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Professional Development for Working with Students with Autism Spectrum Disorders and Teacher Self-Efficacy

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Professional Development for Working with Students with Autism Spectrum Disorders and Teacher Self-Efficacy

Abstract

The purpose of this pilot study was to determine the effect of teacher professional development for working with students with Autism Spectrum Disorders and teacher ($N = 56$) self-efficacy in the general education classroom. A pretest/posttest quasi-experimental research design was implemented. Teachers in one randomly assigned school received professional development training on research-based practices in working with students with autism to determine if the training had any effect on their perceived self-efficacy ratings and teachers in the other school were randomly assigned to serve as the control (i.e., no additional professional development training was provided during the research phase). Results showed that the training had a large positive effect on teacher self-efficacy ratings regarding working with students with autism in the inclusion classroom. Findings tentatively show the need and importance for the provision of more professional development training to general education teachers for working with students with autism to improve teacher self-efficacy and to provide the most effective and inclusive educational experience possible.

Keywords

Autism, Early Childhood, Intervention, Teacher Self-Efficacy

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Introduction

Inclusion in the early childhood and elementary classrooms provide developmental benefits to students with disabilities. When students have access to meaningful inclusive education starting in the preschool setting, they have more success in the classroom, as well as models for language and social development. According to Gupta and Henninger (2014), research has shown that when preschool students receive inclusive early care, they are given the opportunity to acquire meaningful skills that will enable them to be more successful in later years. Such skills include increased achievement of individual education plans (IEP), communication skills, and increased positive social-emotional behaviors as compared to their peers in separate classrooms for special education students. Research has shown that students with Autism Spectrum Disorder who are educated in a general education setting experience greater success than students who are in a special education classroom (Kurth, et al., 2015). However, inclusive education was not always possible for students with disabilities for decades in United States public education (Yell, 2016); several federal mandates had to be enacted to move the concept of inclusion forward.

Inclusion as we have come to know it today was first enacted by the passing of The Education of All Handicapped Children Act (1975). The law was amended in 2004 as the Individuals with Disabilities Education Improvement Act (IDEA). The defining significance of this law was that students with disabilities were afforded a Free Appropriate Public Education (FAPE) in the Least Restrictive Environment (LRE) and at no costs to parents. Secondly, the No Child Left Behind Act of 2001 (Pub. L. No. 107-110), (No Child Left Behind [NCLB], 2002), reauthorized in 2015 as the Every Student Succeeds Act (ESSA), further guaranteed that students with disabilities were to be educated with their regular education peers as appropriately determined. It is not surprising that both laws further stipulated that students with disabilities must have equal access to the school's curriculum while simultaneously receiving IEP's tailored to each student's specific needs. Subsequently, inclusion must be of high-quality and meaningful (Gilmour, 2018). From this stance, inclusion for regular education teachers has created a myriad of challenges.

It is important to note that the Centers for Disease Control and Prevention (CDC, 2018) estimated that one in 59 children are affected by autism which is a substantial increase from one in 68 children in 2014 and one in 88 in 2012. As a result, the CDC now regards autism as the fastest growing developmental disorder in the United States. Additionally, data from the United States Department of Education (2017) report that students with autism are served in an inclusion setting

80% or more of the time. Subsequently, these numbers suggest there is a growing need for all regular education teachers to understand students with Autism Spectrum Disorders to properly meet their learning needs in the classroom. Yet, effective research-based practices have not been commensurate with the increased numbers of students who have autism (Harrower, et al., 2016). Gupta and Henniger (2014) have explicated for quite some time that high-quality and meaningful inclusion consist of appropriate training, support, and time for regular education teachers to prepare necessary instruction. In conjunction, McLeskey, et al. (2014) posited there cannot be an effective collaborative relationship to support students with Autism Spectrum Disorders if regular education teachers have not had sufficient professional development training in proven research-based practices.

As educators it is paramount to understand how to best support students on the autism spectrum. By understanding the needs of our students on the autism spectrum, we can provide the best inclusive environment for them. While inclusion has been heavily researched and there is an abundance of empirical evidence to support inclusive classrooms, there is a dearth of research that has targeted the necessary training related to evidence-based practices (Zagona et al., 2017) to effectively teach students with Autism Spectrum Disorders. In addition, the few studies that have examined the appropriate training regular education teachers need were conducted outside the U.S. (e.g., Frederickson et al., 2010; Humphrey & Lewis, 2008; Lindsay et al., 2013). Predicated on the purpose of the pilot study and the gaps determined from research in the field, we sought to examine the effects of professional training on research-based practices for working with students with Autism Spectrum Disorders on teacher self-efficacy.

What follows is a report of one pilot study involving 56 general education teachers from grades prekindergarten through fifth grade who were currently teaching in inclusion classrooms. Utilizing a quasi-experimental pretest/posttest design, participants were randomly placed into either the experimental group who received professional development for working with students with Autism Spectrum Disorders versus the control group who did not receive professional development. The report begins with a brief discussion on the meaning of students with Autism Spectrum Disorders, followed by a discussion on the literature from the field that advances the significant role professional development training in researched-based practices play for classroom teachers. For purposes of the current study, a discussion on the two types of focused interventions that are germane to the research are provided. The report then concludes with a discussion on how the pilot study was implemented, followed by a report of the findings and implications that can be made.

Students with Autism Spectrum Disorders

According to the American Psychiatric Association (APA, 2018), Autism Spectrum Disorder is defined as "... a complex developmental condition that involves persistent challenges in social interaction, speech and nonverbal communication, and restricted/repetitive behaviors" (p. 1). Research from Odom and Wong (2015) represents similar information stating that common characteristics of Autism Spectrum Disorder include difficulties in communication, social interactions, and restricted or repetitive behaviors. Both APA (2018) and Odom and Wong (2015) also state that Autism Spectrum Disorder is usually diagnosed in early childhood around two to three years of age. Although there is no medical evaluation for Autism Spectrum Disorder, children can be evaluated through observational and developmental assessments by trained professionals such as psychiatrists, psychologists, and pediatricians (APA, 2018). Due to advances in medical and professional fields, Lord et al. (2018) offered, "The outlook for many individuals with autism spectrum disorder today is brighter than it was 50 years ago; more people with the condition are able to speak, read, and live in the community rather than in institutions . . ." (p. 508). However, more can be done.

Teacher Training

Research has shown that the degree of preparedness, knowledge of autism, level of training, and support is closely linked to teachers' perceptions for working with students with Autism Spectrum Disorders is imperative for general education teachers working in the inclusion classroom setting (Abel et al., 2015; Busby et al., 2012; Morrier, et al., 2011; Odum & Wong, 2015; Roberts & Simpson, 2016; Sparapani, et al., 2016). Abel et al. (2015) found that teachers in inclusion classrooms want and need more professional training in basic knowledge about Autism Spectrum Disorders, more resources to accommodate social needs of students in the classroom, and more understanding of how to advocate for students with Autism Spectrum Disorders in their classrooms. For example, Morrier et al. (2011) analyzed teacher training related to teaching strategies for working with students with Autism Spectrum Disorders in the classroom. Morrier et al. (2014) found that less than 5% of the teachers in their study utilized research-based practices. To confound the problem, Morrier et al. (2011) further found that very few teachers had received training, and if they did receive training, it was from a workshop or through trial and error in their own classrooms. The researchers concluded more professional development is needed in inclusion classrooms with a focus on research-based practices. In addition, research has shown that when teachers do not have the proper training, students with Autism Spectrum Disorders

do not receive effective instruction in the inclusion classroom as teachers have reported feeling unprepared (Roberts & Simpson, 2016; Woodcock & Woolfson, 2019). The lack of knowledge and lack of training on appropriate instructional strategies was echoed by Sparapani et al. (2016) as teachers in this study felt inadequate to teach and reach students on the autism spectrum.

However, inadequate training does not just include in-service teachers as training on Autism Spectrum Disorders is not typically included in pre-service teacher education (Odum & Wong, 2015). One study examined a teacher preparation program and the results from participant interviews showed a need for more field-based experiences with students on the autism spectrum, as well as more knowledge in research-based practices (Busby et al., 2012). More recently, the findings of one study further offered implications on inclusive education for certification-seeking teachers. Zagona et al. (2017) surveyed 33 regular education teachers and ten special education teachers to determine the relationship between the teacher designation, training, and the skills to function effectively in the inclusive classroom. In this study, training included prior university preparation, ongoing workshops, and professional development. Follow-up interviews were also conducted. From data analysis Zagona et al. (2017) found that a significant relationship did exist for teachers who had received continued support; i.e. participation in workshops and professional development opportunities. Additionally, findings from interview data supported that successes in inclusive education were attributable to prior and ongoing training. However, due to obstacles encountered that were reported by the interviewees, Zagona et al. (2017) concluded that there is a need in teacher education programs to establish the knowledge, skills, and collaborative ability required for inclusive classrooms. Similarly, Peterson-Ahmad et al. (2018) studied the perceptions of pre-service teachers' development in regular and special education and determined that more professional training was needed related to students with special needs. While Peterson-Ahmad et al. (2018) acknowledged that all participants had completed coursework in their programs, the researchers concluded that pre-service teachers need more than perfunctory coursework. The researchers offered that pre-service teachers are trying to survive and are ill-prepared to understand students with special needs on the autism spectrum and need ongoing support from qualified mentors.

Teacher Attitudes toward Inclusion of Students with Autism Spectrum Disorders

General education teachers' attitudes are closely linked to their knowledge about the autism spectrum or the lack thereof and according to Zucker et al. (2014),

the level of knowledge influences teachers' attitudes. Research has shown that teachers in the United States who have low expectations toward students with Autism Spectrum Disorders can have a significant impact on students' learning outcomes (Alamri & Tyler-Wood, 2016; Bock & Erickson, 2015). For example, Sansosti and Sansosti (2012) investigated teachers' attitudes toward students with high-functioning Autism Spectrum Disorders and discovered that there was resistance to the inclusion classroom. The resistance stemmed from teachers feeling they were not sufficiently qualified with the amount of training they had received. In a similar study, Chung et al. (2015) compared 234 teachers' attitudes towards students with Autism Spectrum Disorders to their typically developing peers. The researchers used a Likert scale questionnaire to gain information from the participants regarding their certifications, years of experience teaching, and other demographic identifiers. The survey contained questions that were related to two student scenarios; one of a typically developing student and the other of a student displaying characteristics of Autism Spectrum Disorder. The participants were then asked to respond to the questions in each scenario. Chung et al. (2015) found that even with prior positive attitudes towards students with Autism Spectrum Disorders, the participants still demonstrated more negative attitudes toward the scenario with the student with characteristics of Autism Spectrum Disorders compared to the scenario of the typically developing student.

In one of the first comprehensive studies that focused on many stakeholders' attitudes, Segall and Campbell (2012) investigated 196 educators' attitudes, knowledge, and experience in working with students with Autism Spectrum Disorders. This study included general education teachers, special education teachers, administrators, and school psychologists. The researchers utilized a Likert scale questionnaire to address the following domains: knowledge of Autism Spectrum Disorders, opinions about inclusive education in general and inclusive education for students with Autism Spectrum Disorders, classroom behaviors, and knowledge of classroom practices for working with students with Autism Spectrum Disorders. The overall view of the participants in the study showed positive attitudes towards inclusive settings for students with Autism Spectrum Disorders. Not surprisingly, the attitudes of special education teachers were more positive than the other participant groups in the study. General education teachers reported the least positive attitudes towards inclusive education for students with Autism Spectrum Disorders. General education teachers' attitudes were closely aligned with the lack of professional development training and the inability to teach students with Autism Spectrum Disorders.

Teachers' Self-Efficacy

As the experiences when teaching students on the autism spectrum differ in the inclusive classroom, their self-efficacy to effectively deliver instruction to these students also vary. According to Bandura (1993), self-efficacy can significantly impact motivation, thought, affect, and action. Closely linked to teachers' attitude, Vaz et al. (2015) found that teachers who reported low levels of self-efficacy in relation to research-based teaching skills exhibited negative attitudes toward students on the autism spectrum. Similarly, Roberts and Simpson (2016) found that regular education teachers who reported insufficient knowledge of research-based practices lead to a lack of confidence and a feeling they are ill-prepared to teach in the inclusion classroom. Conversely, research has found that teachers who have knowledge of research-based practices have higher levels of self-efficacy in their abilities to work with children with Autism Spectrum Disorders (Brock et al., 2014; Paynter & Keen, 2015).

One early study that investigated teacher self-efficacy, Finch et al. (2013) researched the levels of knowledge and the training teachers obtained on research-based practices for working with students with Autism Spectrum Disorders. The participants in the study were third, fourth, and fifth grade general education teachers from the same school district. Focus groups and a survey were used to gain information from the participants. Such information related to demographic information, experiences in regards to teaching students with Autism Spectrum Disorders, professional training in Autism Spectrum Disorders, and the self-efficacy ratings on the ability to successfully teach students with Autism Spectrum Disorders in the inclusion classroom. From data analysis, Finch et al. (2013) found that teachers' self-efficacy ratings were negatively affected by low levels of professional training. Due to a lack of professional development for working with students with Autism Spectrum Disorders, the participants reported they lacked confidence and believed they were ineffective teachers. More recently, Accardo et al. (2017) examined knowledge of effective pedagogical practices for reading comprehension for students with Autism Spectrum Disorders and how effective instructional practices affect teacher self-efficacy ratings. The researchers found that teachers who had more training in effective practices for working with students with Autism Spectrum Disorders had higher self-efficacy ratings of themselves as effective teachers in the inclusive classroom.

Research-based Practices

Love et al. (2019) posited that the increasing numbers of students who have been diagnosed with Autism Spectrum Disorders has necessitated the need for teachers to have the knowledge of evidence-based practices specific to students on the autism spectrum. Even with the preponderance of students with Autism

Spectrum Disorders, many students do not receive effective interventions (Hess et al., 2008) despite the fact that the implementation of research-based practices is required by ESSA (2015) and IDEA (2004) (Young & Jean, 2019). According to Schalock et al., (2017), evidence-based practices are “practices for which there is a demonstrated relation between specific practices and measured outcomes” (p. 115). To expound, evidence-based practices are practices that have been extensively examined in research studies and have proven to positively influence the expected outcomes (Graham et al., 2016; Young & Jean, 2019).

Today, one form of evidenced-based practices that have met the criteria and is recommended for working with students on the autism spectrum is the focused-intervention model (see Table 1).

Table 1.

Evidence-based Practices for Children, Youth, and Young Adults on the Autism Spectrum

Interventions		
Antecedent-based Interventions	Naturalistic Interventions	Self-management
Cognitive Behavioral Intervention Narratives	Parent-implemented Interventions	Social
Differential Reinforcement Skills Training	Peer-mediated Instruction & Intervention	*Social
Discrete Trial Training Structured Play Groups	Picture Exchange Communication System	
Exercise Analysis	Pivotal Response Training	Task

Extinction Technology-aided	Prompting	Instruction & Intervention
Functional Behavior Reinforcement	Assessment	
Time Delay Response Interruption/	Functional Communication	
Intervention	Training	
Video Modeling Supports	Modeling	*Visual

*Note: * Indicates evidenced-based interventions used in current study for professional development.*

Wong et al. (2015) conducted an extensive review of current practices in the field, involving 159 reviewers. The findings from content analysis revealed 27 evidence-based practices that have been shown to be effective interventions. Each intervention focuses on one skill for a student with autism. It is important to note that a second form of evidenced-based practices – practices that are commonly implemented over a period of time - is the comprehensive treatment model (Wong et al, 2015). However, and for purposes of this pilot study, we focused on two specific intervention practices within the focused-intervention model.

Social Skills Training

Teachers in inclusion classrooms intend to believe that students with Autism Spectrum Disorders may not want to communicate; communication is easier for some students than others (LaBarbera, 2019). One prevalent intervention method is social skills training. Social skills training is a research-based practice general education teachers can use in the classroom to promote more positive interactions among all students and to support social goals for students with Autism Spectrum Disorders. Bohlander et al. (2012) recommend that general education teachers engage students with social deficits in social skills training using peer mentoring, social skills groups, social stories, picture books, and video modeling. Bohlander et al. (2012) found that when students with Autism Spectrum Disorders

are taught social skills, more positive interactions occur with other students in the classroom, as well as other adults in the school setting. With reduced anxiety and behavioral issues, students with Autism Spectrum Disorders can further complete their work tasks and participate in the inclusion classroom setting.

Visual Supports

Researchers in the field have long advocated the effective use of visual supports classroom teachers can use to assist students with Autism Spectrum Disorders. According to Denning and Moody (2018), visual supports allow students on the autism spectrum an opportunity to increase their focus and communication skills. Young and Jean (2019) recommend that teachers use visual supports that are comprised of real objects, photographs, line drawings, words, interactive supports, labels, visual scripts, visual rule reminders, and visual schedules. While working with students with Autism Spectrum Disorders, Maedan et al. (2011) found visual schedules can reduce anxiety, as well as issues with behavior in the classroom setting. One specific example of the use of visual supports to aid students with Autism Spectrum Disorders was investigated by Hume et al. (2012). The researchers employed individual work systems to understand how these systems support students with Autism Spectrum Disorders in the classroom setting. An individual work system is an organized space that uses visuals to communicate the specific tasks required of the student, how many tasks are necessary to complete the work, how the student will know the work is completed, and what to do after they have completed their work. Hume et al. (2012) concluded that through the use of task analysis and visuals, students with Autism Spectrum Disorders have clearer expectations of what is expected of them throughout an instructional task in the classroom as tasks or activities are broken into steps for students to complete one at a time. Moreover, individual work systems may be used to generalize tasks in different environments. As students with Autism Spectrum Disorders learn how to use their individual work system and achieve success, different tasks and environments can be introduced to further promote generalization of skills and independence.

Summary

As we discussed in our review of existing literature, common characteristics of Autism Spectrum Disorders include difficulties in communication, social interactions, and restricted or repetitive behaviors. Autism Spectrum Disorders are usually diagnosed in early childhood around two to three years of age. Although there is no medical evaluation for Autism Spectrum Disorders, children can be evaluated through observational and developmental assessments by trained

professionals such as psychiatrists, psychologists, and pediatricians. A review of the literature found that teachers in inclusion classrooms want and need more professional training in basic knowledge about Autism Spectrum Disorders, more resources to accommodate social needs of students in the classroom, and more understanding of how to advocate for students with Autism Spectrum Disorders. Researchers identified the need for more professional training in research-based practices for working with students with Autism Spectrum Disorders in the inclusion classroom setting.

We further reported that research has shown the degree of preparedness, knowledge of autism, level of training, and support is closely linked to teachers' perceptions for working with students with Autism Spectrum Disorders. In addition, research has shown that teachers who have insufficient knowledge of research-based practices lead to a lack of confidence and a feeling they are ill-prepared to teach in the inclusion classroom. This in turn means student with Autism Spectrum Disorders do not receive effective instruction in the inclusion classroom. Conversely, a review of the literature found that teachers who have knowledge of research-based practices have higher levels of self-efficacy in their abilities to work with children on the autism spectrum.

As we discussed in our review of literature, many students on the autism spectrum do not receive effective interventions despite the fact that the implementation of research-based practices is required by ESSA (2015) and IDEA (2004). Evidenced-based practices are considered to be practices that have been extensively examined in research studies and have proven to positively influence the expected outcomes. Two forms of evidenced-based practices that are implemented today are the focused-intervention model and the comprehensive treatment model. From our review of literature, we found a paucity of research that has targeted the necessary training related to evidence-based practices. For purposes of the current study, we have highlighted the focused intervention model and specifically addressed social skills training and visual supports.

Research Question

The purpose of the present investigation was to pilot the implementation of professional development to determine the effect on teacher self-efficacy for teachers who work with students of Autism Spectrum Disorder. Predicated on the gaps in the research literature we identified, we posed the following research question:

1. What is the effect of participating in professional development training on research-based practices for working with students with Autism Spectrum Disorders on perceived teacher self-efficacy post-training while controlling for pre-training perceived self-efficacy?

Method

Participants, Sampling, and Research Design

The study employed a quasi-experimental pretest/ posttest design. Participants were randomly placed into either the experimental group or the control group. All participants in this study were general education teachers from grades prekindergarten through fifth grade. The elementary teachers at these two elementary schools ranged from having one year of experience to twenty-five years of experience in teaching the elementary grades. All teachers in both the experimental group and the control group were currently teaching in inclusion classrooms. The participants were chosen through convenience sampling. Alpha Elementary and Beta Elementary had only inclusion classrooms and did not offer any other settings, including resource rooms and alternative curriculum classrooms when this study occurred. In addition, all students with disabilities were served in the general education classroom for 80% or more of the day.

The potential pool of participants between Alpha Elementary and Beta Elementary was 87 general education teachers who were eligible to participate in the study. These two schools were randomly assigned to be part of the experimental or control group (i.e., teachers in the intact schools either received or did not receive additional professional development training during the research phase of this study). Out of this total participant pool, 65 of the general education teachers volunteered to participate. Out of the 65 participants, 63 participants completed the pretest and only 56 completed the posttest. Therefore, to preserve a consistent sample size and to avoid potential bias, the actual sample size for the present study was 56 elementary teachers in total (i.e., only participants who completed the study in its entirety were included).

Instruments

Teacher self-efficacy was measured by adapting a survey from a study regarding teacher self-efficacy in teaching nutrition (Brenowitz & Tuttle, 2003). For this study, the items in the original scale were modified to be germane to teaching students with Autism Spectrum Disorders in an inclusion classroom (see Appendix A). Participants responded to items on a 4-point Likert scale, with 1

indicating “not confident at all,” 2 indicating “not very confident,” 3 indicating “somewhat confident,” and 4 indicating “very confident.” Internal consistency reliability coefficients, Cronbach’s alpha, for both the pretest and posttest were the same of 0.965, which demonstrates that participants consistently interpreted the survey as intended.

Procedure

We solicited institutional review board approval prior to the commencement of the study, and we adhered to all ethical expectations regarding the treatment of human participants throughout the conduct of the study. The participants were from two elementary schools named Alpha Elementary and Beta Elementary. The participants from the two schools were randomly assigned to either receive professional development (experimental group) on research-based practices for teaching students with Autism Spectrum Disorders or no professional development (control group).

The primary author first attended each elementary schools’ grade level meetings and explained the research along with the informed consent forms or contacted a contact teacher and explained the study. After answering any possible questions or concerns participants had, the primary author left the informed consent forms with the contact teacher from the school. This contact teacher placed informed consent forms in the mailboxes of each general education teacher. Interested participants returned their signed informed consents to an envelope in the office. Participants had one week to turn in the signed forms.

After one week, the primary author retrieved the envelope of signed informed consent papers and created a list of numbered names in order to pair the pretests and the posttests for each participant. The primary author then placed the numbered pretests surveys for both the experimental and control groups in their mailboxes and participants were given one week to complete the pretest and returned them to an envelope in the mailroom. The primary author retrieved the anonymous, numbered surveys.

Following this procedure, the researcher placed the numbered posttest surveys for the experimental and control groups in their mailboxes and participants were given two weeks to complete the posttest survey. When the two-week deadline was reached, the primary author returned to each school and retrieved the completed posttest surveys in an envelope from both the control group and the experimental group schools.

As a result, the control group participated in the pretest survey and the posttest survey. The experimental group participated in the same pretest and posttest surveys; however, they received online training on research-based practices for working with students with Autism Spectrum Disorders in the general education classroom. The professional development was created by the primary author based on tips and strategies obtained from the research literature. The training consisted of videos explaining social skills training and visual supports and how to implement these practices in the classroom setting, as well as information and videos describing Autism Spectrum Disorders and what makes students who have Autism Spectrum Disorders unique learners in the classroom setting. The professional development was available as an online course for the schools and was made available to the school district after the research was concluded. To maintain anonymity, the experimental group participated in the training by a given deadline; however, the primary author only saw the number of participants who completed it, not individual names of participants who completed the study.

Results from Data Analysis

Data were evaluated for requisite statistical assumptions (e.g., normality, homogeneity of variance, linearity, etc.) and examined for outliers. Data met the assumption of normality (all skewness and kurtosis values were less than the absolute value of 2 for both groups and type of tests [i.e., pretest, posttest]), homogeneity of variance (Levene's Test $p = .56$), linearity and lack of collinearity. Further, no extreme outliers in the groups or type of test that would otherwise undermine the trustworthiness of the data were detected. Hence, data analysis proceeded with 56 complete cases.

Establishing Group Equivalence at Baseline and Analytic Approach

An independent samples t -test to establish group equivalence in perceived self-efficacy at baseline revealed that the groups were statistically significantly different regarding baseline self-efficacy, $t(61) = 2.36$, $p = .02$, Cohen's $d = .593$. Therefore, to include the most accurate and trustworthy findings, and to account for the significant difference between-groups at baseline, the research question was answered by conducting a one-way analysis of covariance (ANCOVA), with the groups (experimental, control) serving as the between-subjects factor, pretest perceived self-efficacy serving as the covariate, and posttest perceived self-efficacy serving as the outcome.

Results for RQ 1

Descriptive statistics for both groups are shown in Table 2, including initial and adjusted means, after controlling for the effect of pretest self-efficacy. As is evident, the experimental group reported significantly higher self-efficacy at posttest, both prior to, and after, controlling for pretest self-efficacy.

Table 2.

Descriptive Statistics for Teacher Self-Efficacy in Teaching Children with Autism by Group

Variables	Control ($n = 26$)		Experimental ($n = 30$)	
	$M (M_a)$	SD	$M (M_a)$	SD
Pretest Self-Efficacy	2.04	0.71	1.64	0.66
Posttest Self-Efficacy	2.23 (2.06)	0.77	2.89 (3.04)	0.61

$N = 56$

M_a = Adjusted posttest mean after controlling for pretest self-efficacy.

Results of the one-way ANCOVA revealed that the between-group (experimental, control) main effect was statistically and practically significant, even after controlling for pretest perceived self-efficacy, $F(1,53) = 59.17, p < .001, \eta^2 = .528$. The effect size, η^2 , shows a large practical significance in favor of teachers who received the professional development training.

These data demonstrated that there were statistically and practically significant differences in the perceived self-efficacy levels of teachers, even after controlling for pretest self-efficacy. This tentatively suggests that the professional development training had a meaningful, large, and statistically significant impact on the self-reported self-efficacy levels of teachers regarding working with students with Autism Spectrum Disorders.

Discussion of Findings

The findings showed that professional development training for working with students with Autism Spectrum Disorders does have a large effect on teacher self-efficacy ratings in the general education classroom. The current finding is

supported by research conducted by Segall and Campbell (2012) who found that there was a significant relationship between attitudes, knowledge of strategies, and knowledge of Autism Spectrum Disorders among general education teachers who participated in professional training in their study. The current finding further aligns with Abel et al. (2015) who found that teachers in inclusion classrooms want and need more professional training in basic knowledge about Autism Spectrum Disorders.

The findings of the current study also parallel the findings of prior studies that examined professional development and teachers' level of confidence (Brock et al., 2014; Chung et al., 2015; Paynter & Keen, 2015) that professional development training can increase teachers' levels of confidence, sense of self-efficacy, and improved skills and practices to work with students with Autism Spectrum Disorders. The lack of training in research-based practices has shown that teachers feel in adequate and ill-prepared to work with students on the autism spectrum (Roberts & Simpson, 2016; Woodcock & Woolfson, 2019). Additionally, the findings of our study are supported by Accardo et al. (2017) who examined the knowledge of effective pedagogical practices for reading comprehension for students with Autism Spectrum Disorders. Accardo et al. (2017) found that teachers who had more training in effective practices for working with students with Autism Spectrum Disorders had higher self-efficacy ratings of themselves as effective teachers in the inclusive classroom.

Limitations of the Study

One limitation of the pilot study was the compact nature of the online professional development training the experimental group received on practices for working with students with Autism Spectrum Disorders in the general education classroom, as on-site training allows for more synchronous questions and practice. The compact nature of the training, however, was important to ensure participation from the experimental group of teachers who may have opted to not complete the training, and thus, further decrease the already small sample size and undermine statistical power. We acknowledge the small sample size and the quasi-experimental design make it difficult to generalize the results of the study.

The use of a self-report instrument to measure self-efficacy was also problematic. It is possible that teachers may not have been completely honest regarding their self-efficacy. This problem, often called the social desirability bias, is endemic to self-report measures such as surveys. Regarding generalizing the findings of the study, there is the potential that the findings of this study may be different from other schools or research on this topic because this study specifically

examined teachers who taught in a general education inclusion setting. Most schools in the school district where the research occurred serves students with disabilities 80% or more of the day in an inclusion classroom and did not have other service options at their school.

Despite the various limitations of our study, we wish to underscore two strengths. First, the research occurred in an ecologically valid setting (i.e., in actual schools) rather than the contrived setting of a laboratory, and hence, our conclusions are more contextually valid. Second, we employed a robust research design—quasi-experimental pretest/posttest—and thus, the internal validity of our study, particularly as it pertains to the validity of our conclusions, is much stronger than if we had implemented a non-experimental, cross-sectional descriptive design.

Implications for the Practice and/or the Profession

Research has shown that general education teachers reported that they wanted more professional training to increase their knowledge about Autism Spectrum Disorders as well as practices to use when accommodating students with Autism Spectrum Disorders (Able et al., 2015). Our findings demonstrated that professional development training had a statistically significant impact on general education teachers' self-efficacy ratings for working with students with Autism Spectrum Disorders. The large effect size of the training manipulation in this study supports our recommendation that more training increases teacher self-efficacy. As a result, our study indicates for students with Autism Spectrum Disorders to be effectively and fully included in the general education classroom, there is a continued need for more professional training for general education teachers in research-based practices. Research has further shown that professional development for regular education teachers is not commensurate with increased numbers of students who have autism (Harrower, et al., 2016). As the prevalence for autism is increasing, this study implies that general education teachers need to feel confident in their abilities to serve their students in the classroom setting. Inclusion is vital for students with Autism Spectrum Disorders and until public school districts provide more professional training in research-based practices for students with Autism Spectrum Disorders, teacher self-efficacy will continue to be low and students will not be served as effectively in the inclusion classroom setting. On a larger scale, our results suggest that professional development for working with students with Autism Spectrum Disorders should be incorporated into teacher preparation programs as well. Existing literature demonstrates that in-service teachers and pre-service teachers alike are asking for more training regarding Autism Spectrum Disorders (Busby et al., 2012; Finch et al., 2013). By sharing the results of this study with school districts and teacher preparation programs, many

teachers both in-service and pre-service can begin to receive training in research-based practices for Autism Spectrum Disorders. This will create long-term positive effects for students with Autism Spectrum Disorders in the general education classroom setting and change the view of inclusion to truly effective instructional experiences for all students.

Recommendations for Future Research

It is important that future studies utilize in-person trainings for a longer time frame to account for the compact nature of our training and to replicate our findings. It is important to see if the same results can be replicated using in-person training as well as with different school setups. The elementary schools used in this study served all their students with disabilities in the general education classroom for 80% or more of the school day. Conducting research using elementary schools that have different settings such as alternative curriculum and resource classrooms would make the results of this study even more meaningful for educators, if the same results were replicated. It would also be important to replicate this study for special education teachers. Many special education teachers who have been teaching for a long time may not have received training in current research-based practices for working with students with Autism Spectrum Disorders. When working in the inclusion setting, special education teachers are supposed to guide the general education teachers in how to best support students. If the special education teachers do not have enough training in these research-based practices, there cannot be an effective collaborative relationship to support students. It is important for future research to continue to explore the relationship between teacher training and general education teachers' self-efficacy so that vital changes to teacher preparation programs and professional development can be made to more effectively serve students with Autism Spectrum Disorders in the inclusion setting.

Conclusion

When considering inclusion for students with disabilities, it is vital to supply effective instruction that is meaningful to the student. Without training, inclusion becomes a physical location and not a wholly inclusive instructional environment. When considering the needs of students with Autism Spectrum Disorders, it is important to have an understanding of their needs to fully plan and support them in the inclusion classroom; however, without training from professional development and teacher preparation programs, general education teachers do not have the knowledge to support students with Autism Spectrum Disorders effectively and this negatively impacts their self-efficacy ratings as an effective teacher. The results of this investigation demonstrated that the self-

efficacy ratings at posttest of the general education teachers who participated in this study increased from the pretest self-efficacy score in those who received a training in specific research-based practices found in existing literature. Therefore, there is a large need for more training in research-based practices for working with students with Autism Spectrum Disorders in the inclusion classroom setting in order to improve self-efficacy ratings of general education teachers, but most importantly to provide truly inclusive education for students with Autism Spectrum Disorders in the inclusion classroom setting. By providing a truly inclusive instructional environment for students with Autism Spectrum Disorders, general education teachers will not only have a higher self-efficacy rating, but ultimately students with Autism Spectrum Disorders will receive the supports and education they need to flourish, grow, and build meaningful relationships in their classrooms.

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APPENDIX A

Teacher Self-Efficacy Survey (Adapted from Brenowitz & Tuttle, 2003).

On a scale of 1-4, please rate the following questions about yourself by circling the corresponding number:

- 1: Not confident at all
- 2: Not very confident
- 3: Somewhat confident
- 4: Very confident

1. How confident are you that you have adequate training to teach students with Autism Spectrum Disorders in your classroom? 1 2 3
4

2. How confident are you that you understand Autism Spectrum Disorders enough to effectively include students in your classroom? 1 2 3 4

3. How confident are you that you have the skills and training necessary to teach students with Autism Spectrum Disorders in your classroom? 1 2 3 4

4. How confident are you that you can teach students with Autism Spectrum Disorders grade level standards in your classroom? 1 2 3 4

5. How confident are you that you have adequate training to handle behaviors related to Autism Spectrum Disorders in your classroom? 1 2 3 4

6. How confident are you in the knowledge you have of Autism Spectrum Disorders? 1 2 3 4

7. How confident are you in your ability to differentiate instruction for students with Autism Spectrum Disorders in your classroom? 1 2 3 4

8. How confident are you in your ability to teach social skills to students with Autism Spectrum Disorders in your classroom? 1 2 3 4

9. How confident are you in your knowledge of evidence-based practices in working with students with Autism Spectrum Disorders? 1 2 3 4

10. How confident are you in differentiating assessments for students with Autism Spectrum Disorders in your classroom? 1 2 3 4