burden of training provided to professionals in the classroom environment. The relationship of training to duties and workload will need to be managed by administrators who understand the need for time that can be used effectively to meet the increased demands on a teacher in a coaching relationship. Data collection must include monitoring of the generalization of skills exhibited by students. Students with autism spectrum disorders struggle to develop skills in the areas of communication, behavior, and socialization, all of which require the ability

of skills to transcend settings. The collection of maintenance data is important because interventions that can create lasting change in teachers and students have the ability to impact practice on a larger scale and increase effectiveness over time.

Evaluation is also a critical piece in discovering the link between interventions that use coaching and lasting, genuine change in educational staff and the students with whom they worked with. Future studies must examine how to critically evaluate professional development, such as coaching, to ensure that the efforts translate into improvement in student achievement. Detailed models for evaluation of coaching procedures can help to determine effectiveness as well as work towards development of a common definition of coaching and successful implementation steps accepted by the field. Continued research in the field of coaching must work to contextualize the conversation about what makes coaching effective and what is a barrier to successful implementation. If a variety of external factors and confounding variables affect the data on student progress, how can the field identify and evaluate the ability of coaching to mitigate these issues?

Conclusions

Developments by NPDC (2008) and NAC (2005) have helped to alleviate the lack of consensus in evidence-based practices for students with autism spectrum disorders. However, further research is required to determine the most effective practices to target with coaching for professionals working with students. The field must be able to not only define these practices, but also identify those that can be developed in the classroom setting with teachers and paraprofessionals through coaching. Once this begins, the impact on positive skill development and achievement of students can be analyzed. Identifying practices and discovering the effect on

student achievement can then help to shape professional development activities that can benefit instructional practice in our schools.

Schools use professional development to meet training needs of their teachers and staff. Coaching, as a mode of professional development, has been shown to be effective for teachers and may even translate to student gains. However, this link has yet to be made for students with autism spectrum disorders. The practice of coaching reaches beyond simple evaluative feedback and becomes a form of contingent instruction that is designed to meet the individual needs and development of professionals. The field must work to identify this process and find a way to evaluate coaching within the classroom setting in order to demonstrate that this time and effort intensive process is worthwhile. In order to gauge the effectiveness of coaching, teachers' key components of training need to be identified by the field through research and evaluated in practice. The use of coaching to increase educational professionals' ability to utilize evidence-based practices could improve instruction specifically for students with autism spectrum disorders. By giving teachers the appropriate tools, research can work towards creating successful educational opportunities for students with autism spectrum disorders.

CHAPTER 3: METHODOLOGY

This study was conducted in order to determine teachers' self-reported satisfaction and success with the NPDC coaching model. Findings demonstrate teachers' satisfaction with implementation and the report on the ability of the coaching model to change their teaching practice. The goal of the NPDC coaching model is to develop skills and support for the implementation of evidence-based practices for student with autism spectrum disorders. Findings from this study will inform the continued development of the NPDC coaching model, provide a measure of teacher satisfaction with the coaching model, and advise staff working to provide support and professional development to teachers. This study on the effect of coaching on self-reported change in teacher practice, was designed to address the following questions:

1. Is there a relationship between frequency of coaching sessions and the use of evidence-based practices with students involved in the NPDC project as reported by teachers?

2. Is there a relationship between teaching experience and increased self-efficacy of teachers on implementing evidence-based practices with students?

3. Do experienced teachers (more than a year of experience) report better outcomes for their students' skill development targeted by the NPDC project than first-year teachers?

4. What appraisals do teachers report of the professional development system used by the NPDC project?

5. Do teachers report using strategies learned by coaching to other students with and without disabilities outside of the NPDC project?

Type of Study

This study utilized a nonexperimental survey research design to investigate the relationship among the independent variables: participation in the NPDC coaching process, years of teaching experience, and the frequency of meeting with coach. The dependent variables examined in the study included: the use of evidence-based practices with students and teachers; reported appraisal of the NPDC professional development activity; student outcomes; and their use of evidence-based practices. In order to measure the effect of coaching on self-reported change in teacher practice, a survey was conducted with teachers currently involved in the NPDC coaching model implementation sites.

Definition of Variables

One of the independent variables is participation in the NPDC coaching process as defined by the *NPDC Coaching Manual*. Using this model, coaches and teachers work together through a process to determine goals and focus, meet periodically to measure implementation and make adjustments to practice, and collect data. The first step of the coaching process after identification of the participants is the preobservation conference. During the preobservation conference, rules are established for the observations and goals or coaching targets are identified. Implementation of any practice involves the progression through coaching targets. The implementation checklist for each practice outlines the coaching targets that must occur to ensure fidelity of implementation (NPDC, 2010). These implementation checklists are compared alongside the planned lesson during the observation to establish meaningful targets of teacher behavior to be observed by the coach. The second step of the coaching process is the observation. During the observation, the activities identified through the preobservation meeting are completed. The teacher follows the plan of evidence-based practice implementation through

the completion of the instructional lesson. The coach collects data on the agreed upon coaching targets and observes the interaction between teacher and student. The final step of the NPDC coaching process is the postobservation conference. The postobservation conference closes the loop of the observation process but also serves as the beginning of the active coaching process. During the postobservation conference, coach and teacher discuss the data collected and the instructional process including the coaching targets that were determined during the preobservation conference. Coach and teachers also review the implementation checklists to ensure fidelity to the evidence-based practices. This summarization and interpretation of data sets the stage for the partners to discuss the evaluative measures of the process. Evaluation of the teacher's implementation of coaching targets determines the focus and practice of instruction by the coach. Depending on the situation and relationship this instruction can vary greatly including: additional instruction around a practice, role-playing and brainstorming additional uses of a practice in the classroom setting, and developing a plan of action for the next coaching session. This three-step process of preobservation, observation and postobservation provides a vehicle for professional development and continuing education within a practical setting for teachers.

In this study, coaching was defined as participation in the three-step coaching process of the NPDC model. Coaching was measured by the frequency of teachers meetings with the coach that they recorded in his/her coaching log and referenced during the survey. Information provided by national research reports on special education teacher professional development (National Council for the Accreditation of Teacher Education [NCATE], 2012) and the Council for Exceptional Children (CEC) was used to sort teacher groups into meaningful experiential brackets (Appendix C). This categorization of teachers and their years of experience provided

measurement for the independent variable of years of teaching experience. Frequency of times meeting with a coach was also identified as an independent variable. Categories for frequency of meetings were determined by the guidance in the NPDC coaching manual, which outlined monthly visits of varying frequency depending on the needs of the participants. Values for the independent variable of meeting frequency ranged from less than one meeting a month to over five meetings per month. Dependent variables were self-reported by survey participants and include: the use of evidence-based practices with students and teachers reported appraisal of the NPDC professional development activity, student outcomes and their use of evidence-based practices.

Sample

The nonprobability sampling method of a purposeful sample was used. Due to the small population of teachers participating in the NPDC project, size randomization was not used because all teachers were surveyed. Mitchell and Jolley (2007) define purposeful sampling as including individuals in the survey because they are a readily available population with the specific characteristics required. For this study, the entire population was solicited and included all those teachers who have participated in the project. Currently there are 21 teachers involved in the NPDC project across the Commonwealth of Virginia. They represent all regional geographic areas of the state and a variety of local school divisions. Teachers have been involved in the program since 2010. Teachers identified on the survey how long they have been involved in the project thereby identifying what year cohort they joined. Only the teachers who were participating in the NPDC model site implementation were appropriate to survey given their involvement with the project. Teachers across both original and expansion sites from 2010-2013 and involved in the coaching model were included in the survey sample. The teachers

surveyed were special education teachers working in public schools in rural and urban areas across Virginia. Teachers involved in the NPDC project included teachers who had volunteered for participation as well as teachers who had been assigned to participate from their school divisions level central office. All participants were licensed special education teachers and employed through their local school divisions.

Instrument Development

This instrument was novel due to the fact there is no developed survey or checklist for coaching model effectiveness or implementation as developed by the NPDC. The researcher worked with NPDC staff and the coaching manual from NPDC to develop the survey instrument. Appendix D contains the survey questions and the concepts they measured related to the purpose of the instrument. After completion of the first draft of the survey a panel of three experts who served as research associates for the NPDC were asked to review the instrument. Each reviewer was sent an electronic copy of the instrument, a memo explaining the purpose and procedure for review. Feedback was received from all three experts and edits were made to two items with one item being added.

Administration procedure. Participants accessed the survey via the Internet after receipt of an introductory e-mail with a hyperlink to the survey administration site housed at the Virginia Commonwealth University Autism Center for Excellence (VCU ACE). The survey administration website issued each participant an anonymous user identifier and password that enabled the results to be available only to the researcher and without any identifying information. No attempt was made to match responses to specific participants to ensure anonymity. When entering the site, participants were directed to an introductory page that provided a description of the study and instruction for completion. Survey participants were instructed to complete each

of the 23 items. For this study the target response rate was 100%. In order to achieve maximum responsivity contact was made through local coaches to teachers providing the link to the survey. The study also awarded an incentive to a random participant in the survey. If the 100% response rate was not met follow-up contact would have been made with teachers directly. Appendix D details the survey questions and the five Likert scale responses available for selection delineated by item.

Data Analysis

Examinations of the distribution of the scores to determine the effective measures for analysis were conducted. Descriptive statistics of central tendency (mean, median, and mode) and measures of variability (range and standard deviation) were reported. Measures of central tendency were used to provide histograms that represented distribution of responses across questions. In order to identify the relationship between variables correlation statistics (Pearson *r*) were conducted and levels of significance were determined.

Qualitative Data Analysis Protocol

The survey also contained three open-ended response questions. The qualitative analysis of these items relied on the use of thematic networks as a tool to analyze main themes from responses. Thematic networks illustrate the progression from raw data to areas of shared focus and emergent themes within responses. In order to create the base system in developing the thematic network, observers began with the development of lowest order premises (basic themes) that were joined to summarize abstract principles (organizing themes) and encapsulated in super ordinate themes (global themes) (Attride-Sterling, 2001). The use of thematic analysis over other means of qualitative analysis was not taken lightly. Content analysis was also a consideration; however, given the small sample size of the study and the inability to meet the

usual minimum requirements for reliable statistical generalization thematic analysis was determined to be a more descriptive tool for the purposes of this study (Marks & Yardley, 2004).

Two individuals with prior qualitative data analysis experience conducted the thematic analyses independently. The primary observer for the present study was an independent rater with a doctorate degree in Assessment and Measurement with prior experience in using thematic analysis. The secondary observer was a doctoral candidate in Education.

Delimitations

The sample includes only those teachers who have worked with the NPDC project, as the inclusion of additional participants would not be directly relevant to the purposes of this study. This sample size is a delimitation due to the lack of control over the skill acquisition of the teachers as well as the implementation of the NPDC process by the coaches. Coaches are uniformly trained to ensure equal levels of competence; however, this study does not seek to address the variability across implementation or to use the implementation checklists as data.

Virginia Commonwealth University Institutional Review Board

An application to the Virginia Commonwealth University Institutional Review Board was completed and approved on July 19, 2013 (VCU IRB #: HM15256). This study qualified for exemption according to 45 CFR 46.101(b) Category 1.

CHAPTER 4. RESULTS

The purpose of this study was to determine teachers' self-reported satisfaction and success with the NPDC coaching model. Data were collected by a survey disseminated to all teacher participants in the NPDC program. All of the 21 teachers involved in the NPDC project participated in the survey resulting in a 100% response rate. Survey questions were developed based on the purpose of this study and the specified research questions. Participants accessed the survey via the Internet after receipt of an introductory e-mail with a hyperlink to the survey administration site housed at the Virginia Commonwealth University Autism Center for Excellence (VCU ACE). The survey administration website issued each participant an anonymous user identifier and password that allowed the results to be available only to the researcher and without any identifying information collected pursuant to the approved Institutional Review Board application. No attempt was made to match responses to specific participants to ensure anonymity. Based on the results of the survey the characteristics of the teachers participating in the survey will be examined and each of the research questions using the quantitative and qualitative data collected will be addressed. A reference to the master descriptive statistics of the study (Appendix E) and the correlation matrix (Appendix F) are located in the appendix.

Summary of Teacher Characteristics

The majority of teachers participating in the NPDC project reported having eight years or more experience teaching. No participating teachers were new to the position (i.e., having worked as a teacher for 0 to 1 years). One participating teacher reported having minimal experience (i.e., having worked as a teacher for 2 to 4 years). Six participating teachers reported

having moderate experience (i.e., having worked as a teacher for 5-7 years). The remaining majority, 14 teachers, reported having extensive experience (i.e., having worked as a teacher for 8 or more years). As a result, the respondent group was not representative of the full range of teaching experience with the majority of responses being obtained from more experienced teachers. Figure 3 contains teachers' self-reported years of experience.

Figure 3. Teachers' self-reported years of experience.

Respondents also reported the number of years they had participated in the NPDC project in response to Item 20 (How many years have you been a participant in the NPDC project?). The largest cohort to participate in the project was the first year of implementation resulting in a large group of teachers having participated in the NPDC project for 3 years. However, the majority of teachers that responded to the survey had been in the NPDC project, collectively, for

less than 2 years. Figure 4 depicts teachers' self-reported years of participation in the NPDC project.

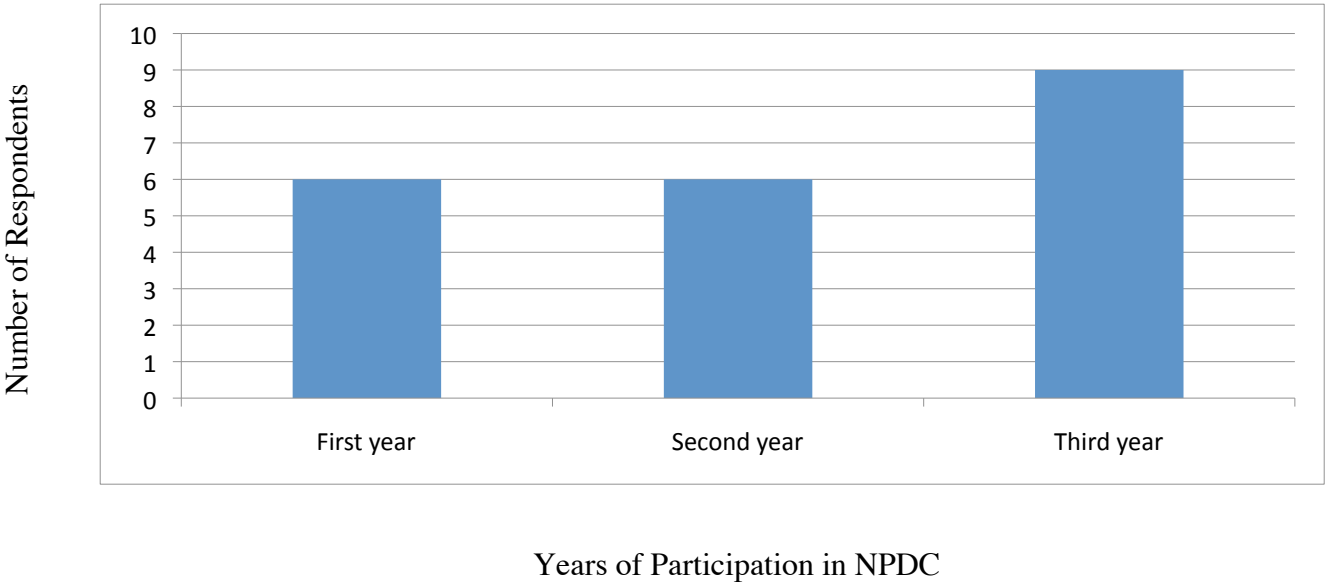

Figure 4. Teachers' self-reported years of participation in the NPDC project.

Research Question 1

Is there a relationship between frequency of coaching sessions and the use of evidence-based practices with students involved in the NPDC project as reported by teachers? In order to address this research question the responses to survey Item 1 (How often do/did you meet with your coach during the NPDC model classroom implementation?), Item 4 (I used the evidence-based practices with the students involved in the NPDC project), and Item 5 (I did not use the evidence-based practices with the students involved in the NPDC project) were examined. All 21 teachers responded and reported meeting with their coach a minimum of zero times a month and a maximum of three times a month. On average, teachers reported meeting with their coach twice a month. No respondents reported meeting with their coach more than three times a

month. Figure 5 contains respondents' self-reported frequency of meeting with their NPDC coach.

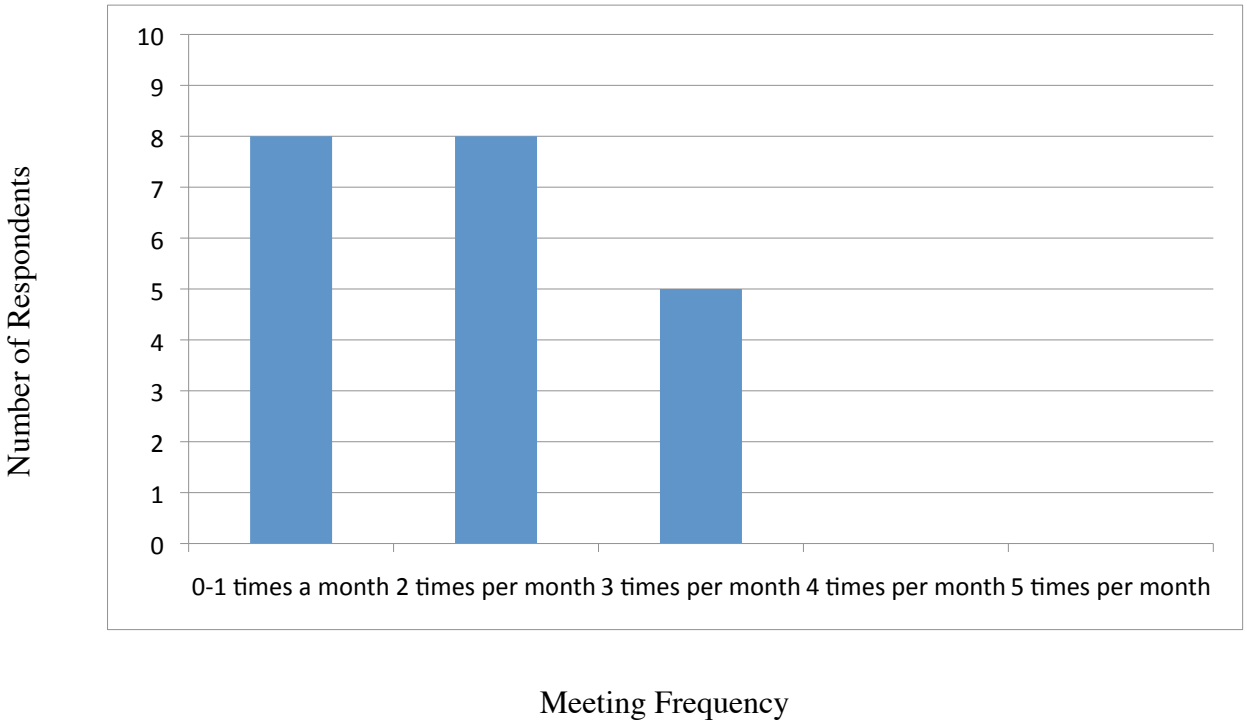

Figure 5. Teachers' self-reported meeting frequency with coach.

Only 20 respondents answered Item 4 (I used the evidence-based practices with the students involved in the NPDC project). One of the teachers either did not complete Item 4 or his/her response was removed from the results due to an unexplained error. The mean response to Item 4 was 4.75, indicating that, on average, the teachers tended to strongly agree that they used evidence-based practices with students involved in the NPDC project. All 21 respondents answered Item 5 (I did not use the evidence-based practices with the students involved in the NPDC project). The average response to Item 5 was 1.19, indicating that, on average; teachers disagreed with the statement that they did not use the evidence-based practices with students

involved in the NPDC project. It is important to note when comparing Items 4 and 5 that there was no reverse-scoring of items. For example, although Item 5 (I did not use the evidence-based practices with the students involved in the NPDC project) was the negatively-worded version of Item 4 (I used evidence-based practices with the students involved in the NPDC project), the scoring of these item responses did not differ thus yielding a negative correlation coefficient (r = -.87). As expected, this correlation estimate (r = -.87) indicates a strong, inverse relationship between teacher responses to items 4 and 5, such that teachers who agreed with the statement of using the evidence-based practices were more likely to disagree with the statement that they did not use the evidence-based practices.

Inter-item correlation coefficients were not significant for Items 1 (How often do/did you meet with your coach during the NPDC model classroom implementation), 4 (I used the evidence-based practices with the students involved in the NPDC project), and 5 (I did not use the evidence-based practices with the students involved in the NPDC project). With regards to Item 1 and Item 4, responses were inversely related, r = .08, p = .75. That is, there was a not a significant relationship between frequency of meeting with a coach and the implementation of evidence-based practices. These findings illustrate that there is no significant relationship between how many times a teacher met with his/her coach and if he/she used the evidence-based practices. Specific descriptive statistics, including correlations and significance values (when compared with Item 1) for Items 4 and 5 are displayed in Table 2.

Table 2

Descriptive Statistics for Survey Items 4 and 5

Item No.	No. of responses	Mean	SD	Min	Max	*r* value with item 1	*p* value with item 1
4	20	4.750	0.444	4.0	5.0	.08	.75
5	21	1.190	0.402	1.0	2.0	.09	.70

It is also important to note that there was a relationship between teachers' frequency of meetings with their coach and their reported years of experience. Responses to Item 1 (How often do/did you meet with your coach during the NPDC model classroom implementation) and Item 19 (How many years have you been teaching?) were moderately, inversely related, $r = -.49$, $p = .03$ (less than .05 to be statistically significant). That is, there was a significant, negative relationship between teacher experience and number of monthly meetings with a coach, indicating that teachers reporting more experience met less often with their coach.

Research Question 2

Is there a relationship between teaching experience and increased self-efficacy of teachers in implementing evidence-based practices with students? In order to address this research question the responses to Item 3 (I see myself as more able to implement the evidence-based practices in my classroom after receiving the coaching), Item 19 (How many years have you been teaching?), and Item 21 (How adept do you perceive yourself to be in implementing the evidence-based practices selected for the NPDC project?) were examined. All 21 teachers responded to Item 3 with a mean response of 4.76, indicating that, on average, teachers tended to strongly agree that they perceived themselves to be more able to implement the evidence-based practices after receiving coaching. Figure 6 displays the frequency of responses to Item 3 (I see

myself as more able to implement the evidence-based practices in my classroom after receiving the coaching).

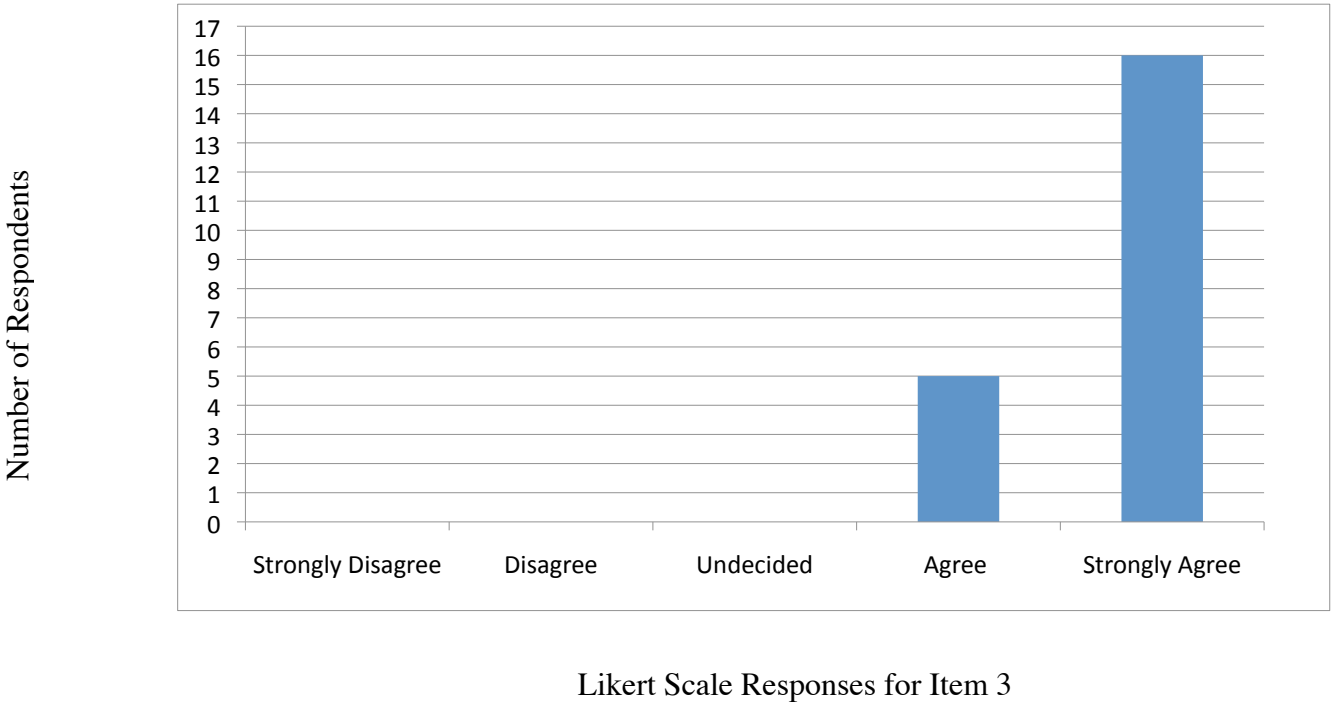

Figure 6. Teachers' self-reported ability to implement evidence-based practices.

Responses to Item 3 (I see myself as more able to implement the evidence-based practices in my classroom after receiving the coaching) and Item 19 (How many years have you been teaching?) were slightly, inversely related ($r = -.06$, $p = .80$), however, this relationship was not statistically significant. All 21 teachers submitted constructed responses for Item 21 (How adept do you perceive yourself to be in implementing the evidence-based practices selected for the NPDC project?). Responses were analyzed using thematic analysis and resulted in basic themes of reporting a comfort with the instruction practices, ease in the application of evidence-based practices (EBP) within their classroom and being able to use feedback and resources provided by the NPDC project successfully when needed. The organizing themes of proficiency and progress were evident among participant responses and are displayed below in Figure 7

additional information regarding the qualitative responses can be found in Appendix G (Thematic Analysis Coding Schemes and Responses).

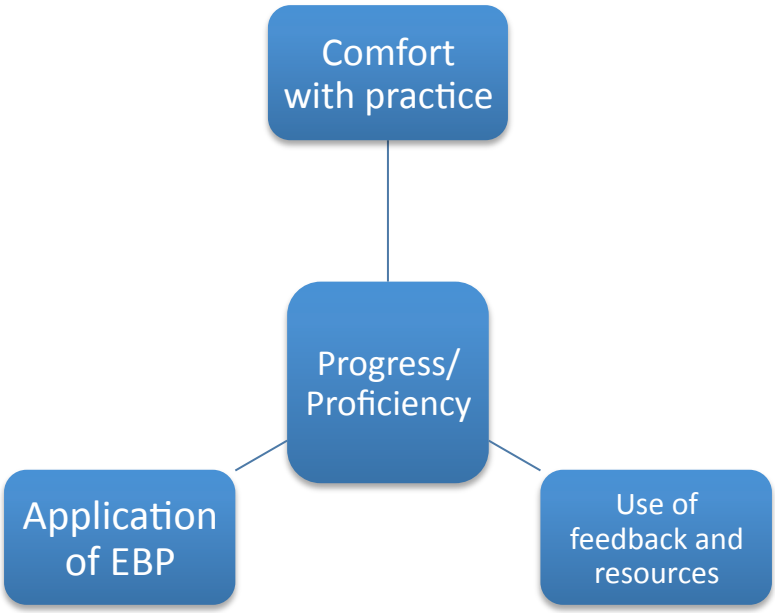

Figure 7. Thematic network of basic and organizing themes for item 21.

Research Question 3

Do experienced teachers (more than a year of experience) report better outcomes for their students' skill development targeted by the NPDC project than first-year teachers? Given that this study did not contain responses from any first-year teachers, we cannot create groups to compare in order to address this question. However, examining the responses to Item 19 (How many years have you been teaching?), and Item 6 (My students have improved on the behaviors/skills that were the focus on the NPDC model) can provide valuable information. All 21 teachers responded to Item 6 and the mean response was 4.43, suggesting that, on average, teachers tended to strongly agree that their students improved on the behavior and skills that

were the focus of the NPDC project. Responses to Item 19 and Item 6 were moderately, inversely related, $r = -.32$, $p = .15$ as displayed in Table 3 along with descriptive statistics. There was a not a significant, relationship between teacher experience and perceived student progress on the skills and behaviors targeted by the NPDC project.

Table 3

Descriptive Statistics for Survey Items 6 and 7

Item No.	No. of responses	Mean	SD	Min	Max	*r* value with item 1	*p* value with item 1
6	21	4.428	0.597	3.0	5.0	-.32	.30
7	21	1.952	1.023	1.0	5.0	.15	.18

Recall that no items were reverse-scored, thus, some correlation estimates were expected to be negative. Comparisons between the positive and negatively worded options resulted in variability among these items as displayed in Table 3. Eighteen respondents disagreed with Item 7 (My students have not progressed in the behaviors/skills targeted through the NPDC model) while two respondents agreed with the statement. All of these teachers had just previously agreed stating that their students had progressed on the behaviors and skills targeted by the NPDC project per their response to Item 6 (My students have improved on the behaviors/skills that were the focus on the NPDC model).

Responses to open-ended Item 23 (Do you feel that there was variability within the NPDC program for you and your students' development?) were useful in determining teachers' self-reported assessment of student skill development. The majority of teachers reported variability in implementation given differences across both a student's skills and characteristics. The remainder of teachers reported low variability across students given the homogeneity of the

functioning level of students within their classrooms and perhaps the selection of certain evidence-based practices. Other respondents also noted an inability to respond given their limited participation with the project. Additional information regarding the qualitative responses can be found in Appendix G (Thematic Analysis Coding Schemes and Responses).

Research Question 4

What appraisals do teachers report of the professional development system used by the NPDC project? A variety of items contributed to measuring teachers' appraisals of the professional development system used by the NPDC project. Results from Item 3 (I see myself as more able to implement the evidence-based practices in my classroom after receiving coaching), Item 12 (I would use techniques from the coaching session again in my classroom), Item 13 (The commitment of time and resources was reasonable for my work with the NPDC), Item 14 (I would be open to receiving coaching in the future to improve my ability to implement evidence-based practices for students with autism), Item 16 (I have benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division), and Item 22 (Why would you encourage or discourage other teachers of students with autism from participating in the NPDC project?) were included as part of the findings for this research question.

All 21 teachers responded to Item 3 (I see myself as more able to implement the evidence-based practices in my classroom after receiving coaching) with an mean response of 4.76, indicating that, on average, teachers tended to strongly agree that they perceived themselves to be more able to implement the evidence-based practices after receiving coaching. See Figure 6 for response distribution for Item 3.

All participants responded to Item 12 (I would use techniques from the coaching session again in my classroom) with the average response being 4.62. All teachers agreed that they would use the techniques that were the focus of their coaching sessions again in their classrooms. Figure 8 displays response distribution for Item 12.

Twenty-one respondents completed Item 13 (The commitment of my time and resources was reasonable for my work with the NPDC). The average response for Item 13 was 4.38. All teachers agreed that the time and commitment required from the NPDC project was reasonable. Figure 9 displays the distribution of responses for Item 13.

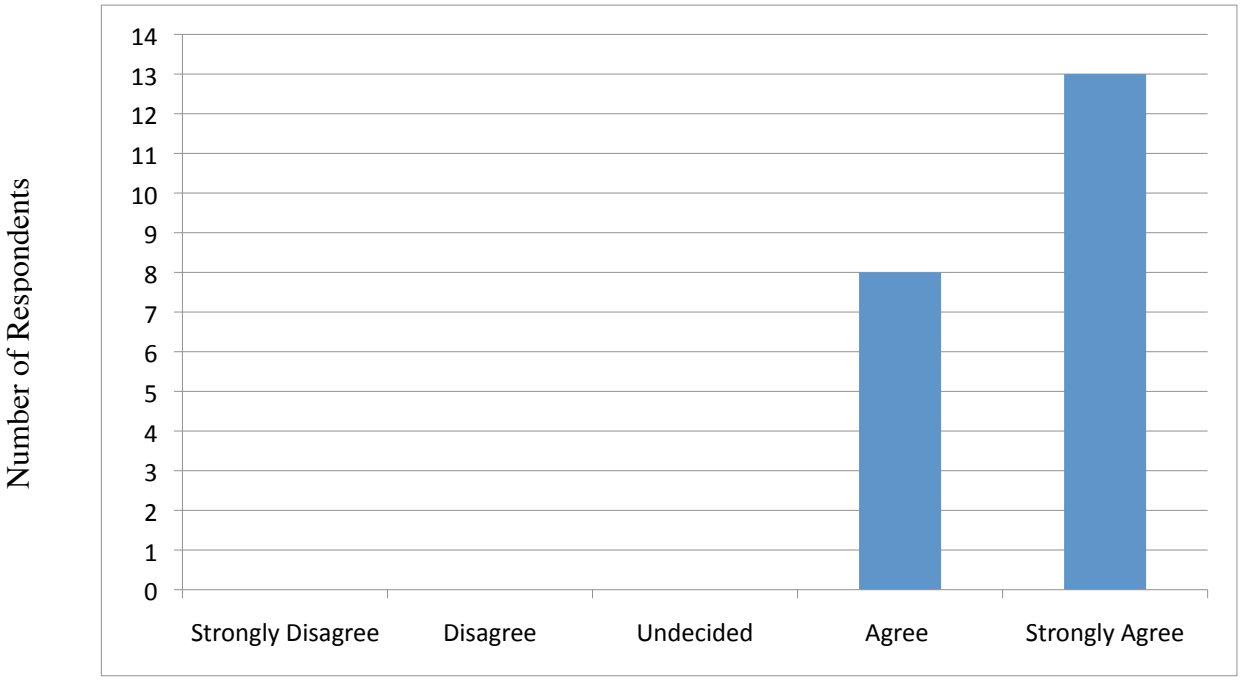

Figure 8. Teachers' responses to item 12.

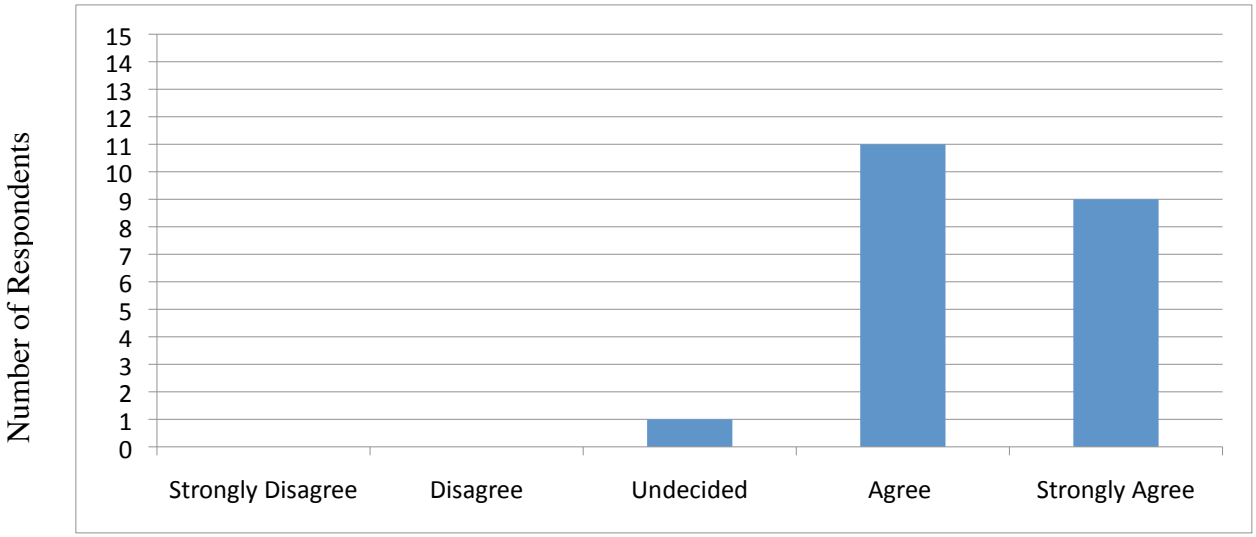

Figure 9. Teachers' responses to item 13.

Figure 10 shows the distribution of teacher responses across item 14. All 21 participants completed Item 14 and the average response was 4.71. All teachers agreed that they would be open to receiving coaching in the future to improve their ability to implement evidence-based practices with students with autism spectrum disorders. Respondents also completed Item 15, which was the negative construct for Item 14. All of the respondents completed Item 15 and the average response was 1.52, with all teachers disagreeing with the statement that they would not be open to receiving coaching in the future. It is important to note when comparing Items 14 and 15 that there was no reverse scoring of items. For example between Items 14 and 15 $r = -.10$, $p = .67$. Items 14 and 15 were inversely related nonsignificant relationship meaning that teachers who agreed that they would be open to receiving coaching would not have agreed with the statement that they would not be open to receiving coaching.

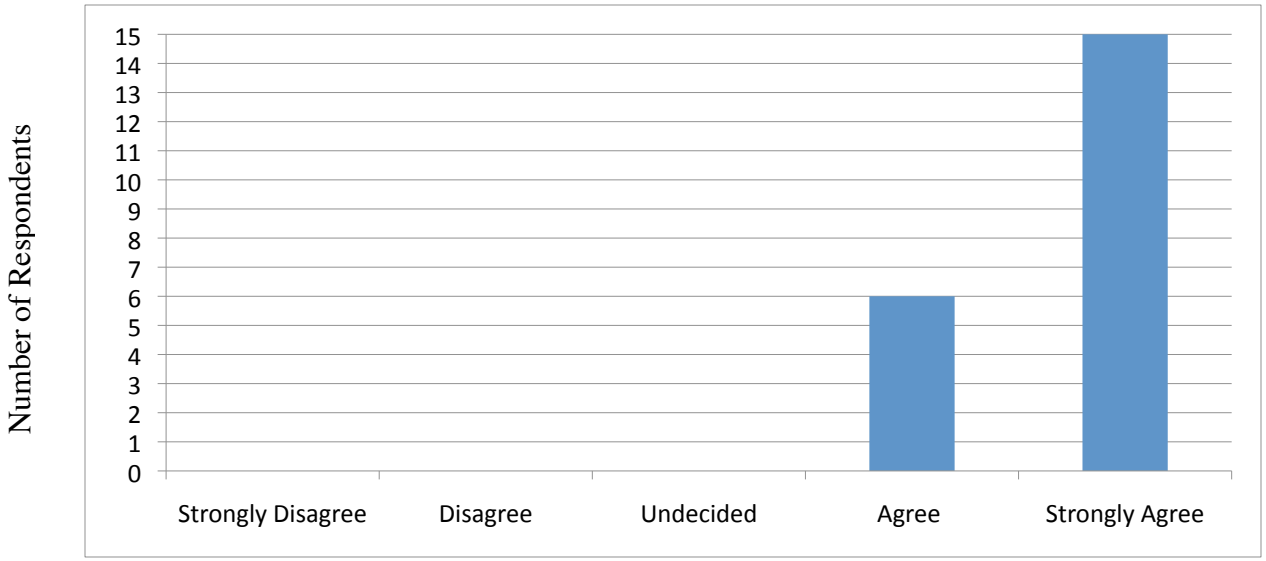

Figure 10. Teacher's responses to item 14.

All respondents completed Item 16 (I have benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division). The average response was 4.38. Nineteen of the 21 respondents reported greater benefit from the NPDC project than from other school sponsored professional development. Respondents also completed Item 17 (I have not benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division). There was high variability across responses for Item 17 with a standard deviation of 1.28 and an average response of 1.95. On average teachers disagreed that participation in the NPDC project was not beneficial. Between Items 16 and 17 $r = -.51$, $p = .02$. Items 14 and 15 were moderately, inversely related and there was a significant relationship between the two items. Teachers reporting NPDC as a beneficial professional development opportunity were highly unlikely to

disagree with the same statement. Figure 11 provides a detailed distribution of responses across Item 16 and Figure 12 provides the same information for Item 17.

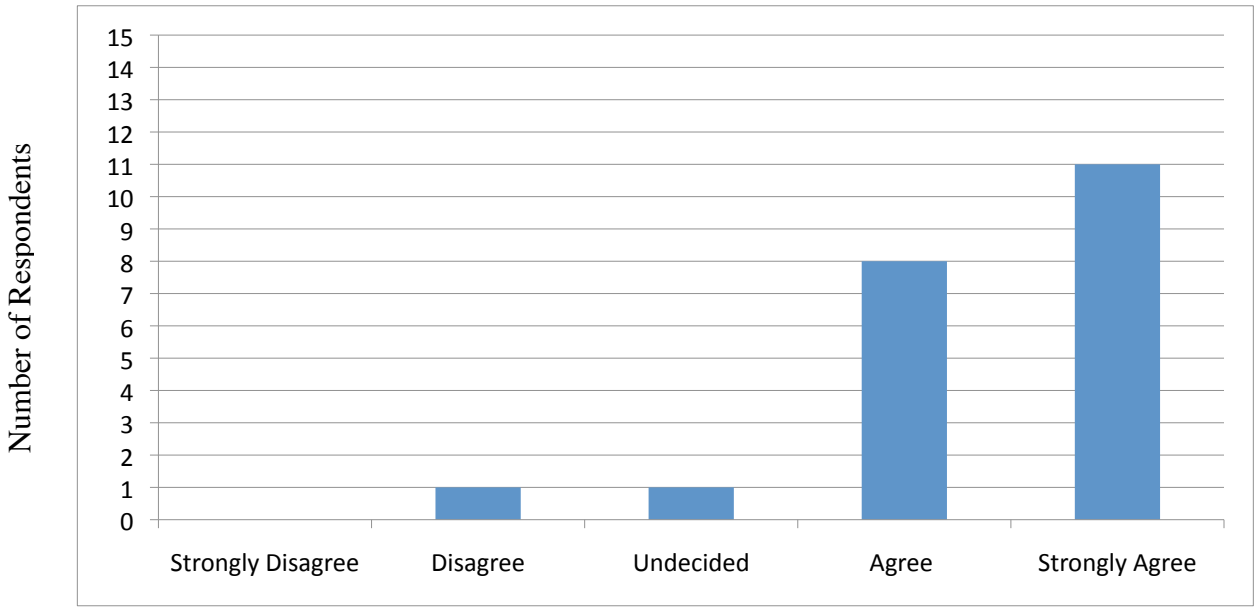

Figure 11. Teachers' responses to item 16.

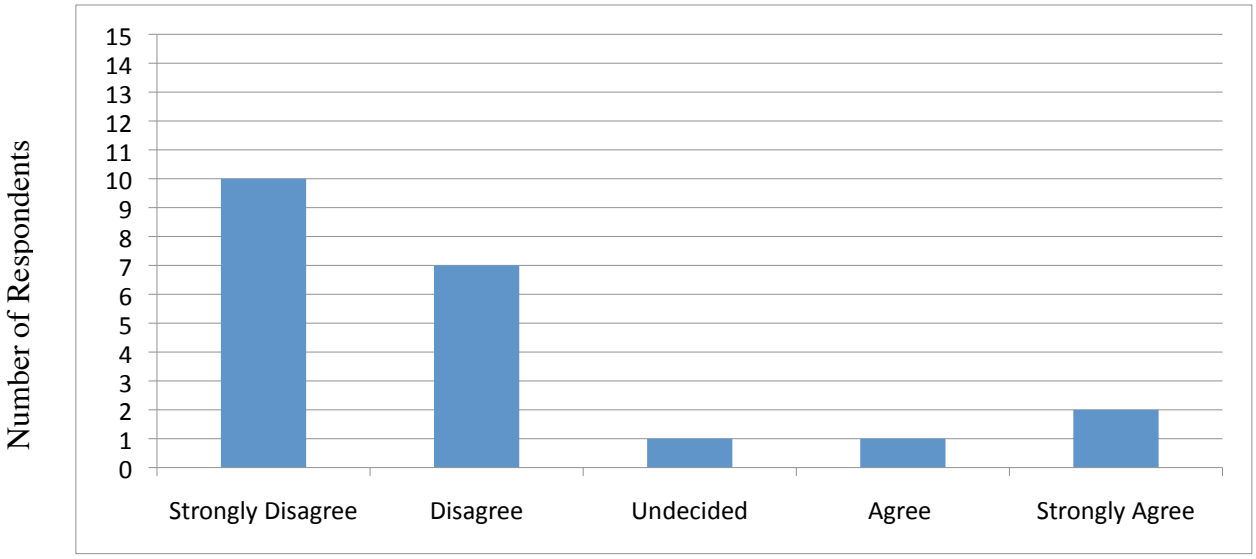

Figure 12. Teachers' responses to item 17.

Responses to Item 22 (Why would you encourage or discourage other teachers of students with autism from participating in the NPDC project?) introduced variability to teacher appraisals of the NPDC project as a mode of professional development. When asked why they would encourage others to participate, teachers responded regarding the effective model, resources, and support offered by the coaching methodology and the improvement they saw with their students' skills and development. However, teachers also responded with reasons why they would discourage participation in the NPDC project. Teachers reported that they would discourage others to participate given the extensive time commitment, specifically around finding the time and opportunity to meet with coaches. Teachers also offered a specific caution to allowing first-year teachers to participate in the project. They reported that the requirements of participation could present a significant challenge to beginning teachers. Responses were varied with approximately half of teachers reporting that they would discourage other teachers

from participating citing the amount of time and resources required for participation. Additional information regarding the qualitative responses can be found in Appendix G (Thematic Analysis Coding Schemes and Responses).

Research Question 5

Do teachers report using strategies learned by coaching to other students with and without disabilities outside of the NPDC project? Items 8 through 11 were developed to evaluate teachers' self-reported use of the evidence-based practice with students outside the NPDC project. All 21 teachers responded to each of the items. The average response for Item 8 (I have used these techniques with other students with autism spectrum disorders outside those participating in the project) was 3.86. Eighteen of the 21 teachers agreed that they had used the techniques from the NPDC project with other students with autism spectrum disorders. The average response to Item 9 (I have used these techniques from the NPDC project with students with other disabilities) was 3.29 with only 12 out of the 21 teachers reporting using the NPDC techniques working with students with other disabilities (not including autism spectrum disorders). Ten out of the 21 teachers did not report, or were undecided, in using the NPDC techniques with students with disabilities in inclusive settings. Fourteen out of the 21 teachers did not report or were undecided in using the NPDC techniques with neurotypical students. The variability among self-reported perceptions of teachers' use of the evidence-based practices with students outside of the NPDC project is displayed in Table 4.

Table 4

Descriptive Statistics for Survey Items 8 Through 11

Item No.	No. of responses	Mean	SD	Min	Max
8	21	3.857	1.152	1.0	5.0
9	21	3.285	1.101	1.0	5.0
10	21	3.190	1.030	2.0	5.0
11	21	3.000	0.948	2.0	5.0

CHAPTER 5. DISCUSSION

The purpose of this chapter is to provide an overview and discussion of the results of the study. Limitations to the findings will also be discussed. This chapter will also examine the recommendations for policy, practice, and future research informed by the study results.

Conclusions

The purpose of this study was to determine the self-reported efficacy as an outcome of coaching for teachers according to the NPDC coaching model implementation utilizing a survey completed by the participants. Findings from this study suggest that, overall teachers are satisfied with the implementation of the coaching model and perceived levels of student progress. Teachers reported using evidence-based practices after receiving coaching. Self-reports demonstrated teachers' ability to implement the evidence-based practices and see improvement in students' skill development regardless of their years of teaching experience. Teachers also reported high degrees of social validity related to this study. Participants stated their willingness to participate in coaching as a professional development modality in the future and rated coaching as an improvement over their existing and available professional development opportunities. The results of this study suggest a variety of information related to the characteristics of the participants in the NPDC coaching model and findings in reference to research questions posed by this study.

Teacher Characteristics

The majority of teachers in this survey were experienced, reporting eight years or more spent in the classroom. The low turnover rate of the teachers in this study could be linked to their selection to participate in the NPDC project. The selection of teachers with increased

tenure could satisfy an attempt of the local school division to maintain the benefit of participation with a professional who is more likely to remain in the classroom setting. Since the population did not contain any first year teachers, specific data results related to that group were not able to be determined. When able, comparisons were made between teachers with differing levels of experience in reference to the research questions.

Teachers also reported the cohort year in which they entered the NPDC project. The majority of the teachers were in the first or second year of implementation. This variability among cohort groups could have demonstrated different perceptions of implementation and in evaluating student progress. For example, teachers within the third year of implementation would have had a better understanding of the longitudinal results of participation when compared with teachers who were just completing their first year of implementation. Teachers within the first and second years of implementation could be affected in their responses given their more limited experience within the project.

Research Questions

Research Question 1

Is there a relationship between frequency of coaching sessions and the use of evidence-based practices with students involved in the NPDC project as reported by teachers? There was no relationship between meeting more often with a coach and a teachers self-reported ability to implement evidence-based practices. The teachers responding to this survey only met with their coaches a maximum of three times a month and a minimum of once a month. This finding is disappointing given the expected link between increased coaching and frequency of the use of evidence-based practices. The researcher would have preferred to see a strong, positive

relationship between meeting with a coach and the use of evidence-based practices in the classroom.

Possible explanations could also include the characteristics of the teachers surveyed. It is interesting to note the high concentration of experienced teachers among the respondents. More experienced teachers may have already been using these evidence-based practices and also may have required fewer meetings with a coach to continue implementation. It is possible that less frequent meetings with their coaches were required in order for the teachers to feel that they were implementing the practices successfully and supporting their students effectively. In fact, there was a significant, negative relationship between teacher experience and the number of reported monthly meetings with a coach. This could be attributed to teachers with more experience not requiring a coach beyond introductory support. Meetings that focused on continued maintenance and implementation fidelity may have been less frequent as time and exposure within the model occurred. Also, many of the teachers were in their second or third year of implementation in the project, perhaps requiring less frequent meetings as they had received more continual support early on in the project. Even though there was no relationship established between more frequent meetings with a coach and implementing evidence based practices, teachers involved in this project received coaching and support that could have been effective at supporting teachers on a variety of levels that would not have required frequent meetings with their coach. Furthermore, participation in the project did guarantee the teachers were receiving coaching, yet there was no formal requirement for meetings. The actual reported number of visits could have varied among participants due to respondents not reporting meetings that were not physically on-site and in person. The ability to meet with coaches via technology (WebEx, conference call) was available and could have not been reported as a meeting by respondents.

Research Question 2

Is there a relationship between teaching experience and increased self-efficacy of teachers in implementing evidence-based practices with students? There was no relationship between teachers experience and their reported self-efficacy in implementing evidence-based practices. That is, teachers with more experience did not report an increase in the implementation of evidence based practices over teachers with less experience. However, in reporting their perception of their ability to implement the evidence-based practices, teachers reported themselves as able to implement evidence-based practices after receiving coaching. Specific comments made by respondents included, but were not limited to, "proficient, making progress, able to implement practices and improving" regarding their perceived ability of successful implementation. It is possible that the coaching received through the project could have served as an equalizing variable, giving support to teachers with less experience and enabling them to report the ability to implement the practices successfully regardless of their experience.

Research Question 3

Do experienced teachers (more than a year of experience) report better outcomes for their students' skill development targeted by the NPDC project than first-year teachers? There were no first-year teachers among the respondents. All teachers reported student improvement on skills and behaviors addressed by the NPDC project. However, there was no significant relationship between years of experience and self-reported progress of students in skills and behaviors targeted by the NPDC project as reported by the teachers participating in the survey. Teachers reported their students as progressing on the skills and behaviors selected by the coaching model regardless of their experience. Coaching could have served to support all teachers, even those with limited experience in the classroom, in implementing the evidence-

based practices effectively. The ability of the coaching to support a teachers quality of practices may have resulted in gains across students regardless of a teachers self-reported years in the classroom.

Teachers also reported variability across their students' skill development. Teachers noted differences, especially given a students pre-existing functioning level. Differentiation among individual students could be the result of students beginning and progressing along different levels of skills and behaviors during the course of the NPDC project. All of the students involved in the NPDC project had been found eligible for special education services under the disability classification of autism. Yet, across the classes within the NPDC project, there was variability among individual students and classes as a whole. This variability across students may have resulted in teachers self-reporting their ability to notice marked differences in implementing the practices across students. This inconsistency across students could have also had an impact on the selection of evidence-based practices based on individual student needs.

Research Question 4

What appraisals do teachers report of the professional development system used by the NPDC project? Teacher's self-reported high appraisals of their participation in the NPDC project. They noted that the NPDC project increased their knowledge related to evidence-based practices and their ability to implement the evidence-based practices in the classroom. There was also high social validity reporting regarding teachers' participation in the project. Specifically, teachers stated the reasonableness of the time and resources commitments as well as being open to receiving future professional development form the project. The majority of teachers also reported the NPDC project as a greater benefit than professional development provided by their school division.

However, teachers were quick to provide feedback regarding possible challenges and barriers to participation. In responding to open-ended questions asking if they would encourage or discourage other teachers from participating, results were mixed. While the teachers participating in the NPDC project judged their own experience to be worthwhile, they were reluctant to encourage other teachers to participate, citing time commitments and the lack of resources as negative implications. These results are important in considering the application of coaching based professional development and the teachers selected for participation. It is also obvious that adequate time and resources are integral for participants to feel supported in developing new aspects of their professional practice.

Research Question 5

Do teachers report using strategies learned by coaching to other students with and without disabilities outside of the NPDC project? Teachers reported using the NPDC practices with other students with autism spectrum disorders and even with students with other disabilities in inclusive settings. The majority of teachers did not use the techniques from the NPDC project with neurotypical students. It seems as though the information and knowledge gained from participation in the NPDC project has implication for use across students with disabilities that may present with deficits similar to autism spectrum disorders in both self-contained and inclusive settings. The use of the evidence-based practices was not expected to be as useful for students without disabilities. This could be a lack of ability for teachers to generalize practices to populations that are vastly different that the student group they are working with as part of the NPDC project. This finding could also be indicative of a weakness in the transfer of learning when it comes to environments outside of the NPDC classroom.

Limitations

Data reported demonstrated related, not conclusive, points between individuals and data attributed to the analysis tools used. The use of correlation coefficients limited the interpretive ability of the data especially related to causality between variables. The use of thematic analysis as a tool for analyzing qualitative data from the survey resulted in reliability concerns due to variability and subjectivity among observers, making it difficult to communicate a sense of continuity of the data given the difference among language and content. Due to the results from this study and the lack of reported theoretical framework, results indicate limited interpretive power of results from the qualitative portion of the survey. This study was also not a comprehensive program evaluation assessment but rather an evaluation of a component of the NPDC project.

In protecting the confidentially and identity of the respondents, this study had a limited ability to draw specific conclusions based on specific respondents' characteristics. For example, though the majority of respondents were teachers with 8 or more years of experience, these teachers' responses were not tied to their years of experience so the patterns of responses for groups of teachers with different levels of experience within the study beyond conclusions drawn from inferential data was unable to be determined. Due to the small size of the study, it was difficult to utilize a wide range of inferential statistics in the analysis. The results of these analyses would have been significantly underpowered and the small subgroups within responses would not provide reliable findings due to extensive variability among so few respondents. The findings of this study may not generalize to the larger population of teachers of students with autism spectrum disorders based on the limited sampling employed.

The use of thematic networks as a tool for qualitative analysis was also a limitation to the findings of this study. The use of thematic networks relies heavily on observer subjectivity (Attride-Sterling, 2001; Marks & Yardley, 2004). The results of the themes that have been identified in this study are also developed from a relatively brief and limited amount of qualitative data. Variability and the lack of richness across respondent answers for the three open-ended questions limited the ability to identify global themes of importance across the data provided. Recommendations to address these limitations follow in the subsequent section.

Recommendations

The results, conclusions, and limitations of this study informed the following recommendations for policy, practice, and future research.

Recommendations for Policy

This study examined the efficacy of a coaching model endorsed by a national technical assistance center that is part of the U. S. Department of Education's Office of Special Education and Rehabilitative Services. As part of the IDEAs that Work initiative centers like NPDC receive grant funding from the federal government. The NPDC is just one example of the many national technical assistance centers that continue to be a large part of grant funding propagated by the U. S Department of Education. As such, the consistent evaluation of the centers' findings and their impact on instructional practice is integral to justify the continued support. This is the first policy recommendation provided by this study.

Second, the development of companion educational policy at both the federal and state levels dedicated to the propagation of models that assist states and localities in building local capacity to meet the needs of their teachers and students should be of paramount concern. Also important among policy recommendations is the creation of a system to address problems that

teachers have with instruction and behavior management of students with autism spectrum disorders. The goal of the system should be to address the use of research and practices developed at technical assistance centers in informing practice for teachers working in the classroom.

Finally, the shift in policy should reflect the shift in research from identifying evidence-based practices to the science of successful implementation (Cook & Odom, 2013). In order to accomplish successful implementation of evidence-based practices, educational policy must provide the guidance, resources, and initiative that can set the stage for educational professionals to work together on addressing the research to practice gap. Administrators, teachers, and researchers must work together to inform practice, support the development of teachers' skills and evaluate the results for teachers and students.

Recommendations for Practice

The first implication for practice includes the development of a data collection method aimed at determining how teachers address problems with their practice and address the implementation of new practices. In this study coaching could have been the support that allowed teachers to change their practices; however, the lack of complete, empirically validated guidance for implementing evidence-based practices in the field limits teachers ability to use the practices that have been shown to be the most effective with their students. Relationships between time and implementation will be important to determine the support and feasibility required in practical educational environments. This means conducting evaluation on teacher practices and student performance. There is also the challenge of the extensive variability between practices and participants as self-reported and identified in this study. It is important that this evaluation method be critical of the quality of implementation and fully examine the

means to support it successfully. Future development must inform the transfer of skills from coaching and training to actual practice. Determining how difficult is it to effect the transfer from research to practice should also include the identification of key supports that could equip educational professionals appropriately.

Secondly, future practice should also address the measurement of implementation fidelity. The benefit of identifying evidence-based practices is only as useful as the mechanism of implementation (Fixsen, Blase, Metz, & Van Dyke, 2013). Determining the real-world impact of research practices must incorporate the many dimensions of successful implementation. For example, using the RE-AIM model as identified by Glasgow, Vogt, and Boles (1999) as a measure for accounting for the variability within implementation and characteristics associated with it may promote better implementation. This model uses four facets of implementation (reach, adoption, implementation, and maintenance) and its efficacy in order to determine the impact. Supporting the development and research of resources for measuring fidelity and assisting implementation in the field is critical to continuing the work of improving instruction and support to students and bridging the gap from research to practice. Future research is important in determining the effectiveness of the practice of implementing skills learned through professional development.

Recommendations for Methodology

During the execution of this study, the researcher identified practices and suggestions that could serve to improve future studies and aide in possible replications. First, in reference to the survey tool, a limitation of this study was the inherent social desirability as a potential explanation for the lack of variability in results. Future research should work to word questions in a way that can control for social desirability across responses by differentiating language and

providing inverse items that are related and that can provide more contextual information. Additional survey items should gather more detailed information on the types of evidence-based practices participants used. Detailed information regarding the specific practices would help to identify patterns and gather evaluative information surrounding which practices are used most often and the challenges identified with them. Secondly, regarding control for participant characteristics, researchers could improve the quality of the study findings by controlling for years of experience across participants and identifying how participants are selected for the NPDC project. This information would be useful in planning the dissemination of the survey and in gathering data regarding participants prior to beginning the study. An additional suggestion in gathering more information regarding participants is to focus more on the implementation checklists. The current study identified the lack of attention to these resources as a limitation. In working to integrate the data from the checklists, more details could be gathered pertaining to the transfer of skills and knowledge from the coach to the participant. Considering this record of a participants' work and development around the implementation of these new practices would be a worthwhile endeavor to produce rich data related to the transfer of learning and skill development among participants. Finally, modifying the methodology of the study to include for more in-depth interviews with participants would begin to detail and expand findings that the current study identified through qualitative data analysis. Interviews would provide more detailed analysis and data regarding participant's motivation, measurement of self-efficacy, and reports on the social validity of the coaching model.

Recommendations for Future Research

First, it is recommended that research must be able to influence the practice of teachers in the classroom. Future research specifically related to the NPDC model should examine the

effects of coaches using implementation checklists and the impact that has on feedback that is key to evaluating fidelity across teachers. There is a need for future studies to find a way to incorporate the use of implementation checklists as a meaningful variable for data collection. The use of a metric to measure the use of the implementation checklists across both coaching instruction to the teachers and the implementation of practices would be a beneficial addition to future studies in order to address the limitation of implementation fidelity in the coaching model provided by NPDC. These implementation checklists also serve as structure to work with teachers on skill development and can assist coaches by serving as a means of data collection within the classroom. Companion studies to the current study should include the implementation checklists as a variable for observation and measurement and incorporate data collection around the coach and teacher relationship to trace fidelity and implementation.

Second, future research should also begin to examine the efficacy of the model involving students with different characteristics over time and across settings. Many of the respondents identified the variability across students on the spectrum depending on their level of academic functioning (identified by teachers as high versus low functioning students). Additional variability created by interfering factors such as attendance, aggressive behavior, communication abilities, medical needs, and physical limitations was a concern in literature reviews regarding this topic and within this study. Variability and diversity across students should be considered when collecting and evaluating findings. Additional attention should be given to the selection of specific evidence-based practices for each student based on individual characteristics, goals, and functioning levels.

Finally, future research should also include the expansion of qualitative questioning in order to produce increased interpretive power from participant responses. The use of pre and

posttest measurements would have also been helpful in this study to determine teachers existing use of evidence-based practices and how coaching may have altered that practice. Use of pre and posttest measurements in future studies could offer a way to define more directly the impact of professional development on a teachers practice. Measurements to determine coaching and the impact it has on the fluency of practice should be included in future analysis to determine a link between time spent and effective implementation. Finally, it is recommended that future research examine the link between coaching for teachers and the development of skills and positive behavior management strategies of students with autism spectrum disorders to determine the causal relationship, if any, between them.

LIST OF REFERENCES

LIST OF REFERENCES

American Educational Research Association. (2006). Standards for Reporting on Empirical Social Science Research in AERA Publications. *Educational Researcher, 35*(6), 33-40.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders DSM-IV-TR*. Arlington, VA: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders DSM-V*. Arlington, VA: Author.

Attride-Sterling, J. (2001). *Qualitative research*. Thousand Oaks, CA: Sage.

Baker, R. G., & Showers, B. (1984). *The effects of a coaching strategy on teachers' transfer of training to classroom practice: a six-month follow-up study*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Bolton, J., & Mayer, M. D. (2008). Promoting the generalization of paraprofessional discrete trial teaching skills. *Focus on Autism and other Developmental Disabilities, 23*(2), 103-111.

Centers for Disease Control. (2012). *Morbidity and mortality weekly report* (ND 227-240), *61*(17), 297-316.

Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation science in special education. *Exceptional Children*, *79*(2), 135-144.

Denton, C., & Hasbrouck, J. (2009). Description of instructional coaching and its relationship to consultation. *Journal of Educational and Psychological Consultation*, *19*, 150-175.

Dib, N., & Sturmey, P. (2007). Reducing student stereotypy by improving teachers' implementation of discrete trial teaching. *Journal of Applied Behavior Analysis, 40*(2), 339-343.

Fixsen, D., Blase, K., Metz, A., & Van Dyke, M. (2013). Statewide implementation of evidence-based programs. *Exceptional Children*, *79*(2), 213-230.

Ganz, J. B., Flores, M. M., & Lashley, E. E. (2011). Effects of a treatment package on imitated and spontaneous verbal requests in children with autism. *Education and Training in Autism and Developmental Disabilities, 46*(4), 596-606.

Garet, M., Porter, A., Desimone, L., Birman, B., & Yoon, S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915–945.

Gibson, J. L., Pennington, R. C., Stenhoff, D. M., & Hopper, J. S. (2010). Using desktop videoconferencing to delver interventions to a preschool student with autism. *Topics in Early Childhood Special Education, 29*(4), 214-225.

Glasgow, R., Vogt, T., & Boles, S. (1999). Evaluating the public health impact of health promotion interventions: The RE AIM framework. *American Journal of Public Health*, *89*, 1322-1327.

Goodman, J. I., Brady, M. P., Duffy, M. L., Scott, J., & Pollard, N. E. (2008). The effects of 'bug-in-ear' supervision on special education teachers' delivery of learn units. *Focus on Autism and Other Developmental Disabilities, 23*(4), 207-216.

Guskey, T. R., & Sparks, D. (2002). *Linking professional development to improvements in student learning.* Paper presented at the Annual Meeting of the American Educational

Research Association, New Orleans, LA. Retrieved August 16, 2010, from EBSCOhost ERIC database (ED 464112).

Guskey, T. R., & Yoon, K. S., (2009). What works in professional development? *Phi Delta Kappan, 90*(7), 495-500.

Howe, K., & Eisenhart, M. (1990). Standards for qualitative (and quantitative) research: A prolegomenon. *Educational Researcher*, *19*, 2-9.

Howlin, P., Gordon, R. K., Pasco, G., Wade, A., & Charman, T. (2007). The effectiveness of picture exchange communication system (PECS) training for teachers of children with autism a pragmatic, group randomized control trial. *Journal of Child Psychology & Psychiatry, 48*(5), 473-481.

Individuals with Disabilities Education Improvement Act of 2004, Pub.L. 101-476, Stat. 1142.

Joyce, B., & Showers, B. (1988). *Student achievement through staff development.* White Plains, NY: Longman.

Joyce, B., & Showers, B. (2002). *Designing training and peer coaching: Our needs for learning*. Alexandria, VA: ASCD.

Joyce, B., Showers, B., & Bennett, B. (1987). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. *Educational Leadership, 45,* 77-87.

Kaale, A., Smith, L., & Sponheim, E. (2012). A randomized controlled trial of preschool-based joint attention intervention for children with autism. *Journal of Child Psychology & Psychiatry, 53*(1), 97-105.

Klingner, J. K. (2004). The science of professional development. *Journal of Learning Disabilities*, *37*(3), 248-255.

Kretlow, A. G., & Bartholomew, C. C., (2010). Using coaching to improve the fidelity of evidence-based practices: A review of studies. *Teacher Education and Special Education*, *33*(4), 279-299.

Kurth, J. A., & Mastergeorge, A. M. (2010). Academic and cognitive profiles of students with autism: Implications for classroom practice and placement. *International Journal of Special Education, 25*(2), 8-14.

Leblanc, M. P., Ricciardi, J. N., & Luiselli, J. K. (2005). Improving discrete trial instruction by paraprofessional staff through abbreviated performance feedback intervention. *Education and Treatment of Children, 28*(1), 76-82.

Lerman, D. C., Vorndran, C. M, Addison, L., & Kuhn, S. C. (2004). Preparing teachers in evidence-based practices for young children with autism. *School Psychology Review, 33*(4), 510-526.

Machalicek, W., O'Reilly, M. F., Chan, J., Rispoli, M., Lang, R., Davis, T, . . .Langthorne, P. (2009). Using videoconferencing to support teachers to conduct preference assessments with students with autism and developmental disabilities. *Research in Autism spectrum disorders, 3*, 32-41.

Machalicek, W., O'Reilly, M. F., Rispoli, M., Davis, T., Lang, R., Franco, J. H. & Chan, J. M. (2010). Training teachers to assess the challenging behaviors of students with autism using video tele-conferencing. *Education and Training in Autism and Developmental Disabilities, 45*(20) 203-215.

Marks, D. F., & Yardley, L. (2004). *Research methods for clinical and health psychology*. Thousand Oaks, CA: Sage.

Mazurik-Charles, R., & Stefanou, C. (2010). Using paraprofessionals to teach social skills to children with autism spectrum disorders in the general education classroom. *Journal of Instructional Psychology, 37*(2), 161-169.

McDougall, J., Servais, M., Meyer, K., Case, S., Dannenhold, K., Johnson, S., & Riggin, C. (2009). A preliminary evaluation of a school support program for children with autism spectrum disorders: Educator and school level outcomes and program processes. *Exceptionality Education International, 19*(1), 32-50.

Mitchell, M. L., & Jolley, J. M. (2007). *Research design explained*. Belmont, CA: Thompson Higher Education.

National Autism Center. (2007). National standards project. Retrieved from http://www.nationalautismcenter.org/nsp/

National Center for Educational Statistics. (2008, March 25). *Digest of education statistics, 2007 schools and staffing survey* (NCES Number: 2008022). Washington, DC: Author.

National Council on Accreditation of Teacher Education. (2012). *Council for exceptional children initial and advanced preparation standards*. Retrieved from http://cec.sped.org/

National Professional Development Center on Autism spectrum disorders. (2010). *Evidence-based practices*. Retrieved from http://autismpdc.fpg.unc.edu/

National Professional Development Center on Autism spectrum disorders. (2010). *Coaching* manual. Retrieved from http://autismpdc.fpg.unc.edu/

Nigro-Bruzzi, D., & Sturmey, P. (2010). The effects of behavioral skills training on mand training by staff and unprompted vocal mands by children. *Journal of Applied Behavioral Analysis, 43*, 757-761.

No Child Left Behind (NCLB). (2002). Pub. L. 107-110. Stat. 750, 42 Stat. 108, 48 Stat. 986, 52 Stat. 781, 73 Stat. 4, 88 Stat. 2213, 102 Stat. 130 and 357, 107 Stat. 1510, 108 Stat. 154 and 223, 112 Stat. 3076, 113 Stat. 1323, 115 Stat. 1425 to 2094.

Onchwari, G., & Keengwe, J. (2008). The impact of a mentor-coaching model on teacher professional development. *Early Childhood Education Journal, 36*(1), 19-24.

Robinson, S. E., (2011). Teaching paraprofessional of student with autism to implement pivotal response treatment in inclusive school settings using a brief video feedback training package. *Focus on Autism and Other Developmental Disabilities, 26*(2), 105-118.

Rodriquez, G., & Knuth, R. (2000). Critical issue: Providing professional development for effective technology use. *Pathways to School Improvement*. Retrieved from http://www.ncrel.org/sdrs/areas/issues/methods/technlgy/te1000.htm

Ross, J. A. (1992). Teacher efficacy and the effects of coaching on student achievement. *Canadian Journal of Education*, *17*(1), 51-65.

Russo, A. (2004). School-based coaching. *Harvard Education Letter Research Online*. Retrieved from http://www.edletter.org/past/issues/2004-ja/coaching.shtml

Ryan, C. S., Hemmes, N. S., Sturmey, P., Jacobs, J. D., & Grommet, E. K. (2008). Effects of a brief staff training procedure on instructors' use of incidental teaching and students' frequency of initiation toward instructors. *Research in Autism spectrum disorders, 2*, 28-45.

Sarokoff, R. A., & Sturmey, P. (2008). The effects of instruction, rehearsal, modeling and feedback on acquisition and generalization of staff use of discrete trial teaching and student correct responses. *Research in Autism spectrum disorders, 2*, 125-136.

Schon, D. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.

Showers, B. (1982). Transfer of training: The contribution of coaching. Eugene, OR: Center for Educational Policy and Management.

Showers, B. (1994). School improvement through staff development: The coaching of teaching. Paper presented at the Making our Schools More Effective: Proceedings of Three State Conferences. Retrieved from http://old.sandi.net/depts/programmonitoring/researchbasededucationalpractices.html

Showers, B., & Joyce, B. (1996). The evolution of peer coaching. *Educational Leadership, 53*(6), 12-17.

Simpson. R. L. (2005). Finding effective intervention and personnel preparation practices for students with autism spectrum disorders. *Exceptional Children, 70*, 135-144.

Simpson R. L., McKee, M., Teeter, D., & Beytien, A. (2007). Evidence-based methods for children and youth with autism spectrum disorders: stakeholder issues and perspectives. *Exceptionality, 15*(4), 203-217.

Suhrheinrich, J. (2011). Training teachers to use pivotal response training with children with autism: Coaching as a critical component. *Teacher Education and Special Education, 34*(4), 339-349.

U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs. (2008). *Everything you wanted to know about coaching but were afraid to ask.* Retrieved from http://www2.ed.gov/about/offices/list/osers/reports.html

Weinkauf, S. M., Zeug, N. M., Anderson, C. T., & Ala'i-Rosales, S. (2010). Evaluating the effectiveness of a comprehensive staff-training package for behavioral intervention for children with autism. *Research in Autism spectrum disorders, 5*, 864-871.

Virginia Department of Education. (2011). *Special education child count*. Retrieved from www.doe.virginia.gov/

Vismara, L. A., Young, G. S., Stahmer, A. C., Griffith, E. M., & Rogers, S. J. (2009). Dissemination of evidence-based practice: Can we train therapists from a distance? *Journal of Autism and Developmental Disorders, 39*(12), 1636-1651.

Yoon, K. S., Duncan, T., Lee, S. W-Y., Scarloss, B., & Shapley, K. (2007). Reviewing the evidence on how teacher professional development affects student achievement (Issues & Answers Report, REL 2007-No. 033). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. Retrieved from http://ies.ed.gov/ncee/edlabs

Appendix A

Twenty-Four Practices That Have Been Shown to be Effective With Children and Youth With AUTISM SPECTRUM DISORDERS

	Academics & Cognition			Behavior			Communication			Play			Social			Transition		
Evidence-Based Practices	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH
1. Antecedent-based Interventions	■	■	■	■	■	■												
2. Computer Assisted Instruction	■	■	■															
3. Differential Reinforcement				■	■	■	■	■	■				■	■	■			
4. Discrete Trial Training	■	■		■	■		■	■		■	■		■	■				
5. Extinction				■	■	■												
6. Functional Behavioral Assessment				■	■	■	■	■	■									
7. Functional Communication Training				■	■		■	■										
8. Naturalistic Interventions							■	■	■				■	■	■			
9. Parent Implemented Interventions				■	■		■	■		■	■		■	■				
10. Peer Mediated Instruction/Intervention							■	■	■				■	■	■			
11. Picture Exchange Com. System				■	■	■	■	■	■				■	■	■			
12. Pivotal Response Training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
13. Prompting	■	■	■	■	■	■	■	■	■									
14. Reinforcement	■	■	■	■	■	■	■	■	■									
15. Response Interruption & Redirection	■	■	■	■	■	■												
16. Self-Management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
17. Social Narratives	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
18. Social Skills Groups							■	■	■				■	■	■			
19. Speech Generating Devices (VOCA)							■	■	■									
20. Structured Work Systems	■	■	■							■	■	■				■	■	■
21. Task analysis	■	■	■	■	■	■	■	■	■				■	■	■			
22. Time delay		■						■			■			■				
23. Video Modeling	■	■	■				■	■	■	■	■	■	■	■	■			
24. Visual Supports	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Evidence By Domain and Grade Level
Based on evidence reported in EBP Brief Overviews

July 2, 2009

Appendix B

Sample Coding Matrix

Article Information	
Participants	
Setting	
Design/Method	
IV DV	
Measures	
Initial Findings	
Secondary Findings	
Limitations	
Social Validity	
Generalization and Maintenance	
Other	

Appendix C

Survey Questions and Research Questions/Domains Measured

Survey Question	Response Option
How often do/did you meet with your coach during the NPDC model classroom implementation?	Question 1
I do not think that my participation in the NPDC project has increased my knowledge related to the evidence-based practices.	Question 1 and 2
I see myself as more able to implement the evidence-based practices in my classroom after receiving coaching.	Question 1 and 2
I used the evidence-based practices with the students involved in the NPDC project.	Question 1 and 2
I did not use the evidence base practices with the students involved in the NPDC project.	Question 1 and 2
My students have improved on the behaviors/skills that were the focus of the NPDC model.	Question 3
My students have not progressed in the behaviors/skills targeted through the NPDC model.	Question 3
I have used these techniques with other students with AUTISM SPECTRUM DISORDERS outside those participating in the NPDC project.	Question 5
I have used the techniques from the NPDC project with students with other disabilities.	Question 5
I have used the techniques from the NPDC project in inclusive settings with students with disabilities.	Question 5
I have found these techniques from the NPDC project to be helpful in inclusive settings with neurotypical students.	Question 5
I would use the techniques from the coaching session again in my classroom.	Question 4
The commitment of time and resources was reasonable for my work with the NPDC.	Question 4
I would be open to receiving coaching in the future to improve my ability to implement evidence-based practices for students with autism.	Question 4
I would not be open to receiving coaching in the future to improve my ability to implement evidence-based practices for students with autism.	Question 4
I have benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division.	Question 4
I have not benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division.	Question 4

I was satisfied with the quality of the coaching I received through the NPDC project?	Question 4
How many years have you been teaching?	Question 2 and 3
How many years have you been a participant in the NPDC project?	Demographic Characteristic
How adept do you perceive yourself to be in implementing the evidenced based practices selected for the NPDC project?	Question 1
Why would you encourage or discourage other teachers of students with autism from participating in the NPDC project?	Question 4
Do you feel that there was variability within the NPDC program for you and your student's development? Examples: Differences in your skill development across evidence-based practices, different students, and different components of the practices?	Question 4

Appendix D

Survey

Survey Question	Response Option
How often do/did you meet with your coach during the NPDC model classroom implementation?	Meeting Frequency
I do not think that my participation in the NPDC project has increased my knowledge related to the evidence-based practices.	Teacher Appraisal
I see myself as more able to implement the evidence-based practices in my classroom after receiving coaching.	Teacher Appraisal
I used the evidence-based practices with the students involved in the NPDC project.	Teacher Appraisal
I did not use the evidence base practices with the students involved in the NPDC project.	Teacher Appraisal
My students have improved on the behaviors/skills that were the focus of the NPDC model.	Teacher Appraisal
My students have not progressed in the behaviors/skills targeted through the NPDC model.	Teacher Appraisal
I have used these techniques with other students with AUTISM SPECTRUM DISORDERS outside those participating in the NPDC project.	Teacher Appraisal
I have used the techniques from the NPDC project with students with other disabilities.	Teacher Appraisal
I have used the techniques from the NPDC project in inclusive settings with students with disabilities.	Teacher Appraisal
I have found these techniques from the NPDC project to be helpful in inclusive settings with neurotypical students.	Teacher Appraisal
I would use the techniques from the coaching session again in my classroom.	Teacher Appraisal
The commitment of time and resources was reasonable for my work with the NPDC.	Teacher Appraisal
I would be open to receiving coaching in the future to improve my ability to implement evidence-based practices for students with autism.	Teacher Appraisal
I would not be open to receiving coaching in the future to improve my ability to implement evidence-based practices for students with autism.	Teacher Appraisal
I have benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division.	Teacher Appraisal
I have not benefitted more from my participation in the NPDC project than in other professional development activities provided by my school division.	Teacher Appraisal

I was satisfied with the quality of the coaching I received through the NPDC project?	Teacher Appraisal
How many years have you been teaching?	Teacher Experience
How many years have you been a participant in the NPDC project?	Length of Time in NPDC Project
How adept do you perceive yourself to be in implementing the evidenced based practices selected for the NPDC project?	Open Ended Question
Why would you encourage or discourage other teachers of students with autism from participating in the NPDC project?	Open Ended Question
Do you feel that there was variability within the NPDC program for you and your student's development? Examples: Differences in your skill development across evidence-based practices, different students, and different components of the practices?	Open Ended Question

Likert Scale Response Choices:

Teacher Appraisal

- Strongly Agree
- Agree
- Undecided
- Disagree
- Strongly Disagree

Teacher Experience

- 0-1 year
- 2-4 years
- 5-7 years
- 8-10 years
- 11+ years

Meeting Frequency

- 0-1 times per month
- 2 times per month
- 3 times per month
- 4 times per month
- 5+ times per month

Length of Time in NPDC Project

- First Year
- Second Year
- Third Year

Appendix E

Descriptive Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Q1	21	1.857	0.793	1.000	3.000
Q2	21	1.524	0.981	1.000	5.000
Q3	21	4.762	0.436	4.000	5.000
Q4	20	4.750	0.444	4.000	5.000
Q5	21	1.190	0.402	1.000	2.000
Q6	21	4.429	0.598	3.000	5.000
Q7	21	1.952	1.024	1.000	5.000
Q8	21	3.857	1.153	1.000	5.000
Q9	21	3.286	1.102	1.000	5.000
Q10	21	3.190	1.030	2.000	5.000
Q11	21	3.000	0.949	2.000	5.000
Q12	21	4.619	0.498	4.000	5.000
Q13	21	4.380	0.590	3.000	5.000
Q14	21	4.714	0.463	4.000	5.000
Q15	21	1.524	0.928	1.000	5.000
Q16	21	4.381	0.805	2.000	5.000
Q17	21	1.952	1.284	1.000	5.000
Q18	21	4.524	0.602	3.000	5.000
Q19	21	4.095	0.995	2.000	5.000
Q20	21	2.143	0.854	1.000	3.000