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Elements of Good Teaching and Good Teachers: A Theoretical Framework and Effective Strategies for Special Educators

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Abstract

Within schools in the United States, teachers must now acquire the skills and dispositions necessary to effectively teach students with a wide variety of needs. As an important first step, the effective behaviors of successful teachers need to be considered. The author has identified three key components that are integral to that process; namely, (a) relationship-building, (b) pedagogical skills, and (c) subject knowledge. One framework that appears to be useful in identifying specific skills common to “good” teaching and good teachers is Kennedy’s (2008) three criteria of effective teaching behaviors: (a) personal resources; the qualities that the teacher brings to the job (b) teacher performance; teachers’ everyday practices that occur in and out of the classroom and (c) teacher effectiveness; the relational teacher qualities that influence students. In a relevant investigation, the author and colleagues conducted research that identified effective teacher strategies, such as awareness of body language, flexibility in accommodating different learning styles, active listening techniques, the use of eye contact, teacher availability, and incorporating a variety of teaching methodologies. Other research-based strategies are discussed relative to their implications for effective (good) teaching.

Introduction: A Mandate for Becoming an Effective Teacher

As the inclusive classroom continues to develop into standard practice throughout the United States, classroom teachers can no longer claim students with special needs and behavioral challenges are not their responsibilities. Frequently, within the inclusion model, special and general educators are paired to serve students with a variety of needs – gifted, average, learning disabled, and emotionally disturbed, in a single classroom. As a result, all teachers must now acquire the skills and dispositions necessary to effectively teach students with a wide variety of needs. Teacher preparation programs and schools must find ways to insure that preservice and novice teachers are prepared to address the increasingly diverse needs of all students assigned to their classrooms. As one step in the reflective process of teacher preparation and professional development practices, the effective behaviors of successful teachers need to be considered.

In discussing the needs of some of our most challenging students, Cavin (1998) encourages teachers to,

...remember that these kids with all of their problems, their criminal records, their probation officers, their idiosyncrasies, their unlovable characteristics, and their strange families are still kids. They need someone to care. They need someone to accept them. They need to know they are somebody. If you are willing to provide these ideals, you can be the connection that bridges the gap from drop-out to diploma. (p. 10)

A further incentive to stay the course with challenging students was provided by a former colleague, who observed (after a very discouraging week when it seemed that all the writer’s

efforts to teach a lesson were foiled and he began to have second thoughts about my calling), “for some kids, these days in school may be the best of their lives: the safest, the happiest, and the most secure.” The author never forgot this insightful pronouncement and it helped change his attitude about teaching even the most oppositional, defiant students.

A final inducement to persevere with difficult students comes from recent data provided by the U.S. Office of Juvenile Justice. In 2010, according to their records, 70,792 juveniles were incarcerated in the U.S., the greatest number worldwide. In fact, the incarceration rate for juveniles (school-age children) in the U.S. in 2002 was 336 for every 100,000 youth - compare that figure to the country with the next highest rate, South Africa, with 69 of every 100,000 youth in detention (as cited in Mendel, 2011). In response to these abysmal statistics and his own extensive experience, DeMuro (2010), the former commissioner of the Pennsylvania Juvenile Corrections system, describes the current state of juvenile justice in the U.S. as “iatrogenic” (preventable harm introduced by the caregiver, in this case, the juvenile justice system) (as cited in Mendel, 2011). Mendel (2011) notes further that while education and treatment at most juvenile detention facilities is non-existent, the average annual cost to house an incarcerated youth in a detention facility is approximately \$88,000; whereas, the cost to provide that same individual with effective intervention services in a public or specialized school is approximately \$10,000. Moreover, the recidivism rate for incarcerated youth in New York State, for example, three years or more after release, ranges from 73-89 percent (www.aecf.org/noplacefor kids, 2011).

Similarly, a 2006 investigation revealed that only 33 percent of youth released from a Pennsylvania corrections camp program who said they would return to school did so (Hjalmarsson, 2008). Since there are, effectively, no rehabilitation programs in most juvenile corrections facilities, youths detained in them actually can become more antisocial and more inclined to engage in criminal behaviors after their release. Thus, the data clearly suggests that the last, best hope for most of these at-risk youth is in school, and perhaps the best models of prosocial behavior are their teachers.

Is Teaching an Art or a Science, or a Little of Both?

This question raises the specter of a very old debate, effectively described in N. L. Gage’s book, *The Scientific Basis of the Art of Teaching* (1978). In that book, Gage defined *teaching* as “...any activity on the part of one person intended to facilitate learning on the part of another” (p. 14). Of course, given the diversity of students in today’s K-12 schools, I think we need a more inclusive definition. I would suggest one; namely, that teaching has been transformed in the Twenty-first Century to incorporate a more expansive job description, one that acknowledges that, in addition to facilitating learning, today’s teacher serves as a role model for prosocial behavior, provides examples of civil discourse, and, in some cases, acts as a surrogate parent. What has precipitated this revolutionary change? One only needs to examine the changing social structure that surrounds our children; specifically, the volatile economy, which determines how we live in society and has required a radical increase in the number of hours spent working, and, as a result, has all but eradicated the luxury of the “stay-at-home” parent. Absent parental guidance, many American students have found themselves without the traditional role model who once taught and reinforced prosocial behaviors and discouraged antisocial ones.

Now to the age-old debate that Gage (1978) so famously addressed: whether teaching (in school) is an “art” or a “science.” In his examination of these positions, he noted that, “...even in the fixed programs of computer-assisted instruction-there is a need for artistry: in the choice and use of motivational devices, clarifying definitions and examples, pace, redundancy, and the like” (p. 15). Gage (1978) suggested that, rather than teaching being considered an art or science, it should be, in its highest form, considered an amalgam of both. He further delineates the term “science” used in association with teaching, to be construed as “the scientific *basis*.” He differentiates these two designations by suggesting that a science of teaching, “...implies that good teaching will someday be attainable by closely following the rigorous laws that yield high predictability and control” (p. 17). In contrast, teaching, like medicine and engineering is not a science, but, like medicine and engineering, teaching “...requires a knowledge of much science, concepts, or variables, and their interrelations in the form of strong or weak laws, generalizations, or trends” (p. 18).

Palmer (1998) asserts further, that “...good teaching cannot be reduced to techniques; good teaching comes from the identity and integrity of the teacher” (p. 10). He suggests that teaching cannot be reduced to technique, but is fundamentally connected to identity and integrity. In a more expansive view, the author would propose that, like Gage (1978), effective teaching and effective teachers must possess a “scientific basis” for teaching that is construed as an expertise in the subject matter as well as the passion that is integral to an “artistic” pedagogy, but would here add the facility to build relationships with students. This enlarged characterization is delineated in the author’s “framework for good teaching,” which follows.

A Framework for Good Teaching

After reviewing the relevant literature concerning the elements common to most good teachers, the author has distilled three that he believes to be prototypical; namely, (a) relationship-building, (b) pedagogical skills, and (c) subject knowledge, in that order.

Relationship-building. What is meant by *relationship* as it pertains to teachers and students? Simply put, the term refers to the rapport the teacher builds with the student, a connection that fosters trust and that facilitates learning. Truth be told, such meaningful and affirming relationships are the reasons most of us want to teach in the first place. Good teacher-student and student-teacher relationships are often the reason that students choose to stay in school, acquire an affinity for a particular subject, feel good about their school experience, look forward to coming to class, and report feeling a sense of self-efficacy. Teacher-student relationships like any other human relationship can be either healthy and reciprocally validating or unhealthy and destructive. Boynton and Boynton (2005) note that students are more likely to do what teachers ask when they feel valued and cared for by them. Similarly, Thompson (1998) states that, “The most powerful weapon available to [teachers] who want to foster a favorable learning climate is a positive relationship with our students” (p. 6), and Canter and Canter (1997) suggest that students who enjoy a positive relationship with their teachers will be more inclined to comply with their requests and work conscientiously on assignments.

Furthermore, Marzano (2003) suggests that students who feel genuinely cared for and respected by their teachers are less likely to be discipline problems. In a similar way, Kohn (1996) asserts that, “Children are more likely to be respectful when important adults in their lives respect them. They are more likely to care about others if they know they are cared about” (p. 111). Likewise, Daunic, Smith, and Algozzine (2010) assert that, “research has consistently shown that a positive relationship with an adult is a critical factor in preventing violence at school” and recommend, as a result, that schools provide opportunities for teachers and students to spend “quality” time together (p. 215). Jones and Jones (2012) further posit that both academic achievement and behavior in the classroom are directly influenced by the “quality of the teacher-student relationship” (p. 95). Important to that relationship, of course, is the passion that the teacher feels for her subject and enthusiastically imparts to her students. Indeed, in support of that, Rose (1996) observes that, “it is what we are excited about that educates us” (p. 106).

Similarly, in his investigation of teacher-student interactions at both the elementary and secondary levels, Hargreaves (2000) underscores the frequently unheralded importance of emotional connection or relationship. In examining this critical aspect of good teaching, Hargreaves (2000) offers, “Teaching is an emotional practice. This use of emotion can be helpful or harmful, raising classroom standards or lowering them...Emotions are located not just in the individual mind; they are imbedded and expressed in human interactions and relationships” (p. 824). Lastly, Zehm and Kottler (1993) have suggested that students will *never* trust or truly attend to teachers without an established sense of mutual valuation and respect.

Additionally, as in all aspects of the human condition, it is vital that we, as teachers, integrate our personal and professional selves. It is important that we explore and reflect on our own concepts of self and our beliefs about the essential qualities of good teaching, good teachers, and good character to cultivate an “integrated” self and thereby develop authentic relationships with students and colleagues.

Maya Angelou, the acclaimed poet, author, and solon once wrote, “I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel” (https://www.goodreads.com/author/quotes/3503.Maya_Angelou). The author would suggest that, in a sense, the quality of a relationship is determined by the way those in the relationship “feel” about it. Thus relationship, genuine and affirming, provides the foundation for all else that we strive to do as teachers. It opens the doors of students’ minds to learning, to see education as something worthwhile, to want to acquire the knowledge and skills that we, as teachers, so want to impart. In short, without such quality relationships, there can be no real teaching and learning.

Pedagogical Skills. Similarly, “good” teachers must be steeped in the “art and science” of effective teaching; this is what we refer to as *pedagogical knowledge*. According to the Cambridge Dictionary Online (2012) the term “pedagogy” is defined as: “the study of the methods and activities of teaching (*n.p.*);” essentially, the word denotes the “art and science” that constitutes effective, systematized instruction. There is no shortcut to attaining this vital skill set, which is really honed and refined throughout the professional lifetime of the teacher. Frankly, if teachers do not know *how* to teach subject matter or impart knowledge about a topic or skill, it matters little that they have much to teach and possess a vast knowledge base. We all know of

individuals who are recognized widely for their expertise in a particular area or subject, but do not possess the pedagogical skills to effectively impart that knowledge to others.

Undeniably, sound pedagogical skills must be acquired through effective training, reflective practice, and more reflective practice. As Loughran (2002) notes, “If learning through practice matters, then reflection on practice is crucial, and teacher preparation is the obvious place for it to be initiated and nurtured” (p. 42). Ideally, the foundation of a sound pedagogy should be established in a reputable college-based teacher preparation program.

Cogill (2008) states that pedagogy, as it pertains to the teaching profession, is multi-faceted and thus difficult to simply define. Watkins and Mortimer (1999) describe the term as “any conscious activity by one person designed to enhance the learning of another” (p. 3). Alexander (2003), expands on this definition by adding, “It is what one *needs* to know, and the *skills* one needs to command in order to make and justify the many different kinds of decisions of which teaching is constituted” (p. 3). Cogill (2008) suggests that teacher knowledge is integral to pedagogy and cites Shulman’s (1987) seven categories as a schema for understanding the nuanced term. We think this “framework” is very helpful in understanding pedagogical skills as they pertain to the teaching profession. It might be instructive to list them here: (a) content knowledge, (b) general pedagogical knowledge [e.g., classroom control, group work], (c) pedagogical content knowledge [we refer to this simply as “content or subject knowledge”], (d) curriculum knowledge, which is more specific to instructional design, (e) knowledge of learners and their characteristics, (f) knowledge of educational contexts [e.g., schools and their communities], and (g) knowledge of education purposes and their values [for students] (as cited in Cogill, 2008, p. 1-2). Simply put, pedagogy is the “how to” in effectively imparting a skill to another.

In a different vein, Korthagen (2004) posits a developmental model of pedagogical skills central to a good teacher. He refers to this model as “the onion” because the skills are equally important and interrelated. They flow from a central mission, through identity [of the teacher], beliefs [of the teacher], competencies [teaching], behaviors [relative to effective teaching], and, finally, the interaction of the teacher’s environment with the teacher and her instruction (p. 80). In line with his model, Korthagen (2004) proposes “a more holistic approach towards teacher development, in which competence is not equated with competencies,” but one that finds a middle ground between humanistic and behaviorist perspectives. He further suggests that the teacher educator understand her own core qualities in order to more effectively and authentically promote them in her prospective teachers (p. 94).

Subject Knowledge. Imparting subject knowledge to our students is, arguably, our “raison d’être” as a profession and a professional. Relative to this assertion, Palmer (1998) describes an unforgettable professor who defied “every rule of good teaching” in that he lectured to such a degree and with such passion, that he left little time for student questions and was not a good listener. What he did impart to Palmer was his love of learning, his subject knowledge and his passion for it. Palmer recalls, “It did not matter to me that he violated most rules of good group process and even some rules of considerate personal relations. What mattered was that he generously opened the life of his mind to me, giving full voice to the gift of thought” (p. 22). He goes on to say that, “Passion for the subject propels that subject, not the teacher, into the center of the learning circle-and when a great thing is in their midst, students have direct access to the

energy of learning and of life. A subject-centered classroom is not one in which students are ignored. Such a classroom honors one of the most vital needs our students have: to be introduced to a world larger than their own experiences and egos, a world that expands their personal boundaries and enlarges their sense of community...A subject-centered classroom also honors one of our most vital needs as teachers: to invigorate those connections between our subjects, our students, and our souls that help make us whole again and again” (p. 120).

While the instructional technology revolution has forever changed the way teachers present lessons in the classroom for the better, in the opinion of most educators, the data suggests that the single most important aspect of classroom instruction is the *quality* of the teacher and her *knowledge* of the subject matter (Cochran-Smith & Zeichner, 2005; Croninger, Buese, & Larson, 2012; Darling-Hammond, 2006; Donovan & Bransford, 2005; Pantic & Wubbels, 2010). In response to this acknowledgement, Zimpher and Howey (2013) offer an exhortation to teacher preparation programs, school leaders, and future teachers:

Teachers must be equipped to prepare students to meet the requirements and demands of the 21st Century workforce—but to do that teachers and school leaders themselves need the right kind of rigorous, continuous education, in both pedagogy and content area expertise, in order to become the high-quality professionals students need. (p. 419)

A report, commissioned by the U.S. Department of Education (2001), summarized what the research showed about five key issues in teacher preparation: subject matter preparation, pedagogical preparation, clinical training, pre-service teacher education policies, and alternative certification. The investigators conducted a meta-analysis of fifty-seven studies that met specific research criteria and were published in peer-reviewed journals. Ultimately, they found that these studies demonstrated a positive connection between teachers’ preparation in subject matter and their performance in the classroom (Wilson, Floden, & Ferrini-Mundy, 2001, p. 7). Similarly, Goldhaber and Brewer (2000) and Monk (1994) determined that not only was content preparation positively related to student achievement in subjects like math and science, but courses in methods of teaching, specific to subjects, also demonstrated a significant increase in student achievement.

Clearly, there is a very wide gulf between a desirable level of subject knowledge and the level of knowledge that most student-teachers display either at the start or, in many cases, at the end of their coursework. For example, Ma (1999) posed four simple arithmetical problems to a sample of teachers from both China and the U.S. and examined their responses relative to how they proposed to solve the problems and how they would, ostensibly, teach the process to their own students. Only 9 out of 21 American teachers answered the questions correctly, whereas all 72 Chinese teachers were successful. Furthermore, Ma (1999) found that even the successful American teachers were much less able than their Chinese counterparts to explain why the process they used produced the correct answer and thus were unable to provide exemplars (as cited in French, 2005). These findings indicate that teacher subject knowledge should be foremost on the agenda of educational administrators and policy-makers (French, 2005).

Thus, based on the apparent paucity of subject knowledge evident in many pre-service and novice teachers, Metzler and Woessmann (2010) suggest that a renewed emphasis on teacher

subject knowledge must become an important component in hiring policies, teacher training practices, and compensation schemes.

What is a “Master” Teacher and How Can I Become One?

It is difficult to find research that distinguishes the universally recognized characteristics of a “master teacher.” Most of what we read in journals and online discussion boards simply reflects the subjective opinions or insights of the author with very little, if any, scientific bases. This may be due to the fact that the characteristics of acknowledged “master teachers” are germane to each. Therefore, absent a scientific criteria, we offer several lists of behaviors that are evident in most teachers that are recognized as exemplary, including those effective teacher behaviors identified in our own research. In addition, we encourage teachers who wish to achieve this status to be patient and observant of colleagues who are acknowledged as models of exceptional teaching. For example, Couros (*n.d.*) has suggested that the essential qualities of a master teachers might include: (a) connecting with students first, (b) teaching students first and curriculum second, (c) ensuring that the teacher emphasizes the relevance of the curriculum **to** the students’ lives, (d) working with students to develop a love of learning, (e) modeling and celebrating lifelong learning, (f) focusing on learning goals as opposed to performance goals, (g) ensuring that “character education” is an essential part of learning, (h) being passionate about the content they teach, (i) seeing their role as a “school teacher,” which is not confined to the classroom, and (j) developing strong communication skills. The author has provided a paraphrased elaboration for each of these qualities below:

(a) Connecting with students first. For all students to excel, teachers must learn about them and connect with each child. This is not just about finding out *how* they learn, but it is finding out *who* they are. It is essential that we get to know our students, learn their passions, and help them find out how we can engage them in their own learning.

(b) Teaching students first and curriculum second. Teachers must ensure that they differentiate learning and work to meet the needs of *each* student and understand how they each learn. I believe that students have different learning styles and if we can best figure out how to help them meet their own needs, students will excel in the subject areas we teach.

(c) Ensuring that the teacher emphasizes the relevance of the curriculum to the students’ lives. The question, “What does this have to do with real life?” is something that I would prefer never be said in a classroom. Not because it is not a legitimate question, but because teachers should understand the relevance of everything they teach. A master teacher knows that it is essential to use technology in the classroom to enhance learning in a way that is relevant to students.

(d) Working with students to develop a love of learning. We are obligated to teach curriculum objectives but we are also obligated professionally to help students find their own learning style. A master teacher will try to tap into those ways that students love to learn and build upon them. Creating that spark in each student will lead them to continued academic success and growth.

(e) Modeling and celebrating lifelong learning. A master teacher knows that she will never become the “perfect” teacher since that is unattainable. Master teachers will seek to grow along with their students. Education is a constantly evolving discipline and a master teacher knows that she needs to change with it to maintain relevance. Growth is essential as a teacher. Society changes continuously and so do its needs. We need reflective practitioners in our workplace and teachers must show that they are committed to such “habits of mind.”

(f) Focusing on learning goals as opposed to performance goals. In the book “Drive,” Pink (2011) talks about the difference between performance and learning goals. A performance goal, he suggests, would be similar to having students desiring to receive an “A” in French; whereas, a learning goal would be represented in a student’s desire to become fluent in the language. A master teacher sets goals based on learning not on simply receiving a grade.

(g) Ensuring that “character education” is an essential part of learning. Character education is just as relevant, if not more so, than any learning objectives set out in a curriculum. We live in a world where collaboration is vital to success and working with others is an important skill. Working with students to teach the fundamentals of respecting others and being able to listen and learn from others is vital. Students can understand the learning objectives of a lesson, but not possess the ability to share these ideas with others in a respectful way. A master teacher ensures that students not only grow academically in class, but also socially and emotionally.

(h) Being passionate about the content they teach. If a teacher works in the area of math and loves the subject area that passion will spill over to the students he/she works with. A master teacher shares her passion and enthusiasm with her colleagues.

(i) Seeing their role as a “school teacher,” which is not confined to the classroom. It is essential that master teachers not only impact the learning environment of the class, but also have an impact on the school culture. This can happen in sharing their passion through extracurricular activities or their discrete skills with colleagues.

(j) Developing strong communication skills. Sharing knowledge with colleagues is essential to the growth of the individual as well as the professional community. It is important that these skills are continuously developed. It is also imperative that teachers are able to effectively communicate with parents because they have great insights about how their child learns best. A master teacher will effectively draw upon this knowledge (<http://georgecouros.ca/blog/archives/267>).

Similarly, Jackson (2012) posits that some important characteristics of mastery teaching invariably includes: (a) start where your students are, (b) know where your students are going, (c) expect to get students to their goal, (d) support students along the way, (e) use feedback, (f) focus on quality, not quantity, and, interestingly, (g) never work harder than your students (*n.p.*).

Recently, Buskist, Sikorsky, Buckley, and Saville (2012) surveyed 916 undergraduates relative to the elements or qualities of master teaching and found the following ten to be perceived as the most representative (in order of importance): (a) realistic expectations/fair, (b) knowledgeable about topic, (c) understanding, (d) personable, (e) respectful, (f) creative/interesting, (g)

positive/humorous, (h) encourages, cares for students, (i) flexible/open-minded, (j) enthusiastic about teaching (p. 36). Simultaneously, the investigators presented the same list of qualities to 118 faculty members and a comparison of the results showed that, whereas there was no hierarchical consensus among the two groups, the faculty participants included six of the students' top ten qualities in their ten most representative qualities list. Specifically, the faculty members valued: (a) knowledgeable about topic, (b) enthusiastic about teaching, (c) approachable/personable, (d) respectful, (e) creative/interesting, and (f) realistic expectations/fair, in that order. Clearly some of these qualities could be considered pedagogical skills and others appear relevant to relationship-building.

Teacher Effectiveness based on the Author's Investigation

The concepts of effective teaching behaviors and teacher quality have proven difficult to define, so much so that the terms are frequently rendered useless (Kennedy, 2008). One framework that appears to be more useful is Kennedy's (2008) categorization of effective teaching behaviors: (a) personal resources; the qualities that the teacher brings to the job (b) teacher performance; teachers' everyday practices that occur in and out of the classroom and (c) teacher effectiveness; the relational teacher qualities that influence students. Utilizing these categories suggests a schema from which to discuss the qualities of teacher effectiveness.

Recently, the author and fellow researchers designed a study to investigate the practice of teachers qualified as "very effective," according to a rigorous, evidence-based protocol (Austin, Barowsky, Malow, & Gomez, 2011). The investigators employed a mixed methods approach, which included interviews, video-taped observations of practice, and student feedback via a survey. The results reflected the findings of several similar studies, but also revealed a few that appear unique to the authors' investigation, and these important outcomes are discussed in the subsequent paragraphs.

According to Kennedy (2008), teacher qualities that influence students are labeled as effective. One way that effectiveness can be identified is by questioning students. Pratt (2008) and Biddulph and Adey (2004) studied the topic of teacher efficacy from the perspective of the student. Biddulph and Adey (2004) found that it was not the content of the curriculum that peaked students' interest in a subject, but rather it was the quality of the teaching and meaningfulness of the learning activities that influenced students' opinions about a teacher and the subject area. Pratt (2008) noted that elementary-level students preferred teachers who made them feel like they were an important part or member of a community, provided choices in learning activities, allowed for cooperative projects, made learning seem fun and used authentic and meaningful assessments.

Other researchers also reported qualities related to humor as effective traits of teachers. Mowrer-Reynolds (2008) found teachers who were humorous, funny, and entertaining to be ranked highly as exemplary teacher characteristics. In addition to being humorous, teachers who were easy to talk to, approachable and provided outside help often were considered exemplary (Mowrer-Reynolds, 2008).

The teacher performance qualities are those observable characteristics of teachers; this is what they do in a classroom. All three data sources in our study found strong evidence that the

behaviors represented in this category are exhibited by the highly qualified teachers, they speak to the importance of these characteristics. Furthermore, students find these behaviors desirable in general and acknowledge them in their own teacher. Within this category, it is important to note that the four-videotaped teachers in our study (Austin et al., 2011) did not exhibit the same teaching style, nor was it necessary that they do so. One of the teacher participants (“Teacher 2”) best represented this perspective in her interview response, noting that “...a mixture of teaching approaches and strategies are most effective” and that she purposely changes her approach every “...20 minutes or so...” to keep students focused and interested. Additionally she notes that having the ability to “...read a student and know how to change one’s strategy if it’s ineffective” is an essential skill that can be taught to novice teachers (Austin et al., 2011).

Qualities of interpersonal behavior have been identified as important in teacher effectiveness (Kyriakides, 2005). Others such as Goldhaber and Hansen (2010) suggested that the relevance of interpersonal factors cannot be discounted. Identifying teacher effectiveness must be included in teacher preparation. The highly qualified teachers’ of students with emotional and behavioral challenges utilized for this investigation exhibited the interpersonal behaviors from this category in all three data sources. Specifically it was interesting to hear from all four teachers the strong endorsement for forming a relationship with the students in order to promote their well-being both academically as well as personally. Finally, effective teachers understand that the teacher-student relationship can be difficult (Austin et al., 2011).

To summarize, the research objectives of the author’s investigation were to examine the effective teaching behaviors of highly qualified teacher participants who taught, primarily, students with emotional and behavioral problems and to identify those behaviors deemed teachable for future inclusion in teacher preparation and in-service professional development programs. In the course of the research, the behaviors of four highly qualified teachers were observed. After analyzing the data from the videotapes, interviews, and student surveys, the researchers identified effective teaching behaviors (Austin et al., 2011). The importance of Kennedy’s (2008) framework for breaking effective teaching behaviors into teachable components for general educators was supported and was demonstrated to be applicable to teachers of students with EBD. Specifically, the effective behaviors of highly qualified experienced teachers of students with EBD fell within the three categories framed by Kennedy (2008) for general education teachers. In particular, the performance category presents teachable instructional and interpersonal behaviors. These included strategies, such as awareness of body language, flexibility in accommodating different learning styles, active listening techniques, the use of eye contact, teacher availability, and incorporating a variety of teaching methodologies (Austin et al., 2011).

Conclusion

The author set out to provide the reader with a theoretical framework consisting of three elements of good teaching and good teachers; specifically, (a) relationship-building, (b) pedagogical skills, and (c) subject knowledge as well as a rationale for their adoption. Subsequently, the reader was presented with the findings of several exemplary studies relative to the characteristics and dispositions of “effective” teachers. One of them was a recent study conducted by the author and his colleagues (Austin, 2011) employing the framework of analysis

developed by Kennedy (2008), which identified three strategic criteria by which to examine effective teacher behaviors; specifically, (a) personal resources; the qualities that the teacher brings to the job (b) teacher performance; teachers' everyday practices that occur in and out of the classroom and (c) teacher effectiveness; the relational teacher qualities that influence students. Using this framework, the author's study identified teacher behaviors such as awareness of body language, flexibility in accommodating different learning styles, active listening techniques, the use of eye contact, teacher availability, and incorporating a variety of teaching methodologies as the ones contributing most to effective teaching as perceived by students, investigators, and the teachers themselves.

As a final point, although there was some variation between studies in terms of the most important teacher skills and dispositions relative to "good" teaching, they all shared, in some way, the three elements identified by the author; namely, (a) relationship-building, (b) pedagogical skills, and (c) subject knowledge. The author's extensive review of the literature on effective teacher qualities and behaviors has revealed that many of the skills heretofore considered intrinsic and therefore unteachable, can, in fact be taught to novice and developing teachers. The only two ineradicable traits that appear to defy transmission are a teacher's belief in her students' ability to learn, and her unwavering commitment to that conviction. Indeed, the research clearly substantiates Dweck's (2008) assertion that, "The great teachers believe in the growth of the intellect and talent and they are fascinated with the process of learning" (p. 194).

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What Factors Contribute to Self-Efficacy

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Abstract

This study examined the self-efficacy of paraeducators serving students with moderate to severe disabilities in a specialized public school. Quantitative methods explored the relationship among paraeducator self-efficacy, personal factors (including work experience, age level of teaching assignment, and disability served), and organizational factors (including role of paraeducator, collaboration, professional development, job satisfaction, and supervision). Seventy-five paraeducators working in a suburban public school responded to the Paraeducator Perceived Self-Efficacy Scale and the Paraeducator Descriptive Questionnaire. Findings indicated that overall, personal or organizational factors were not predictors of self-efficacy. However, the organizational factor of job satisfaction was a significant predictor of self-efficacy, suggesting that paraeducators should be encouraged to express their wants and needs. Additionally, strong relationships were present between supervision and role definition and also between job satisfaction and collaboration.

What Factors Contribute to Self-Efficacy

Paraeducators are an integral part of special education classrooms and help to facilitate positive learning outcomes for students with disabilities (Chopra & French, 2004; Downing, Ryndak, & Clark, 2000). Historically, paraeducators worked as clerical assistants in the classroom, performing duties such as record keeping, making copies, and running errands for supervising teachers (French & Pickett, 1997). Paraeducators are now taking on an instructional role under the supervision of a general or special education teacher (Giangreco, Edelman, & Broer, 2003; Keller, Bucholz, & Brady, 2007). This shift has changed the classroom dynamic and has placed additional burdens on the paraeducator who is often unprepared to fulfill this role (Chopra, Sandoval-Lucero & French, 2011).

These new instructional burdens are experienced by paraeducators who are assigned to provide one-to-one supports for students with severe disabilities. Without supervision and clear directions from the supervising teacher, paraeducators are at risk for undermining peer interactions and hovering over their charges (Giangreco, Edelman, Luiselli, & McFarland, 1997). In addition, often paraeducators have not been trained in techniques to facilitate students with disabilities in their interactions with the rest of the class (Carter, O'Rourke, Sisco, & Pelsue, 2009). Furthermore, paraeducators often report the need for professional development when they are faced with students who have challenging behaviors or when they are asked to provide services that are beyond their skill set (Wall, Davis, Crowley, & White, 2005).

It has been well documented that paraeducators often lack time for collaboration with supervising-teachers, roles are not well-defined, and supervision is minimal from supervising teachers or other authority figures (Devlin, 2008; Downing et al., 2000; French & Pickett, 1997; Giangreco, Edelman, Broer, & Doyle, 2001; Riggs & Mueller, 2001; Walter-Thomas, 1997). Additionally, research has shown that paraeducators do not receive enough professional development, and are not given sufficient opportunities to provide reflections on their job satisfaction (Carter et al., 2009; Keller et al., 2007; Lasater, Johnson, & Fitzgerald, 2000; Patterson, 2006). However, paraeducator self-efficacy and the relationship to these variables are not well documented. These issues are becoming extremely pertinent in many school districts throughout the country as paraeducators are increasingly being thrust into more instructional roles for which they are ill prepared (Chopra et al., 2011).

Purpose and Objectives

The purpose of this study was to examine the relationships among personal and organizational factors and self-reported paraeducator self-efficacy. Personal factors were those factors that impact the paraeducator as an individual within the classroom, including amount of work experience, age level of the teaching assignment, and disability served. Personal factors such as these have not been reported in a codified manner, but only as incidental information in prior research. This study also examined self-efficacy of the paraeducator as it related to the organizational factors of collaboration, job satisfaction, professional development, role definition, and supervision. Those factors that impact the school as a whole (collectively) were defined as organizational factors. Self-efficacy was defined as the paraeducator's perceived level of capability to carry out assigned tasks.

Methods

Setting

Participants in the current study were recruited from a small suburban public school located in upstate New York. This public school serves students; ages 3-21, who require mandated special education services. It has a high teacher to paraeducator ratio, averaging approximately three paraeducators to one special education teacher. All students have Individual Educational Programs (IEP) and are in self-contained classrooms. The most common disability within the self-contained special education classrooms at this particular site was Down Syndrome (intellectual disability) followed by students who were classified as severely and profoundly intellectual disabled, autistic, and other health impaired.

Participants

Seventy-five paraeducators responded to the surveys. All paraeducators were White and Hasidic, and were either bilingual Yiddish-English speaking or trilingual Yiddish-English-Spanish speaking. All paraeducators in the school were high school graduates and were considered highly qualified as per New York State education department. To be considered highly qualified, all paraeducators must have either (a) completed two years of college (48 credit hours) or have an associate degree or higher or (b) passed a formal state or local assessment (NYSED, 2011). All paraeducators in this study have passed a local assessment that was developed by the New York University Department of Education and accepted by the NYSED.

Data Collection

The new scale, The Paraeducator Perceived Self-Efficacy Scale (see Appendix A) was devised to measure a paraeducator's beliefs in their abilities to fulfill varied levels of task demands. The Paraeducator Perceived Self-Efficacy Scale was designed to measure the extent to which paraeducators' perceived self-efficacy relates to collaboration, job satisfaction, professional development, role definition, and supervision. Participants were also asked to complete a separate 17-question demographic survey, the Paraeducator Descriptive Questionnaire (see Appendix B), in order to gather information about their background and personal factors of self-reported self-efficacy. The background information included years working as a paraeducator, years working with the same population and/or group of students, primary student disability, primary job in classroom, and number of professional development courses taken.

Data Analysis

The data were used to explore the relationships between the dependent variable of self-efficacy and the independent variables' personal factors: (a) amount of work experience; (b) age level of teaching assignment; (c) disability served and organizational factors; (d) collaboration; (e) job satisfaction; (f) professional development; (g) role definition; and (h) supervision in a special education setting. Descriptive statistics were used to analyze demographic information and for preliminary analysis of the survey. The hypothesis that there would be no difference in the personal perception of self-efficacy (dependent variable) as it relates to work experience as a paraeducator, age level of teaching assignment, and disability served (independent variables) was tested. Additionally, the hypothesis that there would be no difference in the organizational perception of self-efficacy (dependent variable) as it relates to collaboration, job satisfaction, professional development, role definition, and supervision (independent variables) was tested using regression.

Descriptive data was computed including multiple R (R denoting correlation), R square, adjusted R square and standard errors of all study variables. A regression was performed for any variables that significantly related to self-efficacy in bivariate correlations. If only one variable was significant, a linear regression was performed, but if more than one was significant, a multiple regression was performed. Additionally, Factorial Analysis of Variance (ANOVA) analyses were used to report findings. One-way ANOVAs were also used to report findings.

Findings

The Paraeducator Perceived Self-Efficacy Scale was devised by the researcher to measure a paraeducator's beliefs in their abilities to fulfill varied levels of task demands. The scale has 32 questions and employs a 5-point Likert-scale anchoring at *not at all true*, *somewhat true*, and *very true*. This measure was distributed to 106 paraeducators, of which 75 completed and returned it, resulting in a 70% return rate. The analyses used for the quantitative data included descriptive statistics, frequencies, and linear regression.

Participants were also asked to complete a researcher-generated descriptive survey, the Paraeducator Descriptive Questionnaire, in order to gather information about their background and personal factors of self-reported self-efficacy. This measure contained 17 questions. The

scale was also distributed to the same 106 paraeducators, of which 75 completed and returned it, resulting in a 70% return rate. Descriptive data responses were aggregated and analyzed using descriptive statistics which included frequencies, percentages, ranges, means, and standard deviations.

Statistical Program for Social Sciences (SPSS) Version 21 (2013) was used in the statistical analyses of data from both instruments. Statistical outcomes are presented for all research questions. All data were used to answer the three research questions relative to the examination of: (1) extent of paraeducator self-reported self-efficacy related to organizational factors, specifically, collaboration, job satisfaction, professional development, role definition, and supervision; (2) extent of paraeducator self-reported job satisfaction related to personal factors, specifically, amount of work experience, age level of teaching assignment, and disability served; and (3) how paraeducator reports of the organizational factors, collaboration with supervising teachers and supervision from supervising teachers, differ based on their assigned roles.

Organizational Factors

Table 1
Means, Standard Deviation, and Reliability of Six Organizational Factors (N=75)

Subscale	<i>M</i>	<i>SD</i>	<i>A</i>
Collaboration	4.06	0.69	.65
Job satisfaction	4.01	0.71	.77
Professional development	3.04	0.78	.63
Role definition	4.00	0.79	.75
Supervision	3.39	0.97	.81
Personal teaching efficacy	3.25	0.51	.56

Most of the subscale means were in the middle of the item scale; the range of the Likert Scale was 1-5. The collaboration, job satisfaction, and role definition subscales were overall relatively high, which indicates that the population has high job satisfaction and positive views of their role definition and supervision. Findings based on reliability coefficients and linear regressions were that paraeducators had relatively high job satisfaction (.75), role definition (.77), and supervision (.81).

Table 2
Intercorrelations of Organizational Factors for Self-efficacy (N=75)

Measure	1	2	3	4	5	6
1. Collaboration	—					
2. Job satisfaction	.60***	—				
3. Professional development	.13	.33**	—			
4. Role definition	.23	.20	-.02	—		
5. Supervision	.35**	.28*	-.01	.52***	—	
6. Self-efficacy	.15	.17	.10	.05	.30**	—

* $p < .05$. ** $p < .01$. *** $p < .001$.

Job satisfaction was also shown to be a predictor of self-efficacy; job satisfaction statistically significantly predicted self-efficacy, $t(1, 73) = 2.67, p = .01$, and explained 8.70% of the total explained variance. These findings align with the study by Hughes and Valle-Riestra (2008) which found through supporting a team approach, paraeducators and teachers collaborated and defined roles. Paraeducators reported greater job satisfaction using this model.

Personal Factors

Findings showed that paraeducators were satisfied with their jobs regardless of the personal factors. A 3x4x4 Factorial ANOVA was implemented to describe the interactions of job satisfaction with amount of work experience (years working as a paraeducator), age level of teaching assignment (student age groupings 3-5, 6-9, 10-13, and 14-21) and disability served (e.g., autism, intellectually impaired, physically impaired, and other health impaired) and none were found to be significant. The main effect for working experience was not statistically significant, $F(2, 42) = 1.32, p = .79$; neither were the main effects for disability served, $F(3, 42) = .49, p = .69$, nor age group of students, $F(3, 42) = 1.32, p = .28$. The interactions between working experience and age level, $F(5, 42) = .31, p = .90$, working experience and disability served, $F(5, 42) = .59, p = .70$, age level and disability served, $F(7, 42) = .44, p = .87$, as well as working experience by age level by primary disability, $F(4, 42) = .60, p = .66$, were not statistically significant.

Table 3
Frequencies and Age Levels of Assigned Roles (N=75)

Teaching roles	Frequency	Percentage
Age level of teaching assignment		
3-5 years old	20	26.70
6-9 years old	22	29.30
10-13 years old	17	22.70
14-21 years old	16	21.30
Primary student disability		
Autistic	10	13.30
Intellectually impaired	28	37.30
Physically impaired	24	32.00
Other health impaired	12	16.00

Table 4
Average Levels of Job Satisfaction by Working Experience, Primary Disability, and Student Age Groups (N=75)

Group	n	M	SD
Working experience			
0-5 years	44	10.84	2.92
6-10 years	17	10.82	2.78
10+ years	12	11.25	2.21

Primary disability			
Autistic	9	10.89	2.03
Intellectually impaired	28	11.32	3.06
Physically impaired	23	10.52	2.91
Other health impaired	12	10.75	2.45
Student age groups			
3-5 years old	20	10.60	3.15
6-9 years old	22	10.77	2.62
10-13 years old	16	10.38	2.92
14-21 years old	15	12.07	2.09
Overall total	75	10.90	2.76

Using two sets of one-way ANOVAs, it was found that regardless of the primary disability served, teachers and paraeducators collaborated and paraeducators were supervised. The first ANOVA assessed whether primary disability impacted the level of collaboration paraeducators had with their supervising teachers. The model was not significant, $F(3, 70) = .06, p = .98$. The second ANOVA assessed whether primary disability impacted the level of supervision received and was not statistically significant, $F(3, 70) = .46, p = .71$.

Table 5
Average Levels of Collaboration and Supervision by Primary Disability (N=75)

Group	n	M	SD
Collaboration			
Autistic	10	3.50	.53
Intellectually impaired	28	3.57	.79
Physically impaired	24	3.50	.59
Other health impaired	12	3.50	.67
Overall total	75	3.53	.66
Supervision			
Autistic	10	3.00	.67
Intellectually impaired	28	3.07	.60
Physically impaired	24	3.25	.73
Other health impaired	12	3.17	.67
Overall total	75	3.13	.66

Discussion

Organizational Factors

In the current study, linear regression findings determined job satisfaction was a statistically significant predictor of self-efficacy. This was a logical outcome because paraeducators who are satisfied in the position will also be more efficacious. Bandura's (1977) theory supports this outcome; he asserts that mastery experiences are powerful forms of efficacy because they offer examples in which a person displays skill and success. For example, a paraeducator successfully

teaches a child to complete a mathematical equation; the paraeducator identifies with the success and is reinforced for being a valued member of the paraeducator-supervising teacher team.

Additionally, it was found, though not statistically significant, that collaboration and job satisfaction had a strong relationship. Teachers and paraeducators in the school discuss student programs and ways in which they should be carried out. These positive collaborative experiences can explain the strong relationship with job satisfaction. This relationship is supported by the current findings and is also a consistent theme in literature. Chopra et al. (2011) discussed the need for collaboration among paraeducators and teachers, considering it to be fundamental for the success of school teams. French and Chopra (2006) stressed face-to-face communication on a regular schedule was vital for student and team success, and helped maintain a culture of collaboration within the classroom.

With regard to job satisfaction and professional development, the current study found job satisfaction and professional development had a moderate relationship, though not statistically significant. The importance of job satisfaction as a factor related to paraeducator professional development was confirmed by Hughes and Valle-Riestra (2008), who found paraeducators working with young children with disabilities reported high levels of job satisfaction when they received training and opportunities for professional development. Carter et al. (2009) found the same conclusion and reported that improved paraeducator training practices was one factor that increased overall job satisfaction. The school district provides professional development through in-service courses which paraeducators are required to attend. Furthermore, the paraeducators in the district have an opportunity to follow the paraeducator-to-teacher pipeline through a school partnership with a local college.

The current study also found job satisfaction and role definition had relatively high reliability coefficients, .75 and .77 respectively, which indicated the population had relatively high job satisfaction and positive views of their role definition. The finding was not statistically significant. Consistent with this study's findings, Fischer and Pleasants (2011) found salient factors of job satisfaction related to collaboration, roles, and responsibilities, such as acknowledgement of their opinions about students, inclusion in team meetings, and a school culture of collaboration that includes the paraeducator. This could explain the high reliability in the reported data. Paraeducators who have their roles defined are more accepting of supervision (Riggs, 2001). Furthermore, intersubjectivity which is a principle of Vygotsky's (1934/86) social cultural theory also supported these findings. Intersubjectivity stresses the need for peers to work together, thus promoting a collaborative environment.

Finally, the current study found strong relationships between supervision and role definition through linear regression, though not statistically significant. This finding is also consistent with common themes of supervision and role definition in the literature, with paraeducators requiring supervision under NCLB (2002) that was often provided by unwilling teachers (Chopra et al., 2011). Applying Bandura's (1977) assertion that behavior is learned observationally through modeling, supervising teachers must look beyond these circumstances and emphasize the paraeducators' potential as productive partners. This outcome was supported by French and Pickett (1997) who identified supervision as the first of five issues of concern regarding paraeducators in the classroom, another being role definition.

Using a 3 x 4 x 4 Factorial ANOVA to describe the interactions of job satisfaction with amount of work experience (years working as a paraeducator), age level of teaching assignment (student age groupings 3-5, 6-9, 10-13, and 14-21) and disability served (autism, intellectually impaired, physically impaired, and other health impaired), none were found to be significant. Findings indicated paraeducators were satisfied with their jobs regardless of personal factors.

In regard to work experience and job satisfaction, experienced paraeducators who have worked alongside supervising teachers were better able to address the needs of the students regardless of the number of years working as a paraeducator (Riggs, 2001; Chopra et al., 2004). This aligns with Vygotsky's (1934/86) principles of zone of proximal development (ZPD) and intersubjectivity. Collectively, ZPD and intersubjectivity can promote an environment within the classroom in which the teacher and paraeducator nurture a personal and professional relationship for the benefit of their students.

Using two sets of one-way ANOVAs, it was found regardless of the primary disability served, paraeducators and their assigned supervising teachers collaborated and paraeducators were supervised. Though the means of collaboration was slightly higher than that of supervision, it did not impact the ability to achieve statistical significance. One explanation of this finding was for this specific school setting; paraeducator roles may not have been clearly defined. This is supported in literature as Morgan et al. (1998) suggested defining roles and responsibilities of the paraeducator and teacher would lead to purposeful collaboration and team building. Vygotsky's (1934/86) principle of zone of proximal development provides a rationale for the collaboration and supervision of paraeducators, in that, collaboration occurs through the social interactions with a more able peer. French and Chopra (2006) also noted those teachers who displayed leadership took on a supervisory role and had defined roles for their paraeducators. The outcome of clearly defined roles was that paraeducators accepted supervision and collaborated with their assigned supervising teacher.

Implications of this Study for Education Practices at the Research Site

The results of this examination demonstrated that paraeducators at this specific setting, regardless of their grade level or disability served, collaborated and received supervision from the assigned supervising teacher. It may be useful for the school to explore the extent to which roles are defined for both supervising teachers and paraeducators. Additionally, paraeducators who received professional development were slightly more efficacious, though it was not a significant difference. Professional development provided by the school that is accessible and directed to the needs of both supervising teachers and paraeducators might produce more collaborative partnerships. Furthermore, paraeducators, though satisfied with their jobs, were not typically interested in pursuing a professional career. More opportunity for growth might be initiated by the school so future teachers could come from within the ranks of paraeducators. Lastly, based on findings in this study that paraeducators job satisfaction significantly predicted self-efficacy, it is suggested paraeducators speak-up about their wants and needs. Better communication among teachers and paraeducators may improve academic outcomes for students and collaboration among staff.

Recommendations for Future Research

In order to achieve statistical significance, it is recommended future studies utilize a larger population of subjects. Replication of this study using participants from other geographical areas and more diverse educational settings (such as inclusive schools) may provide a richer understanding of the supervising teacher-paraeducator dynamic and the relationship to the personal and organizational variables. Additionally, a paraeducator professional teaching efficacy subscale with valid and adequate psychometric properties is needed. Furthermore, future studies would benefit from adding focus groups to the research design in order to elicit a discussion of qualitative questions. After the data collection was complete, more in-depth and complex answers were revealed through casual conversations about the instrument. The current study offers a good starting point for further inquiry.

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Appendix A

Paraeducator Perceived Self-Efficacy Scale

Paraeducator Perceived Self-Efficacy Scale

Number _____

This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for paraeducators in their school activities. Please indicate your opinion about each of the statements below by circling the appropriate number. Your answers are confidential and will not be identified by name.

Efficacy and Collaboration

1. I can communicate to my teacher about issues in the classroom.
Not at all true Somewhat True Very True
1 2 3 4 5
2. I can collaborate with my teacher about lesson plans.
Not at all true Somewhat True Very True
1 2 3 4 5
3. I can collaborate with other paraeducators within the classroom.
Not at all true Somewhat True Very True
1 2 3 4 5
4. I can help other paraeducators with their teaching skills.
Not at all true Somewhat True Very True
1 2 3 4 5
5. Teachers can help me prepare for lessons.
Not at all true Somewhat True Very True
1 2 3 4 5

Efficacy and Job Satisfaction

6. Professional development impacts my job satisfaction.
Not at all true Somewhat True Very True
1 2 3 4 5
7. Collaboration with a teacher impacts my job satisfaction.
Not at all true Somewhat True Very True
1 2 3 4 5
8. I am satisfied with what I achieve at work.
Not at all true Somewhat True Very True
1 2 3 4 5
9. Work conditions impact my job satisfaction.
Not at all true Somewhat True Very True
1 2 3 4 5
10. Role definition impacts my job satisfaction.
Not at all true Somewhat True Very True
1 2 3 4 5
11. I feel good at work.
Not at all true Somewhat True Very True
1 2 3 4 5

Efficacy and Professional Development

12. I can deal with students with disabilities behaviorally because I have received professional development.

Not at all true	Somewhat True	Very True
1	2 3 4	5

13. I can use computers to further student learning because I have received professional development.

Not at all true	Somewhat True	Very True
1	2 3 4	5

14. I understand different student disabilities because I have received professional development.

Not at all true	Somewhat True	Very True
1	2 3 4	5

15. I am well prepared and can teach subjects that I am assigned to teach because I have received professional development.

Not at all true	Somewhat True	Very True
1	2 3 4	5

16. My professional development consists of learning one to one with a teacher.

Not at all true	Somewhat True	Very True
1	2 3 4	5

Efficacy and Supervision

17. I like to be supervised closely.

Not at all true	Somewhat True	Very True
1	2 3 4	5

18. I like to get frequent feedback on my performance.

Not at all true	Somewhat True	Very True
1	2 3 4	5

19. I like to get frequent feedback on how I prefer to be supervised.

Not at all true	Somewhat True	Very True
1	2 3 4	5

20. I like to discuss when activities do not go well.

Not at all true	Somewhat True	Very True
1	2 3 4	5

Efficacy and Role Definition

21. I like to be told how to do each task.

Not at all true	Somewhat True	Very True
1	2 3 4	5

22. I like to work with a lesson plan.

Not at all true	Somewhat True	Very True
1	2 3 4	5

23. I like having a written work schedule.

Not at all true	Somewhat True	Very True
1	2 3 4	5

24. I like to know exactly what is expected.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |

Personal Self-efficacy

25. If I try really hard, I can get through to even the most difficult student.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
26. Factors beyond my control have a greater influence on my students' achievement than I do.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
27. I am good at helping all the students in my classes make significant improvement.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
28. Some students are not going to make a lot of progress this year, no matter what I do.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
29. I am certain I am making a difference in the lives of my students.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
30. There is little I can do to ensure that all my students make significant progress this year.
- | | | | | |
|-----------------|---|---------------|---|-----------|
| Not at all true | | Somewhat True | | Very True |
| 1 | 2 | 3 | 4 | 5 |
31. I can deal with almost any learning problem.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |
32. There are certain learning issues that I cannot deal with.
- | | | | | |
|-----------------|---------------|---|---|-----------|
| Not at all true | Somewhat True | | | Very True |
| 1 | 2 | 3 | 4 | 5 |

Appendix B

Paraeducator Descriptive Questionnaire

Paraeducator Descriptive Questionnaire

Number _____

Please answer the questions below to the best of your ability. This information is confidential and your name will not appear anywhere on this form. This information will help provide a deeper understanding of the participants in the research study. You can use the back of this paper if you need more room to complete your answers.

1. State number of years you are working as a paraeducator.

2. State the student age group you are currently working with as a paraeducator.

3. State the primary student disability you are currently working with as a paraeducator. _____
4. State number of years you are working with this group of students.

5. State your primary job in the special education classroom.

6. How many professional development courses have you taken in the last year?

7. How often do you collaborate with your teacher throughout the day?
 - a. Not at all
 - b. Rarely
 - c. Often
 - d. Very often
8. How often does your teacher supervise the work you do with the students in class?
 - a. Not at all
 - b. Rarely
 - c. Often
 - d. Very often
9. Rate how much time you *actually* spend in each area, with **1** being the most time and **4** being the least amount of time.
 - a. Instruction _____
 - b. Behavior _____
 - c. Clerical _____
 - d. Hygiene _____

10. Rate how much time you *want* to spend in each area, with **1** being the most time and **4** being the least amount of time.
- a. Instruction _____
 - b. Behavior _____
 - c. Clerical _____
 - d. Hygiene _____
11. Rate which part of your job you like the most and which you like the least, with **1** being the most and **4** being the least.
- a. Instruction _____
 - b. Behavior _____
 - c. Clerical _____
 - d. Hygiene _____
12. Do you like your job? Circle Yes or No
13. What disability would you prefer to serve in the classroom?
14. What age level would you prefer to teach?
15. Describe how the professional development courses you have taken in the past made you a better paraeducator.
16. Describe how you collaborate with your teacher throughout the day.
17. Describe how your teacher supervises the work you do with the students in class or do you design your own lesson plans?

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Co-Teaching and Collaboration: Preservice Teachers' Knowledge, Attitudes, and Perceived Sense of Efficacy in Teaching Students with Disabilities

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Abstract

A quasi-experimental design and multiple regression analysis were used to examine responses of 153 preservice general and special education teachers as a function of (a) participation in an introductory special education course and (b) viewing a co-teaching video (Friend, 2005) versus observing an inclusive classroom. Based on responses to pre- and post-measures (30 test-bank items, Mastropieri & Scruggs, 2010; Preservice Inclusion Survey, Shippen, Crites, Houchins, Tamsey, & Simon, 2005; and Teacher's Sense of Efficacy Scale, Tschannen-Moran, & Woolfolk Hoy, 2001), results showed participants' knowledge, attitudes, and sense of efficacy increased significantly from pre-to post-course survey ($p < .001$). In addition, participants who viewed the co-teaching video scored significantly higher on self-efficacy ($p = .04$) than those who observed in vivo. However, there were no differences in knowledge or attitudes ($p > .05$) based on video versus observation. Finally, attitudes, but not knowledge, significantly predicted sense of efficacy ($R^2 = .21$). Implications for teacher preparation programs are discussed.

Co-Teaching and Collaboration: Preservice Teachers' Knowledge, Attitudes, and Perceived Sense of Efficacy in Teaching Students with Disabilities

Codified in the 1997 changes to the Individuals with Disabilities Education Act (IDEA, 1997) and reinforced with the reauthorization of IDEIA in 2004, access to (and progress towards) the general education curriculum for students with disabilities has become a mantra espoused by policy makers as well as general and special educators. Co-teaching generally is considered an effective means of addressing the achievement gap between students with and without disabilities (Friend & Bursuck, 2012) and there is growing consensus that teacher educators must prepare future teachers to collaborate and co-teach (Blanton, Pugach, & Florian, 2011). Research indicates that knowledge, attitudes, and self-efficacy are important factors that predispose teachers to work effectively with students with disabilities (Brownell & Pajares, 1999; Shippen, et al., 2005; Smith, Polloway, Patton, & Dowdy, 2012). However, research on teacher preparation practices that demonstrably influence these factors is limited (Carroll, Forlin, & Jobling, 2003; Freytag, 2001; Sindelar, Brownell & Billingsley, 2010); further, few published studies systematically address all three of these factors in the context of preparation for co-

teaching. This study was designed to investigate, via both experimental manipulation and correlational analyses, the knowledge, attitudes, and sense of efficacy toward co-teaching for both general and special preservice teachers as a function of: participating in an introductory special education course, participating in one of two variations of observing co-teaching, and demographics, including grade level/area of teaching, level of experience, confidence, and interaction.

Students with Disabilities Increasingly in General Education Classrooms

Historically, general and special education teachers provided different instructional services in separate educational settings. Given the accountability mandates and push for a more inclusive service delivery model in The No Child Left Behind Act (2001) and the reauthorization of the Individuals with Disabilities Education Improvement Act (IDEIA, 2004), teachers face enormous pressures. These pressures include ensuring that all students in their classrooms, including students with disabilities, meet the same academic standards, and achieve the same academic outcomes. Because of the increased expectation for students with disabilities to be included in general education classes and focus on access to the general education curriculum, many general education teachers play an increasingly direct role in educating students with disabilities. Additionally, the role of special educators has shifted to include more collaboration and co-teaching with general educators, and less stand-alone instruction of students with disabilities.

For more than a decade, researchers have reported on the growing trend toward educating students with disabilities in the general education setting and have underscored the need for every teacher to be prepared to work with all students (Kavale & Forness, 2000; Mastropieri & Scruggs, 2001). For inclusive policies to be implemented appropriately, general educators must be receptive to the principles and demands of inclusion, and committed to teaching even the most challenging students (Berry, 2010). All educators need to develop awareness of disabilities under IDEIA as well as appropriate instructional and behavioral strategies for each of these disability categories. A major consideration for teacher preparation programs must be how to prepare and motivate both general and special education preservice teachers to meet the educational needs of students with disabilities in increasingly inclusive settings (Swain, Nordness, & Leader-Janssen, 2012).

Collaboration among general and special educators is a necessity for successful inclusion (Smith et al., 2012). Given current legislative mandates, general and special educators can no longer work in isolation. However, there has been a lack of preparation in the areas of co-teaching and collaboration at the preservice level (Conderman, Morin, & Stephens, 2005; White & Mason, 2006). In 2001, the Study of Personnel Needs in Special Education (SPeNSE) showed that less than one third of early career general educators ($\leq$ six years) reported receiving preservice training in collaboration with special education teachers. Further, there is a lack of empirically validated training content in special education preparation (Sindelar et al., 2010). To address this gap, Sindelar and colleagues offered suggestions for future research that included identifying variables that foster high-quality instruction in teacher education programs and examining how entering knowledge and beliefs of preservice students influence their learning. Certainly, general and special education preservice teachers enter the teaching profession with differing knowledge, attitudes, and beliefs that may affect their behavior with students with disabilities, influencing both the classroom environment and student outcomes. Three variables that impact teacher

openness to working with students with disabilities are awareness (knowledge of disabilities, legal requirements, and the provision of effective instructional strategies), attitudes, and sense of efficacy (Brownell & Pajares, 1999; Shippen, et al., 2005; Smith, Polloway, Patton, & Dowdy, 2012).

Awareness

Smith et al. (2012) identified two key barriers that can hinder the successful implementation of inclusive educational practices: *knowledge* barriers and *attitudinal* barriers. Knowledge barriers refer to educators' limited knowledge about the needs of students with disabilities, related policy and legal guidelines, and effective instructional strategies. Cook (2002) found that lack of knowledge about disabilities could affect the tendency of teachers to accept students with disabilities, while limited knowledge can increase the fear and anxiety of working with individuals with disabilities (D'Alonzo, Giordano, & VanLeeuwen, 1997).

In 2005, Shippen and colleagues found that increased knowledge about inclusion gained by participation in an introductory university course on exceptionality changed the attitudes of preservice teachers by significantly decreasing their level of anxiety and hostility toward working with students with disabilities in a general education setting. To determine whether a gain in perceived knowledge changed preservice teachers' attitudes toward inclusion, Gartin, Rao, McGee, and Jordan (2001) surveyed 202 preservice general education teachers enrolled in a three-hour special education introductory course. Results indicated a significant gain in both knowledge of and attitudes about inclusion. Campbell, Gilmore, and Cuskelly (2003) implemented a pre- and post-survey of 274 preservice teachers enrolled in a course that combined formal instruction and field experiences in working with individuals with Down syndrome. At the end of the course, preservice teachers had acquired knowledge of Down syndrome and more positive attitudes toward inclusion. Results also demonstrated that raising awareness of one disability might lead to changes in attitudes towards disabilities in general with preservice teachers reporting greater ease when working with all individuals with disabilities.

There is a perception that special educators have knowledge that enables them to meet the unique needs of students with disabilities. In a study of preservice teachers regarding attitudes about including students with mild disabilities in general education classes (Garriott, Miller, & Snyder, 2003), one teacher noted, "...teachers with regular education classes don't have the knowledge or experience, so the students with learning disabilities should be in special education classes" (p. 51). Garriott and colleagues concluded that in order to alleviate fears and misconceptions preservice teachers have about their abilities to educate students with disabilities, preservice teachers should be provided the knowledge and skills needed to feel competent to accommodate a variety of learning needs. In general, evidence supports providing preservice teachers with knowledge about disabilities and effective instructional practices. However, an even greater challenge for teacher educators may be to affect positive attitudinal change.

Attitudes

A review of the literature confirms the importance of positive attitudes towards inclusive practices (Carroll et al., 2003; Evans, 2004; Garriott et al., 2003). Teachers' attitudes and beliefs can directly affect their behavior with students (Tait & Purdie, 2000; Weiner, 2003). Teachers who are successful in working with students with disabilities tend to believe that learning ability

can be improved and accept the slow, effortful nature of learning for some students (Cook, Tankersley, Cook, & Landrum, 2000; Weiner, 2003). Although very little research has focused on the relationship between personal epistemology and teaching (Kang, 2008), epistemological beliefs (i.e., beliefs about knowledge and learning) appear to mediate attitudes toward inclusion (Silverman, 2007). In a study of 71 preservice general and special educators, Silverman found that preservice educators who had positive attitudes toward inclusion held high-level epistemological beliefs (i.e., belief that all students can learn). In order to foster more positive attitudes toward inclusion, Silverman's findings suggest that preservice teachers' epistemological beliefs about the learning capabilities of students with disabilities should be further explored.

According to Scruggs and Mastropieri's (1996) meta-analytic review of 28 studies involving 10,000 teachers, teachers tend to be supportive of inclusion of students with mild disabilities (i.e., disabilities they understand and believe they know how to address) that require only minor academic assistance and who do not demand a significant amount of the teacher's attention. Teachers who favor inclusion believe that students with disabilities belong in the general education setting (Burke & Sutherland, 2004). On the other hand, teachers who do not favor inclusion tend to believe there are too many demands placed on the general education teacher (Zambelli & Bonni, 2004). These teachers also believe that students with disabilities are better off in a special education setting where they can receive more individualized attention and avoid having a negative impact on the learning of other students within the general education setting (Garriott et al. 2003).

Despite the evidence that attitudes are important, there is minimal research addressing how teacher education programs can promote positive attitudes of preservice teachers toward teaching individuals with disabilities (Carroll et al., 2003). Nonetheless, it has been indicated that teachers with positive attitudes about inclusive practices have confidence in their own abilities to teach students with disabilities (Brownell & Pajares, 1999; Buell, Hallam, Gamel-McCormick, & Scheer, 1999).

Ability or Sense of Efficacy

Consistent with Bandura's notion of self-efficacy (1995), teachers who believe they will be successful tend to set higher goals for themselves and their students, try harder to achieve their goals, and persevere through obstacles more than teachers who are doubtful of their abilities to succeed (Ross & Bruce, 2007). Teachers who possess a higher sense of efficacy generate stronger student achievement than teachers with lower teacher efficacy (Goddard, Hoy, & Woolfolk Hoy, 2004). In an often-cited study, Gibson and Dembo (1984) demonstrated that teachers with strong efficacious beliefs tend to view student failure as motivation to greater teacher effort instead of viewing the causes of students' failure beyond their control; thus, they are motivated to provide additional assistance to students experiencing learning difficulties.

According to Brownell and Pajares (1999), teacher efficacy beliefs significantly affect classroom effectiveness. In their study of 128 general education teachers, they found that teacher efficacy beliefs had a direct effect on their perceived success in teaching students with learning and behavior problems. A high sense of efficacy enables teachers to be less critical of students when they made mistakes (Ashton & Webb, 1986). Such teachers are sensitive to the learning differences of students with disabilities, use their skills to teach students, and believe that

learning will improve (Cook et al., 2000). Teachers with a sense of high efficacy have confidence in their capability to work with students, try new ideas, especially techniques that involve risks, are difficult, and require shared control with the students (Ross, 1998). These teachers stimulate student autonomy by using strategies that keep students on task, and attend more closely to the needs of students with lower abilities (Woolfolk, Rosoff, & Hoy, 1990).

In contrast to teachers with high efficacy beliefs, teachers with low efficacy beliefs give up more easily when students experience academic difficulty because quick results are not evident. These teachers possess a pessimistic view toward student motivation and have a rigid classroom environment (Woolfolk & Hoy, 1990). Teachers with low efficacy beliefs tend to concentrate on the efforts of higher achievers and give less attention to the needs of students with lower abilities and/or achievement, viewing students in this group as potential sources of disruption (Ashton, Webb & Doda, 1983). Freytag (2001) indicated that general education teachers have a lower sense of overall teacher efficacy compared with special educators in inclusive settings. However, Brownell and Pajares (1999) found that general education teachers exhibit confidence instructing and managing students with disabilities if they have taken coursework addressing the needs of students with disabilities, instructional adaptations, and behavior management techniques. Similarly, some researchers have found that limited preparation can heighten fear and reduce general educators' sense of teaching efficacy when faced with inclusive classrooms (Boling, 2007; Hastings & Oakford, 2003).

General education teachers "play a primary role in the education of students with disabilities...[but] often report feeling unprepared to undertake the role" (Brownell, Adams, Sindelar, Waldron, & Vanhover, 2006, p. 171). Sindelar and colleagues (2010) proposed a research agenda for teacher education training with special education focus, paying particular attention to preservice preparation. Consequently, teacher education programs must take steps that afford both general and special education preservice teachers the opportunity to develop knowledge, attitudes, and a high sense of efficacy for teaching students with disabilities. Though most general education preservice students may have limited exposure to special education professors, most preservice preparation programs require at least one course in special education.

The present study was designed to determine whether general and special education preservice teachers' knowledge regarding special education laws, disability characteristics, and best practices, attitudes toward inclusion and co-teaching, and sense of self-efficacy toward educating students with disabilities differed after (a) completing a one semester stand-alone introductory special education course, (b) participating in either a video observation (*Power of 2*, 2nd ed., Friend, 2005) or an in vivo observation of a co-taught class, and (c) as a function of participant's chosen grade level/area of teaching, level of experience, confidence and interaction. The study was undertaken in order to examine the relationships among these variables and to determine the extent to which knowledge and attitudes predict self-efficacy beliefs. Derived from the literature, the specific research questions were:

1. Do the awareness, attitudes, and abilities (sense of efficacy) of preservice educators toward educating students with disabilities improve after participating in a one-semester introductory special education course as measured by a pre-and post survey?

2. Do the awareness, attitudes, and abilities (sense of efficacy) of preservice educators toward educating students with disabilities differ as a function of participation in a one-hour co-teaching video versus in vivo one-hour observation of co-teaching as measured by a pre- and post-survey?
3. Do the awareness, attitudes, and abilities (sense of efficacy) toward educating students with disabilities differ as a function of teaching area (e.g. elementary, secondary), previous interaction with individuals with disabilities, self-reported confidence, and level of experience teaching students with disabilities after participating in a one-semester introductory special education course as measured by a pre- and post-survey.

Method

Participants

Consent was obtained and primary reliability data were collected from 177 participants, 19-53 years of age ($M = 23.12$), enrolled in eight, upper-level undergraduate, introductory special education courses at a large southeastern university during the spring semester of 2011. One of the programs had an intensified urban education focus. Because of the nature and dissimilar requirements of the urban focus course, participants ($n = 19$) were eliminated from the study leaving 158 participants. Of the 158 remaining participants, 153 completed online surveys before receiving instruction in the course and after the course was completed. The introductory special education course targeted for the study was required for all students at the University pursuing initial teaching licensure. Students typically enroll in this course during their third or fourth year of undergraduate matriculation prior to completing a yearlong teaching internship at the graduate level, though a few students each year enroll in the pre-internship courses as post baccalaureate students. The course is one of three “core” courses commonly taken by all education majors and minors. All of the participants were enrolled in courses leading to an education major or minor, prior to a teaching internship.

Of the participants, there were 32 males (20%), and 126 females (80%). The preservice teachers included 13 third year (8%) and 125 (80%) fourth year undergraduates. Twenty (12 %) students were at the graduate level. The preservice teachers were studying the following areas of teacher education: 7 (4 %) early childhood, 67 (42%) primary/elementary, 59 (37%) secondary, 13 (8%) special education, and 7 (4%) other (includes middle grades).

Instrumentation

Participants completed both pre- and post-course online surveys, which consisted of four components: (a) an Attitudes Questionnaire (AQ developed by Authors, 2011), (b) a modified version of the Preservice Inclusion Survey (PSIS developed by Shippen, Crites, Houchins, Tamsey, & Simon, 2005), (c) the Teachers’ Sense of Efficacy Survey (TSES sometimes referred to as the *Ohio State Teacher Efficacy Scale* developed by Tschannen-Moran, & Woolfolk Hoy, 2001), and (d) 30 multiple-choice questions taken from the text test bank (Mastropieri & Scruggs, 2010, *The inclusive classroom: Strategies for effective differentiated instruction*, 4th ed.). Demographic questions were included in the pre-course online survey only.

Two instruments were used to assess preservice teachers’ attitudes. The Attitudes Questionnaire (AQ) used an 8-item Likert-type scale designed to measure attitudes about fairness and meeting

the needs of students with disabilities. Internal consistency reliability of the AQ as determined by alpha coefficient was strong ($r = .83$). For this study, the PSIS was adapted to emphasize collaboration and co-teaching within the one paragraph scenario described as serving students with disabilities in an inclusive classroom, and included the same disabilities as the original form of the PSIS (i.e., learning disabilities, hearing impairments, behavior disorders, and intellectual disabilities). Participants responded to a list of 17 adjectives using a 5-point Likert-type scale (i.e., negative, somewhat negative, neutral, somewhat positive, and positive) to indicate their feelings about collaboration and co-teaching. Positively- and negatively-worded items were counterbalanced. Internal consistency reliability of the PSIS calculated for this sample ($r = .92$) was strong. The Teacher Sense of Efficacy Scale (TSES) measures beliefs in the capability to make a difference in student learning and reach students who are difficult or unmotivated. Internal consistency reliability of the TSES as determined for this sample ($r = .92$) was strong.

To assess preservice teachers' special education knowledge, 30 multiple-choice questions, with four choices, were selected from the course textbook test bank (Mastropieri & Scruggs, 2010). Instructors with experience teaching the introductory special education course were asked to review the test bank items from key chapters and select questions perceived as representative of the most important chapter content. The pool of questions was refined further by the course coordinator and first author using criteria for multiple choice test items (Payne, 2002). Refinement of the question pool resulted in three ten-question sets to assess preservice teachers' knowledge in three distinct areas: legal issues and policies, disabilities characteristics, and teaching strategies.

Demographic information was collected during the pre-course online survey and addressed participants' age, gender, educational status, grade level of expected certification, amount and type of interactions with a person with a disability, amount of training and/or educating students with disabilities, knowledge of special education legislation, level of experience, and confidence in teaching students with disabilities. Internal consistency for the 30-item Knowledge scale was .64 for this sample.

Procedures

Students were assigned to one of two conditions: (a) viewing a one-hour, co-teaching video or (b) observing a one-hour in vivo co-taught classroom through random course assignment. Four instructors taught students in the seven participating sections of the introductory special education course. All instructors use common syllabi (e.g., similar assignments and requirements) and the same course textbook (Mastropieri & Scruggs, 2010). One instructor taught four of the seven sections; therefore, students in two of her sections were assigned to watch the co-teaching video; students in the other two sections were assigned to observe co-teaching in vivo with day and night sections balanced between the condition variables.

Following instructor consent, the first author visited the first class meeting of each course section to introduce the study, acquire consent from participants, and administer the pre-course online survey. Course instructors introduced the class-wide experimental condition (observation or co-teaching video) and provided explanation of the assignment requirements as well as course-wide due dates. In all courses, the observation or video assignment was due approximately two weeks prior to the end of the course.

Based on class assignment, participants in the in vivo observation were supplied with a list of 53 names of effective co-teachers, recommended by several local education agencies (LEA), central office staff, and co-teacher coordinators. Sixty-three participants were matched with one of the names of the effective co-teachers and observed the co-taught classroom for one hour.

Participants contacted the recommended co-teachers and coordinated observations on an individual basis. Seventeen participants did not observe a teacher from the approved co-teaching list. However, a review of the written observation summaries submitted by the participants indicated they had similar experiences. Therefore, for analyses, they were grouped with the participants who did observe a teacher from the approved list ($n = 80$). Seventy-two participants watched the one-hour co-teaching *Power of 2* video (Friend, 2005). One participant did not participate in either assignment (i.e., condition) and was eliminated from the analyses on effects of observation condition. The video offered a comprehensive overview of co-teaching as part of the foundation of an inclusive, collaborative school, and was designed to assist professionals in maximizing student outcomes through classroom partnerships. Video sessions were arranged in the University's main library viewing room. Five different session times were available and students attended the session of their choice.

During the final week of the course (week 18), the first author attended each class to provide instructions for completing the post-course survey. After all surveys were completed, data were downloaded from the online database and analyzed using Statistical Package for the Social Sciences (SPSS) version 18 software.

Results

Characteristics of the distribution of scores on the various dependent variables were evaluated by examining kurtosis and skewness. All scales, with one exception, were generally normally distributed with skewness ranging from $-.76$ to $.26$ and kurtosis ranging from $-.56$ to $+1.02$. To determine if the knowledge, attitudes, and perceived abilities (sense of efficacy) of preservice educators toward educating students with disabilities improved after participating in a one-semester introductory special education course, paired t -tests for equality of means were used to analyze pre- and post-course online survey data. Analyses revealed significant differences between the mean scores of the participants on all dependent variables in the pre- and post-course survey with alpha set at $.05$ (see Table 1). Preservice teachers' knowledge (30 text test bank items) of legal issues, disability characteristics, and instructional strategies significantly increased by the end of the introductory course, $t(152) = -14.28$, $p < .001$. Preservice teachers' attitudes toward educating students with disabilities (8 item AQ) significantly improved by the end of the course, $t(152) = -6.11$, $p < .001$. Preservice teachers' attitudes toward collaboration and co-teaching (17-item PSIS) significantly improved by the end of the course, $t(152) = -10.26$, $p < .001$. Finally, preservice teachers' sense of self-efficacy for working with students with disabilities (12-item TSES) significantly improved by the end of the course, $t(152) = -15.44$, $p < .001$.

Table 1

Knowledge, Attitudes and Sense of Efficacy Means and Standard Deviations of Preservice Teachers' Pre- and Post-Survey Responses

Variable	Pre-survey	Post-survey
	M (SD)	M (SD)
Awareness/Knowledge	15.86 (3.46)	20.21 (3.16)
Attitude Questionnaire (AQ)	4.62 (0.42)	4.82 (0.31)
Preservice Inclusion Survey (PSIS)	3.46 (0.69)	3.99 (0.60)
Teacher Sense of Efficacy Scale (TSES)	6.80 (0.98)	8.08 (0.70)

Note. N = 153.

To determine if any significant differences exist between the mean scores for participants who watched the one-hour co-teaching video and the mean score of those who participated in a one-hour in vivo observation of a co-taught classroom a series of repeated-measures analyses of variance (ANOVA, alpha set at .05) were used to evaluate differences in knowledge, attitudes (AQ and PSIS), and teachers' sense of efficacy (TSES). Means and standard deviations on the Knowledge, AQ, PSIS, and TSES of the two groups are presented in Table 2.

Results of a repeated-measures analysis of variance (ANOVA) indicated no significant differences in participants' knowledge scores from pre- to post-course online surveys as a function of the observation condition, $F(1, 150) = .101$, $p = .751$. Similarly, results of two ANOVAs indicated no significant differences in participant attitudes (AQ) scores from pre- to post as a function of the observation condition, $F(1, 150) = .224$, $p = .636$ and no significant differences in attitudes as measured by the PSIS, based on video versus in vivo observation, $F(1, 150) = 0.00$, $p = .988$. However, PSIS results indicated a significant difference for the main effect of condition, $F(1, 150) = 6.89$, $p = .010$. Both at pre- and post-course survey, participants who watched the video scored significantly higher on the PSIS, but both observation groups made similar gains. Results of a repeated-measures ANOVA for the TSES indicated significant differences in participant scores from the pre- and post-course surveys as a function of the observation condition, $F(1, 150) = .677$, $p = .042$, $\eta_p^2 = .027$. In sum, results indicate similar gains in knowledge and attitudes for participants in both observation groups. However, participants in the video observation group made greater gains in teacher efficacy (TSES) than those in the in vivo condition.

Table 2
Knowledge, Attitudes, and Sense of Efficacy Pre-and Post-Survey Means Based on Condition

Variable	<u>Video</u>		<u>In Vivo</u>	
	<u>Pre-Survey</u>	<u>Post-Survey</u>	<u>Pre-Survey</u>	<u>Post-Survey</u>
	M (SD)	M (SD)	M (SD)	M (SD)
Knowledge	16.00 (3.48)	20.45(3.65)	15.77 (3.48)	20.03 (2.65)
Attitudes Questionnaire	4.63 (.43)	4.84 (.32)	4.62 (.40)	4.80 (.31)
Preservice Inclusion Survey	3.59 (.63)	4.12 (.53)	3.36 (.72)	3.89 (.61)
Teacher's Sense of Efficacy	6.73 (.96)	8.12 (.73)	6.99 (.98)	8.05 (.68)

Note: N = 152.

To determine if levels of knowledge, attitudes, and sense of efficacy differed at the end of the course based on level of teaching, mean difference comparisons were conducted for 139 participants: 67 primary/elementary preservice teachers, 59 secondary preservice teachers and 13 special education preservice teachers; participants who selected early childhood (n = 7) or other (n = 7) as their level of teaching were not included in the analysis due to small sample size. Means and standard deviations for all three groups on the dependent variables from the pre-and post-course survey are presented in Table 3.

A one-way ANOVA yielded no significant differences in knowledge post-survey scores across the three groups, $F(2, 136) = 1.25$, $p = .289$; similarly, no differences were found in attitudes toward collaboration and co-teaching as measured by PSIS post-survey scores, $F(2, 136) = 1.93$, $p = .148$. Because assumptions of normality were violated for the AQ post-survey, a Kruskal-Wallis analysis of variance was used to examine differences based on level of teaching and results indicated a significant difference, $X^2(2) = 9.183$, $p = .010$. Results of a Mann Whitney U indicated a significant difference between the median score for the primary/elementary group (5.00) and the median score of the secondary group (4.87), $p = .003$. Significant differences also were found on perceived abilities (sense of efficacy) as measured by the TSES post-survey, $F(2, 136) = 6.46$, $p = .002$, $\eta_p^2 = .087$. Tukey's post-hoc comparisons of the three groups indicated that the primary/elementary group ($M = 8.28$) scored significantly higher on the post-survey TSES than did the secondary group ($M = 7.84$), $p = .001$.

Table 3

Knowledge, Attitudes, and Sense of Efficacy Pre- and Post-survey Means and Standard Deviations of Primary and Elementary, Secondary, and Special Education Preservice Teachers

Teaching Area	Pre-survey		Post-survey	
	M	(SD)	M	(SD)
Knowledge				
Primary/Elementary	15.44	(3.43)	20.08	(3.06)
Secondary	16.20	(3.12)	20.35	(3.08)
Special Education	16.92	(4.90)	21.61	(4.11)
Total	15.90	(3.47)	20.34	(3.18)
Attitude Questionnaire				
Primary/Elementary	4.73	(.28)	4.88	(.20)
Secondary	4.41	(.52)	4.70	(.42)
Special Education	4.82	(.22)	4.87	(.19)
Total	4.60	(.43)	4.81	(.33)
Preservice Inclusion Survey				
Primary/Elementary	3.39	(.65)	4.05	(.53)
Secondary	3.35	(.70)	3.84	(.68)
Special Education	3.97	(.67)	4.07	(.54)
Total	3.43	(.69)	3.96	(.61)
Teachers' Sense of Efficacy				
Primary/Elementary	6.78	(1.00)	8.28	(.60)
Secondary	6.77	(.79)	7.84	(.75)
Special Education	6.98	(1.39)	8.09	(.71)
Total	6.80	(.96)	8.07	(.70)

Note: primary/elementary ($n = 67$), secondary ($n = 59$), special education ($n = 13$). Not included were early childhood ($n = 7$) and other ($n = 7$).

Demographic information as well as means and standard deviations of preservice teachers' level of experience, confidence, and amount of interaction with individuals with disabilities are presented in Table 4. Correlational analyses depicting the relations between demographic variables and dependent variables as measured by post-survey instruments are presented in Table 5. Correlations ranged from $-.04$ to $+1.00$; 7 of the 18 relations were significant at .05 or greater.

The relation between the two attitude post-measures (i.e., AQ and PSIS) was positive and significant, medium in strength, ($r = .56$, $p = .000$). Though both measure attitudes, the AQ questionnaire targeted the concept of "fairness" for both general and special education students, while the PSIS targeted the emotions of preservice teachers about co-teaching and collaboration. In addition, the relationship between both the AQ and PSIS are positive and medium with the TSES ($r = .41$, $p = .000$, and $r = .50$, $p = .000$ respectively), indicating that positive attitudes are related to sense of efficacy. Knowledge was not found to be significantly correlated with the other dependent measures ($p > .05$).

Results indicated that the TSES post-survey score and self-reported amount of interaction with individuals with disabilities were significantly positively correlated ($r = .16$, $p = .04$). As the amount of interaction with individuals with disabilities increased, there was a slight tendency for sense of efficacy to increase. Similarly, there was a significant small but positive relation between attitudes as measured by AQ and self-reported level of confidence ($r = .19$, $p = .02$) and a small but positive relation between the PSIS and self-reported level of confidence ($r = .22$, $p = .007$). Thus, as attitudes became more positive, so did confidence in teaching individuals with disabilities. Similarly, the relation between attitudes as measured by the PSIS and self-reported level of experience teaching a student with a disability was found to be small but significant ($r = .18$, $p = .02$), indicating that those who have more experience tend to have more positive attitudes toward including students with disabilities.

Table 4

Demographics (Level of Experience, Confidence and Interaction) of Participating Preservice Teachers Enrolled in a One-Semester Stand-Alone Course

Demographics	<i>n</i>	%	<i>M</i>	<i>SD</i>
Level of experience				
None	81	51		
Little (< 1 week)	35	22		
Some (2-4 weeks)	22	14		
Much (5 weeks >)	20	13		
Total	158		1.88	1.07
Level of Confidence				
Very Low	24	15		
Low	68	43		
Average	47	30		
High	19	12		
Total	158		2.39	.887
Significant/Considerable Interactions				
None	16	10		
Little	60	38		
Some	60	38		
Much	22	14		
Total	158		2.56	.856

Note: $N = 158$

Table 5

Correlation Matrix of Knowledge, Attitudes, Sense of Efficacy, and Demographics (Interactions, Confidence and Level of Experience in Working with Individuals with Disabilities) Based on Post-Survey Results

	Awareness2	Attitude Questionnaire2	Preservice Inclusion Survey2	Teacher Sense of Efficacy Scale2	I have had significant/ considerable interactions with a person with a disability	My level of confidence in teaching students with disabilities	My level of experience teaching a student with a disability
Awareness2	1.00	.14	.11	-.04	.04	.08	.04
Attitude Questionnaire2		1.00	.56**	.41**	.08	.19*	.13
Preservice Inclusion Survey2			1.00	.50**	.13	.22**	.18*
Teacher Sense of Efficacy Scale2				1.00	.16*	.12	.10
I have had significant/considerable interactions with a person with a disability					1.00	.26**	.41**
My level of confidence in teaching students with disabilities						1.00	.23**

My level of experience teaching a student with a disability	1.00
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** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2 tailed).

N =153

Results of a stepwise multiple regression analysis indicated the relative predictive power of knowledge and the two measures of attitudes to predict sense of efficacy. Results indicated only one measure contributed unique variance; results of the PSIS explained 21% of the variance on the TSES ($R^2 = .21$, $df(1, 125)$, $p < .05$). Knowledge and attitudes as measured by the AQ did not add significantly to the prediction above the effects of PSIS.

Discussion

Findings of the present study support the notion that participation in a stand-alone, introductory-level special education course can positively influence the knowledge, attitudes, and perceived abilities (sense of efficacy) of preservice teachers (Shippen et al., 2005; Gartin et al., 2001). Unlike most previous studies on preservice preparation for collaborative co-teaching, this study included an experiment, to test effects of watching a video versus in-vivo observation of co-teaching; with results indicating that exposure to the co-teaching video resulted in higher self-efficacy, but not an increase in knowledge or attitudes of preservice teachers. These findings modestly extend the knowledge base about what variables constitute high-quality teacher preparation. Results indicated that simply providing preservice teachers vicarious experiences in collaborating to provide instruction to individuals with disabilities can help preservice teachers build a stronger sense of efficacy toward educating students with disabilities.

Mean difference analyses indicated that knowledge, attitudes, and perceived abilities (sense of efficacy) of preservice educators toward educating students with disabilities differed as a function of teaching level and area. Post-survey responses to items assessing attitudes about fairness and access (AQ) and teacher efficacy (TSES) were significantly higher for preservice teachers preparing to teach at the primary/elementary level than those preservice teachers preparing to teach at the secondary level. Similarly, McHatton and McCray (2007) found differences in perceptions between elementary and secondary preservice teachers after completing a one-semester course. Elementary majors had more favorable perceptions toward inclusion overall, even though both groups were less open to the inclusion of students with particular disabilities (i.e., students with behaviors disorders, intellectual disabilities, and multiple disabilities). In addition, Cook (2002) found that secondary preservice teachers, unlike elementary preservice teachers, were more likely to *strongly disagree* or *disagree* with statements that addressed the benefits of inclusion and the ability to educate students with disabilities within the general education setting. Further attention needs to be devoted in introductory special education courses to provide strategies for addressing the needs of older students with disabilities in inclusive settings.

Surprisingly, in contrast to previous research (Forlin & Chambers, 2011), the 30-item measure of knowledge (legal issues, disability characteristics, and teaching strategies) was not significantly related to any of the other attitude, efficacy, or demographic variables. Interestingly, there was a small positive correlation between self-reported amount of interactions with individuals with disabilities and perceived teacher self-efficacy, but not with other variables. As the amount of interaction with individuals with disabilities increased, the sense of efficacy tended to increase. Similar to previous research (Shippen et al., 2005; Stamopoulous, 2006), there was a small positive correlation between reported level of confidence and attitudes, as measured by the AQ

and PSIS. Finally, there was a small positive correlation between self-reported level of experience teaching a student with a disability and attitudes as measured by the PSIS. In general, the small or insignificant relationships between the demographic variables and the post-survey measures suggest that entering experiences may have a limited impact on knowledge, attitudes, and self-efficacy for preservice teachers who participate in a well-designed, comprehensive course on educating students with disabilities.

Importantly, results of a stepwise multiple regression analysis indicated that emotion-based attitudes as measured by the modified PSIS significantly predicted teachers' sense of self-efficacy toward co-teaching, but knowledge of legal issues, disabilities, and teaching strategies did not add to the prediction. These findings have some parallels to previous studies (e.g., Forlin, Jobling, & Carroll, 2001; Stamopoulos, 2006) which showed that interacting with individuals with disabilities contributed to positive attitudes toward individuals with disabilities, a deeper understanding of diversity, and greater confidence in developing inclusive classrooms.

Limitations

Because data were collected from one teacher preparation program, the nature of the sample in this study limits the generalizability. More importantly, for the pre-post only comparisons, it could not be determined if the results were due to class participation since a control group was not assigned. Furthermore, it cannot be determined what the preservice teachers were doing when they were not in class. Additionally, only 13 participants were seeking special education licensure, limiting findings relevant for special educators in preparation. Despite the fact that most participants in the observation condition observed a class taught by an approved co-teacher, there is no guarantee that the class observed was effectively co-taught during the one-hour observation period.

A variety of survey instruments were used in this study. Although reliability coefficients for all instruments were acceptable, the 8-item AQ was created for this study and has no previous or external validity evidence. The 30 text-test bank questions bear further analysis, given the relatively low internal consistency reliability and correlations between the knowledge items and other variables in the study. Additionally, a significant difference was found on the knowledge portion of the post-survey for participants enrolled in the first author's course section, presumably because the first author was more aware of the specific nature of the knowledge items than the other instructors who participated. Because students were heterogeneously enrolled in the various class sections, this difference presumably would not affect results of analyses with the possible exception of those based on experimental condition.

Future Research

The present study is one of the few studies to include measures of knowledge, attitudes, and sense of efficacy for collaboration and co-teaching to teach students with disabilities and to include both general and special education preservice teachers. A logical next step would be to replicate and extend these findings with a refined knowledge scale and a larger sample of special education preservice teachers. With additional research, the literature suggests connections that may lead to a model for predicting and impacting teacher efficacy, beginning with preservice experiences. Knowledge arguably leads to more positive attitudes (Campbell et. al., 2003, Forlin, et al., 2001; Garriott et. al., 2003), which in turn, contributes to increased self-efficacy. In the

current study, attitudes modestly predicted teacher efficacy, but a more robust measure of knowledge is needed to gain better understanding of these relations.

Additional research is needed to determine the most important content (e.g., knowledge of disabilities, legal and policy issues, teaching methods, and strategies) and the most effective ways to present this content to preservice general and special educators. Researchers should determine what knowledge is most essential for positively impacting attitudes and ultimately building self-efficacy toward the end of producing successful, collaborative educators. Future research should be conducted to examine knowledge, attitudes, and sense of efficacy toward students with other types of disabilities, such as autism, since the PSIS only addressed a scenario that involved individuals with learning disabilities, hearing impairments, behavior disorders, and intellectual disabilities. Furthermore, limited research has focused on both secondary general education teachers and secondary special educators despite the role each plays in educating and influencing students with disabilities. Because of current policy and educational reforms requiring increased graduation rates, school and teacher accountability, and state-mandated assessments, future research is critical in helping determine how to best prepare teachers at the secondary level. Finally, researchers should determine how gains in knowledge, attitudes, and self-efficacy could be maintained and enhanced into internship or student teaching experiences, and teachers' practices.

Conclusion

Results of the present study revealed an increase in the knowledge, attitudes, and sense of efficacy of preservice teachers following participation in a one-semester, stand-alone, introductory special education course. Similar gains were made regardless of exposure to collaborative co-teaching (the observation of a co-teaching video and authentic, in-vivo observation) but self-efficacy was slightly stronger for those who watched the video. Elementary preservice teachers showed more positive attitudes (i.e., views of fairness and emotional receptivity) than their secondary preservice counterparts. Prior experiences with individuals with disabilities had only a small impact on attitudes and sense of self-efficacy by the end of the course. Finally, only emotion-based attitudes significantly predicted sense of self-efficacy.

These findings have several implications in teacher education. Results support the importance of offering courses in special education to all teacher candidates. Previous exposure to individuals with disabilities has a relatively small impact on end of course knowledge, attitudes, and sense of efficacy, implying that teacher education can have a strong influence despite previous exposure. Results also support the importance of attitudes (i.e., being emotionally receptive to collaborative co-teaching, which was the only significant predictor of self-efficacy); teacher educators need to address (implicitly and explicitly) preservice teachers' attitudes. Based on results of this study, a well-produced video could be as effective as or better than in vivo experiences in preparing preservice teachers on the topic of collaboration while requiring limited resources (i.e., time, travel). Interestingly, in this study, knowledge did not predict self-efficacy. In summary, this study provides insights into factors that are key in preparing future educators to work with students with disabilities and it lays the groundwork for future, systematic exploration of these key factors with the ultimate goal of obtaining a clear and applicable understanding of the roles

of knowledge, attitudes, and self-efficacy in preparation of preservice teachers to work effectively with students with disabilities.

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Creating a Common Table: Using Peer Mediated Intervention to Promote Social Communication Skills with At-Risk and Autism Spectrum Disorder Populations

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Abstract

Identifying an intervention that is effective for multiple populations can be a challenge. Given the potential range of students in an inclusive setting, the need to identify common strategies that promote skill development for multiple populations is essential. Professionals need to identify those strategies that promote skill development that meet the needs of the individual student as well as the other students in the classroom setting. An investigation was conducted using a three-part peer mediated intervention for two distinct populations. The purpose of this investigation was to examine how consistent strategies impacted diverse participant populations in the area of social communication. Results are discussed per participant population and how targeted common strategies can promote skill development of diverse populations, including those identified as being at risk or with a diagnosed disability.

Creating a Common Table: Using Peer Mediated Intervention to Promote Social Communication Skills with At-Risk and Autism Spectrum Disorder Populations

The process of social engagement involves a range of complex skills that are honed over time. Social interactions are essential for young children as they evolve into socially competent individuals. Minimal opportunities or missed opportunities can negatively impact social development and thus incur long-term deficits.

For children with diagnosed disabilities or developmental delays, the need for high quality, frequent social opportunities impact not only the social domain but all other domains, specifically communication and cognition (Diamond, Hong & Baroody, 2008). Social interactions with a range of peers provide a child with delays or disabilities opportunities to practice and perfect social skills in novel social situations. In addition, adult mediation bridges the awkward moments that impede engagement. According to the Division of Early Childhood recommended practices to promote social skills include a structured environment with a focus on socialization with peer models and promoting peer proximity, which are supported by responsive and imitative adults that will expand children's play and behavior (Wolery, 2005).

There are numerous interventions that promote social skill development and social competence. Interventions specific to populations with delays or diagnosed disabilities can be for an individual child or a large group (Choi & Kim, 2003; Gagon, Nagle, & Nickerson, 2007; Buggey, Hoomes, Sherberger & Williams, 2011). Identifying the most appropriate intervention

is based on attributes such as: age of child, type of disability or delay, adult support, peer support, environmental considerations, and specific skills sets that need to be developed (Raver, 2008).

Practitioners often use standards provided by professional accrediting agencies to guide their practice and professional development. Implementation of these standards, are due in part, to understanding emerging trends that affect young children and their families. Factors that reduce the use of the standards include lack of collaboration between families, other adults or other teachers, or limited understanding of the target skill, content area or developmental domain (Cochran et al, 2012).

Standards used by practitioners are expected to be evidence-based practices (Cooper, Heron, & Heward, 2007). Given shifts in policy it can be challenging for practitioners to identify and implement empirically validated interventions (McLean, Snyder, Smith & Sandall,, 2002). In general, standards that are evidence-based practices should be assessed using quality indicators. These indicators vary by research design. For example, single subject design quality indicators include a description of the participants, the setting, the dependent and independent variables, and validity considerations (i.e. external, internal and social) (Horner et al, 2005).

A vast number of studies can focus on a skill or developmental domain. Social skill development is one example of a topic with considerable investigation (Guralnick, 2001). It can be a challenge, when dealing with a topic that has been studied extensively, for a practitioner to identify those studies where there is confidence that it adheres to empirically based design conditions. Such studies allow the practitioner to more easily interpret the data and facilitate designing an intervention that will be most effective for the individual student and can be generalized to multiple populations.

If a practitioner is viewed as a consumer and an intervention is viewed as a product, then a consumer would ideally want to select the best product to use. Product or intervention selection depends on the “best fit” of intervention to student. That best fit is based on several criteria. Three basic criteria are: 1) focus on the target population, 2) using methods that have been empirically replicated, and 3) promotion and development of the targeted skill that can include adult support. As the consumer considers these components, they make a selection that has proven and efficient techniques and can assist them in predicting the level of difficulty to implement the intervention and the chances of success (Cooper, Heron, & Heward, 2007).

The practitioner can determine the needs of a single student or multiple students in a classroom setting. For young children at-risk for delays, aspects that address promotion of skills across developmental domains are valued; however, an intervention that addresses and promotes all developmental domains is likely beyond the scope of a single study. A practitioner would then consider what aspects of a developmental domain are in need of intervention as well as the impact that early intervention will have on later development. Focusing on a single type of delay or disorder narrows the scope for the practitioner. The selection of a behavior is likely to produce a positive effect in the natural environment of the student (Allyon & Azrin, 1968).

The first criterion of intervention selection is identifying interventions that focus on the target population. For example, an essential element to determine an effective intervention for a child with Autism is whether the intervention addresses one or more of the key dimensions of autism that are social communication and social interactions, restricted or repetitive actions with manifestation of those dimensions at an early age (American Psychological Association, Diagnostic, 2013). Given autism is a spectrum disorder; the range of functioning per aspect can be specific to the individual. Determining interventions that can be adapted to accommodate a range of functioning per dimension is beneficial for the teacher and their students.

A second criterion is replication of the intervention. An intervention that is reliable and useful based on both findings and limitations of an intervention provides the practitioner with the knowledge that the selection of that intervention will provide them with tested findings that can be used in their practice (Johnston & Pennypacker, 1980; Cooper, Heron, & Heward, 2007).

Interventions that have an extensive replication history specific to young children at-risk for delays include assessment to determine growth, focus on skills that span across multiple developmental domains or curricular areas and promote inclusive practices (Foster, 2010). When criteria for effective interventions are considered, there are opportunities to incorporate play as a context to promote developmental domains and address the child's need for participation in a variety of settings (McWilliam, 2005; Wolery & Hemmeter, 2011).

Intervention studies with multiple replications for children with ASD focus on parental involvement, incorporate behavioral strategies and are multicomponent interventions with an extended duration. (Levy, Kim, & Olive, 2006). Like populations at risk for delays, ongoing assessment of the target skills of the intervention is important as well as the extent that intervention strategies can be implemented in educational and community settings.

A third criterion is adult supported promotion of student learning and development. For young children, adult interaction that is child focused considers the natural environment, adaptation to meet the child's needs, and a method for data collection to make data-based decisions (Wolery, 2005). The combination of these three elements may take time and training, however an effective intervention considers these elements and incorporates them to increase effective implementation.

For young children, the adult role can be family members, teachers or other professionals. Their role is promoting skill development utilizing collaboration and promoting skill development in multiple settings. The key to successful promotion of skills is providing as much adult support as needed to promote the targeted skills. No matter what the intervention, it should be individualized and flexible with a support system that can provide information and guidance (Trivette & Dunst, 2005).

Like populations of young children at risk for delays, when working with ASD populations, the importance of collaboration cannot be understated (Morrier, Hess, & Heflin, 2011). Evidence based strategies specific to the needs of individuals with autism that are implemented with high fidelity maximize the probability of good outcomes (Strain, Schwartz, & Barton, 2011). For

ASD populations, an understanding of the unique social, language and academic needs are necessary competencies to target for intervention.

The interventions implemented for the investigations discussed considered these three criteria in design and implementation. In the first study, participants were at risk for developmental delays. In the second study, participants were students with a diagnosis of autism. Given the large number of students at risk for developmental delays (Boyle et al, 2011) and the need to promote social communication for students with autism, both studies examined the effectiveness of an intervention to promote social communication skills that would generalize to the classroom. The intervention components took into consideration the consequences of limited social communication skills and how those limitations negatively impact peer relationships. By expanding, rather than limiting social communication skills to turn taking and scripted interactions (Stanton-Chapman & Snell, 2011; Jamison, Forston, & Stanton-Chapman, 2012), the intervention for these investigations considered a range of skills that more fully represent the skills set associated with social communication.

Beyond intervention selection, there is the reflective process of practitioner skill and implementation. In terms of social competence, teaching and promoting social skills may appear intuitive; however teaching this domain requires both understanding and implementation of skills across multiple domains including social competence and communication. A practitioner may be an effective and social competent individual but ineffective in teaching skills associated with this domain. The lack of instructional proficiency may result in a practitioner being unprepared or underprepared to promote skill development (Uysal & Ergenekon, 2010).

For these investigations, specific attributes of social communication skill development were analyzed to compare the effects of one intervention on social skill and social competence of the participants from two distinct populations. The following research questions were examined: Was the intervention effective in promoting aspects of social communication (i.e. the use of comments and requests) for both young children at risk for delays (Study 1) and children with autism (Study 2)? Was the intervention effective in promoting language diversity and complexity for both young children at risk for delays (Study 1) and children with autism (Study 2)? Considerations were also examined in determining the best fit of interventions. The criteria were adherence to recommended practices for professionals that work with young children at risk for delays or exceptional populations and the efficiency of implementation.

Methods

The participant characteristics, interventionist characteristics, and settings and materials are provided separately for Study 1 and Study 2. As Study 2 is a replication of Study 1, there is one description of the experimental design and conditions and data collection procedures for both studies (Craig-Unkefer & Kaiser, 2002;2003; Loncola & Craig-Unkefer, 2005;2010).

Study 1

Participants

Six preschoolers between the ages of 3 years, 1 month and 3 years, 11 months participated in the study. The selected criteria were: (a) they demonstrated language skills at least 1.3 standard

deviations (SDs) below the level expected for their chronological age (CA) as measured by the Preschool Language Scale (PLS-3; Zimmerman, Steiner, & Pond, 1992); (b) they demonstrated fewer social skills (e.g., making friends, following directions, initiating conversations with peers) and/or more problem behaviors (e.g. have temper tantrums, appears lonely, shows anxiety, is sad or depressed) than typical 3-year-olds according to the Teacher Report of the Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990). Participants were excluded from participation if they had significant sensory impairments or a previous diagnosis of intellectual disabilities, behavior disorders, or pervasive developmental disorder.

All six participants attended a Head Start center in an urban area in a large metropolitan city. The participants were in three different classrooms for 3- and 4-year-olds. The characteristics of the six participants are described in Table 1. The participants were paired in mixed gender dyads as indicated in Table 1.

According to the results of the PLS-3 (Zimmerman, Steiner, & Pond, 1992), five of the six participant's auditory comprehension, expressive communication, and standard scores were between 1.5 and 1 standard deviation below the mean score and they would be considered as having a mild language disorder with one participant (Child A03) having the characteristics of a moderate language disorder. The scores for the Expressive Vocabulary Test (EVT; Williams, 1992) were within the average range for children their age with the exception of one participant (Child B01) who scored one SD above the mean.

Based on the scores for the SSRS (Gresham & Elliot, 1990) in the area of social skills, four of the six participants exhibited fewer social skills. Five of the six participant's scores in the area of problem behaviors were in the average range and one participant (Child B01) score indicated more problem behaviors.

Child Interventionists

Two child interventionists conducted baseline and intervention sessions. Both interventionists had experience working with at-risk, preschool age children. One interventionist was a doctoral level student and the other interventionist was an undergraduate student majoring in special education.

Table 1.
Participants for Study 1

	Dyad 1		Dyad 2		Dyad 3	
	Child A01	Child B01	Child A02	Child B02	Child A03	Child B03
Age (years/months)	3-09	3-05	3-05	3-06	3-08	3-06
Gender	Female	Male	Female	Male	Female	Male
PLS-3 Expressive Score ¹	81	73	79	77	71	77
PLS-3 Auditory Comprehension Score ¹	72	80	73	78	67	82

PLS-3 Total Standard Score ¹	74	74	73	75	66	77
EVT Standard Score ²	121	90	92	100	92	95
SSRS Social Skills Score ³	78	77	76	105	71	99
SSRS Problem Behavior Score ³	112	128	107	107	104	104

¹ Preschool Language Scale-3 (Zimmerman, Steiner, & Pond, 1992)

² Expressive Vocabulary Test (Williams, 1992)

³ As indicated by the Social Skills Rating Scale Teacher Report (Elliot & Gresham, 2008 and 1990)

Setting and Materials

Baseline and intervention sessions took place in two areas of a Head Start center, a gym and a classroom. Both areas were at least 2m x4m and had sufficient room to accommodate the participants and the interventionist.

Play materials used during baseline and intervention sessions included dramatic play toys (e.g., kitchen, grocery store, hospital), materials associated with careers, (e.g. school bus drive, teacher, gardener, doctor) and manipulative toys (e.g. cars, blocks, trains). These materials were similar to types of toys available in the classrooms of the participants. The toys were grouped into three play themes: (a) careers, (b) manipulative activities, (c) home living. Each activity included toys that provided the participants with a variety of options to explore during play. For example, in the hospital activity, toys included dolls and stuffed animals, doctor scrubs and doctor kits).

Study 2

Participants

Six participants were identified per teacher report based on the following criteria: between the ages of five- and eight-years old, with a diagnosis of mild/moderate autism and had received a passing score on a hearing exam. All six children attended an urban elementary school in a large metropolitan city. Children were excluded if they were hearing impaired, had a diagnosis of moderate to severe autism and/or had a secondary diagnosis of intellectual disabilities or exceeded the age limit of eight-years-old.

The participant's language, cognitive and adaptive behaviors were assessed. To determine receptive and expressive vocabulary ability, the Peabody Picture Vocabulary Test –III (PPVT-III, Dunn, and Dunn, 1997) and the Expressive Vocabulary Test (EVT, Williams, 1992) were used. The participants were paired in dyads as indicated in Table 2.

Participants' standard scores for the PPVT (PPVT-III, Dunn, and Dunn, 1997) ranged from as low as 40 (Child 1A1 and Child 2B3) to a high of 60 (Child 1A2). These scores were well below the expected age equivalent for all participants. There was a similar range of scores for participants on the EVT (EVT, Williams, 1992) with standard scores of 40 (1A1, 1A3 and 2B3) to 82 (1A2).

Table 2.
Participants for Study 2

	Dyad 1		Dyad 2		Dyad 3	
	Child 1A1	Child 2B1	Child 1A2	Child 2B2	Child 1A3	Child 2B3
Age (years/months)	6-04	6-07	7.00	8.03	7.05	8.01
Gender	Female	Male	Female	Male	Male	Male
PPVT ¹	40	42	60	45	52	40
EVT ²	40	42	82	54	40	40

¹ Peabody Picture Vocabulary Test (Dunn & Dunn, 1997)

² Expressive Vocabulary Test (Williams, 1992)

Child Interventionists

One interventionist collected all baseline, and intervention data. The interventionist was a doctoral candidate in Special Education. She had a master's degree in Special Education and six years experience teaching young children with autism.

Settings and Materials

This study was conducted at a public school in a large metropolitan city. Baseline and Intervention sessions occurred in a sectioned off area of a large hallway in the school. Two accordion style dividers were constructed each measuring 4m x 2m. These dividers were placed in an L shape against a wall sectioning off a "U" shaped space that measured 4m x 4m and enclosed on three sides with the camera and tripod at the open end of the U. The area contained a table and two chairs.

Materials

Materials used in the baseline and intervention sessions were representative of play materials commonly found in classrooms of young children and consisted of dramatic play items including themes (grocery store, kitchen) and role playing materials (doctor, veterinarian). Manipulative items such as blocks and cars also were used. Materials were grouped into seven different play themes: Doctor, Vet/Zoo, Construction, Grocery Store, Farm, Housekeeping/ Kitchen, and Airport.

Procedures for Study 1 and Study 2

Design. A multiple baseline across dyads (Kazdin, 2010) was implemented to determine the effects of peer play intervention. Following the logic of a multiple baseline design, each successive dyad had increasingly longer baselines. Treatment was introduced to the second dyad when clear effects had been established for both children in the first dyad based on frequency of a class of descriptive statements of which comments were a component; treatment was introduced to the third dyad when effects were evident in the second dyad. Two experimental conditions were implemented: baseline and intervention.

Baseline Sessions. The baseline sessions were conducted at least three times per week. These sessions were 10 minutes and the following procedure was used: 1) the interventionist brought the two children in each dyad to the space designated for project use, 2) the interventionist invited the children to play with the toys arranged on the carpeted floor and engaged in minimal conversation with the children while they played. The interventionist did not prompt language or prohibit any behaviors except those that were harmful to peers or materials (e.g., hitting, throwing materials). Such behavior occurred infrequently.

Intervention Sessions.

The intervention sessions were conducted three to four times per week. Intervention sessions lasted 20 minutes. Once the interventionist brought the two children in each dyad to the space designated for project use, the three part intervention was conducted. At the conclusion of the session, the children were taken back to their classrooms. All sessions occurred during the morning at times convenient for classroom teachers. All sessions were electronically video recorded.

Intervention Components. An intervention with three components was implemented. The first component, the advanced play organizer, lasted approximately 5 min. During this component, the interventionist and the children developed a play plan specific to the play theme designated for the session. The structure of this component was: 1) the interventionist identified the play theme and (e.g., "Today we are going to go camping."); 2) the interventionist and the children labeled the toys to be used; 3) the interventionist asked the children how they could play with the toys within the theme; 4) if the children could not make a play plan independently, the interventionist suggested roles for the children and ways to talk with each other (e.g., "Sophie you could go fishing and Shelby, you can make dinner.") and role played and modeled ways for the children to use the toys and to talk to each other; 5) the interventionist told the children it was time to play and moved away from the immediate play area and sat approximately 3 m from the children.

The second component was a 10-min. play session. During this component, the children played with the toys and other materials provided. The interventionist sat away from the play area, watched the children, and used verbal re-directs and reflective statements to sustain and maintain the children's play interaction. The interventionist did not prompt or comment when the dyad was engaged in an interaction.

The third component of the intervention, the review session, took place immediately following the play session and lasted approximately 5 min. The interventionist re-entered the play area and sat near the children. The interventionist and the children discussed the play that occurred in the preceding component. The interventionist asked the children what they played with during the play session. If the general question did not elicit a response from the children, the interventionist asked the children specific questions about how they played with the toys and what verbal exchanges had occurred between the children (e.g., "Phoebe, what did you give the baby to eat? What did you say to Zach?, Phoebe, ask Jason to give you a toy?"). At the conclusion of the review session, the interventionist asked the children if they had fun playing together and if they wanted to play again. Finally, the children were thanked for their participation.

Data Coding and Reliability. The data collection procedures for baseline and intervention sessions were as follows: (a) the baseline play sessions, all three components of the intervention sessions, (planning, play session, review) were electronically recorded by the interventionists; (b) all video recorded play sessions were transcribed using the Systematic Analysis of Language Transcripts protocol (Miller & Iglesias, 2008); (c) the transcription was verified by the interventionist who conducted the session; and (d) the play sessions were coded using the Peer Language and Behavior Code (Craig-Unkefer & Williams, 2002). This code measured child communication and interventionist behaviors.

Interobserver Agreement. Interobserver agreement was calculated on the Peer Language and Behavior Code (Craig-Unkefer & Williams, 2002) for 20% of the baseline and intervention sessions. Reliability observations were equally distributed across dyads and experimental conditions. Reliability was assessed using an exact agreement formula in which the total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100. Overall reliability for Study 1 for child behaviors was 89% (range 82-96). Overall reliability for child behavior for Study 2 was 82% (range 70-94).

Child Communication Measures. The child social communicative behaviors observed were descriptive and request utterances. Each category consisted of several types of behavior. Descriptive utterances are commentary between peers about activities or relevant events. Types of descriptives included: (a) peer-directed comments, (b) play organizer statements, and (c) acknowledgment responses. Requests are verbal inquiries between peers in the structure of a question. Types of request utterances included: (a) information requests, (b) yes-no questions, and, (c) action and stop-action requests. In the analysis of the data for these studies, only the peer directed comments and the requests are reported and discussed.

There were three different categories of diversity and complexity analyzed: total words used, vocabulary diversity, and four or more words. The dialogue of the participants that took place during the play sessions were analyzed using the SALT program (Miller & Chapman, 2008). Total words were the sum of all words spoken per participant in a session. Vocabulary diversity was calculated by counting the total number of different word roots. Four or more words calculations were determined by separating phrases or sentences with more than words used.

Results

The first research question addressed the effectiveness of the intervention to promote aspects of social communication (i.e. the use of comments and requests) for both young children at risk for delays (Study 1) and children with autism (Study 2). The baseline and intervention frequency of comments for participants in Study 1 are presented in Figure 1. In Study 1, the baseline frequency of comments per child had distinct patterns across dyads but on average both peers had similar average comment production. At the conclusion of each of the baseline sessions, all participants decreased the frequency of comments to fewer than five comments in a session or no comments. In the baseline phase, Dyad 1 (Child A01 and B01), Child A01 averaged 17 comments and Child B01 averaged 14 comments and Dyad 3 (Child A03 and B03), Child A03 averaged 12 comments and Child B03 averaged 14 comments. In both these dyads, all the participants decreased to five comments or less per participant in the last two or three sessions. Dyad 2 (Child A02 and B02) was consistently low in their use of comments throughout the baseline phase, with both children having an average of 2 comments across baseline sessions.

Once the intervention was introduced, all dyads had similarly higher frequencies of comment production between partners. In Dyad 1, each participant had at least 20 comments per 10 minutes session with as many as 60 comments per 10 minute session. There was an interplay between partners as neither partner was consistently commenting more than their peer. Child A01 averaged 39 comments and Child B01 averaged 37 comments. Children in Dyad 2 displayed gradual and consistent progression over the duration of the intervention phase. Child B02 produced a higher number of comments than Child A02 from the seventh session until the conclusion of the phase, however Child B02 was, on average, within five comments of their peer. Child A02 averaged 25 comments and Child B02 averaged 30 comments. Dyad 3 was distinctive from the other dyads as, after session one in the intervention phase, there was an abrupt shift in the number of comments produced by each partner with Child B03 producing more comments for the majority of the sessions than Child A03. Also, there was a greater range in the frequency of comments between partners. Child A03 averaged 30 comments and Child B03 averaged 46 comments.

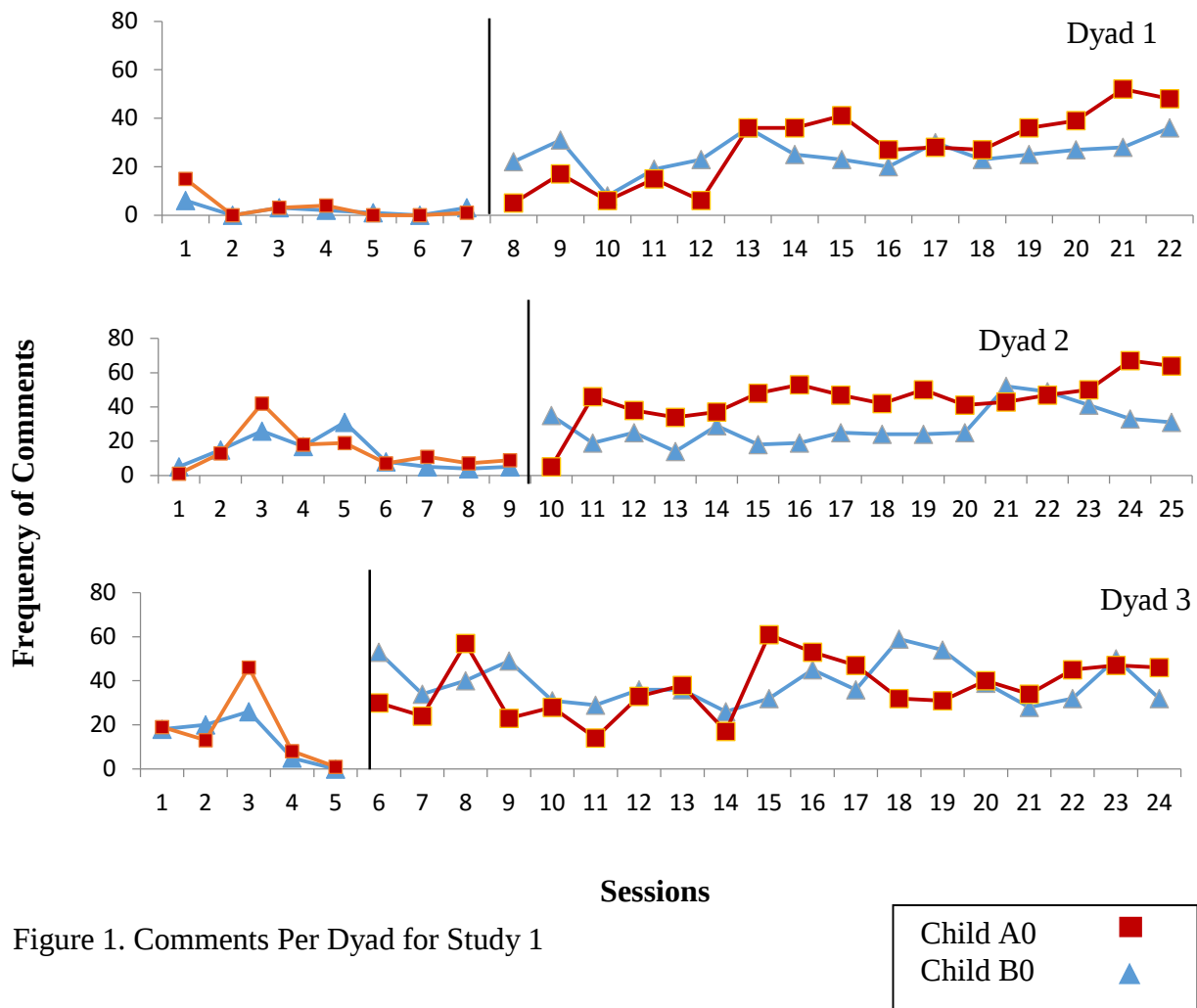


Figure 1. Comments Per Dyad for Study 1

In Study 2, there were distinctive starts with the same outcomes as the dyads ended the baseline phase. The baseline and intervention frequency of comments for participants in Study 2 are presented in Figure 2. Participants in Dyad 1 (Child 1A1 and 2B1) and Dyad 3 (Child 1A3 and 2B3) were consistently low throughout the baseline phase with some spikes by a single participant. In Dyad 2 (Child 1A2 and 2B2), Child 1A2 had an initial spike with a disproportionality higher number of comments than their peer but both partners had a consistent decrease over the baseline sessions producing five or fewer comments at the end of the baseline phase.

As the intervention phase began, children in Dyad 1 had increases above baseline with a dramatic divide in commenting in the session 2 but beyond that session, both children displayed consistency in comments with Child 1A1 commenting more than Child 2B1 but there was not a disproportionate amount of commenting between the two children and at the final session, they had the same number of comments. Child 1A1 averaged 10 comments and Child 1B averaged 22 comments. Dyad 2, like Dyad 1 had little overlap across sessions. Although Child 1A2 averaged 41 comments across all intervention sessions as compared to an average of 18 comments for Child 2B2, there wasn't a vast difference with one child dominating the interactions. Dyad 3 was more similar in their average commenting in the intervention phase. Child 1A3 averaged 26 comments and Child 2B3 averaged 15 comments. Child 1A3 had an increase in the 6th intervention session and then a decline to fewer than five comments in the subsequent session but slowly increased comments for the remaining sessions. Dyad 3 was distinctive in that the participants did not have one session where there were the same number of comments but were more similar in the average number of comments across sessions as compared with the other dyads.

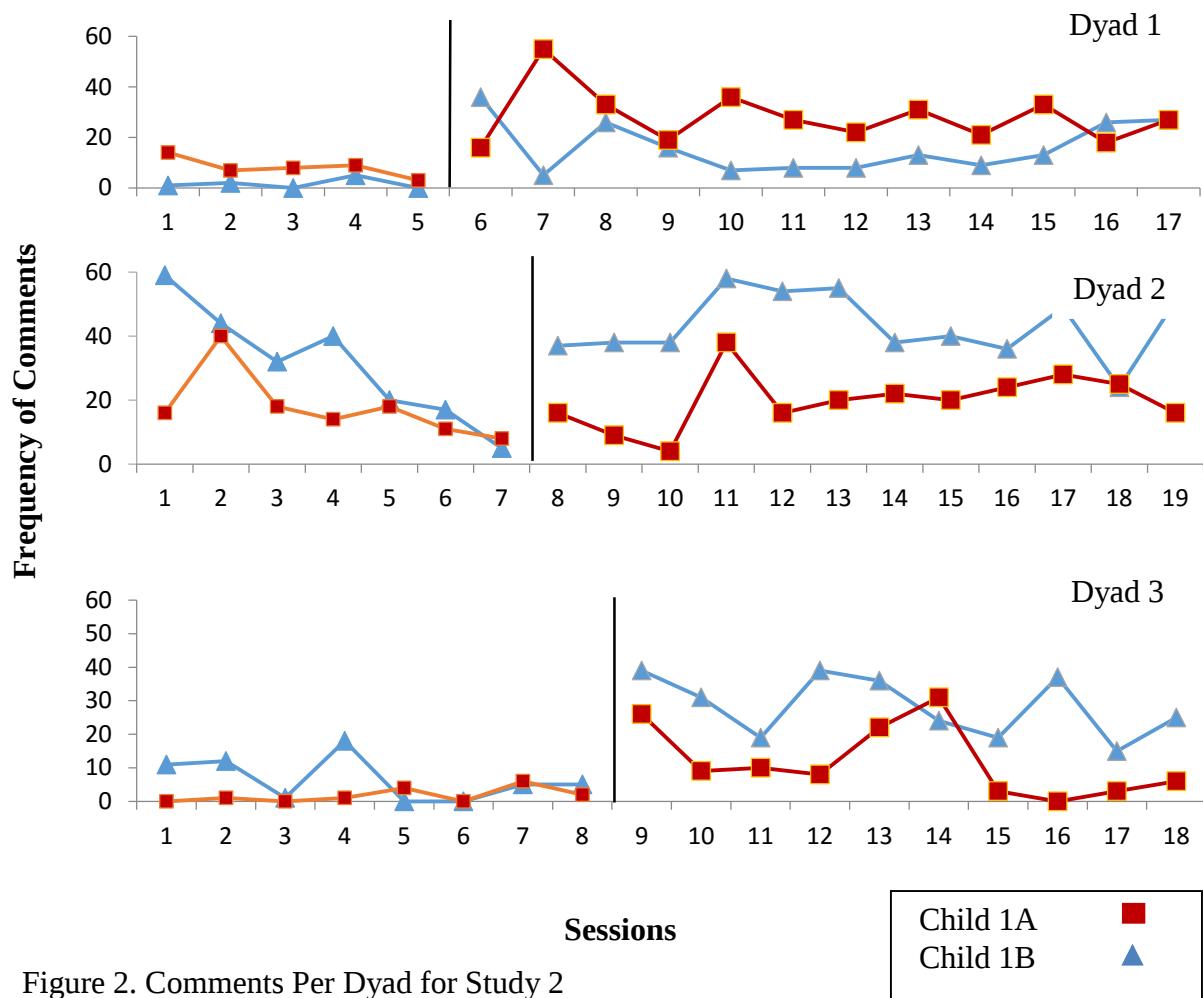


Figure 2. Comments Per Dyad for Study 2

Figure 3 compares the average number of comments for both studies across dyads. The baseline rates for participants in both studies had almost the same average comments. Study 1 participants had an average of 10 comments and Study 2 participants had an average of 11 comments. In contrast, the average comments in the intervention phase for Study 1 were 34 average comments across participants as compared to 24 average comments for participants in Study 2.

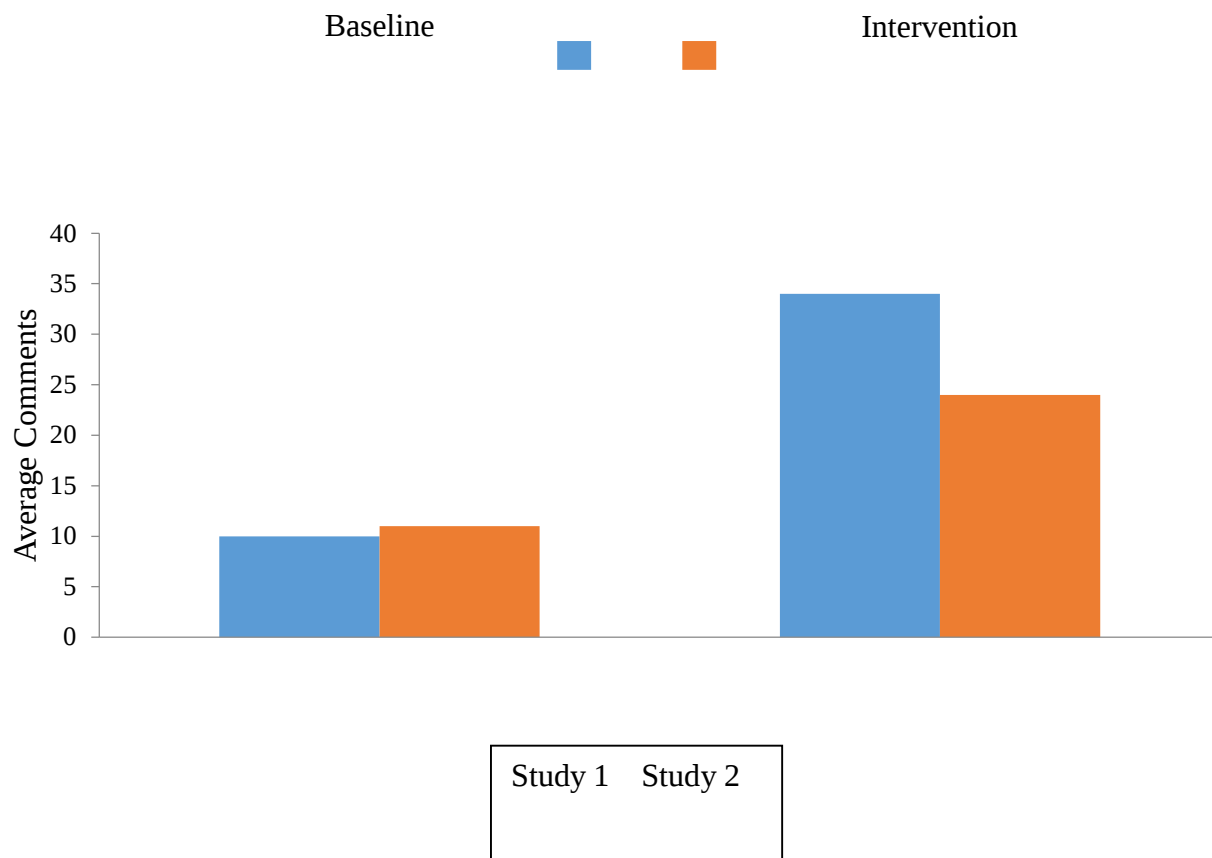


Figure 3. Comparison of Baseline and Intervention Frequency of Comments of Study 1 and Study 2

The baseline and intervention frequency of requests for participants in Study 1 are presented in Figure 4. In the baseline phase of Study 1, participants in Dyad 1 had few requests. Child A01 had a higher frequency of requests as compared to Child B01. Both participants in Dyad 2 had few or no requests in baseline. Participants in Dyad 3 had variable rates with Child A03 having a high rate of requests for one session, however the reason for this high rate was due to asking the same question repeatedly.

There were increases in frequency of requests for all dyads once the intervention was introduced. Participants in Dyad 1 had a steady progression and were similar in their rates of requesting, Child A01 had an average of 15 requests and Child B01 had an average of 14 requests. Child B01 was less consistent across all intervention sessions producing more or less than the more consistent and stable Child A01.

With the exception of two intervention sessions, Dyad 2 participants had similar rates of requesting across sessions with both participants having an average of 15 requests in the intervention phase. Like Dyad 1, there was an exchange per session between the peers with one requesting slightly more than the other but no dominant and consistent requester.

One participant in Dyad 3 had consistently higher rates of requesting than their peers; however, this dyad had higher rates of requesting than the other dyads. Child A03 had an average of 32 requests and Child B03 had an average of 20 requests. After the sixth intervention session, Child A03 consistently produced more requests while Child B03 had variable rates of production but never reduced production of requests to a baseline rates.

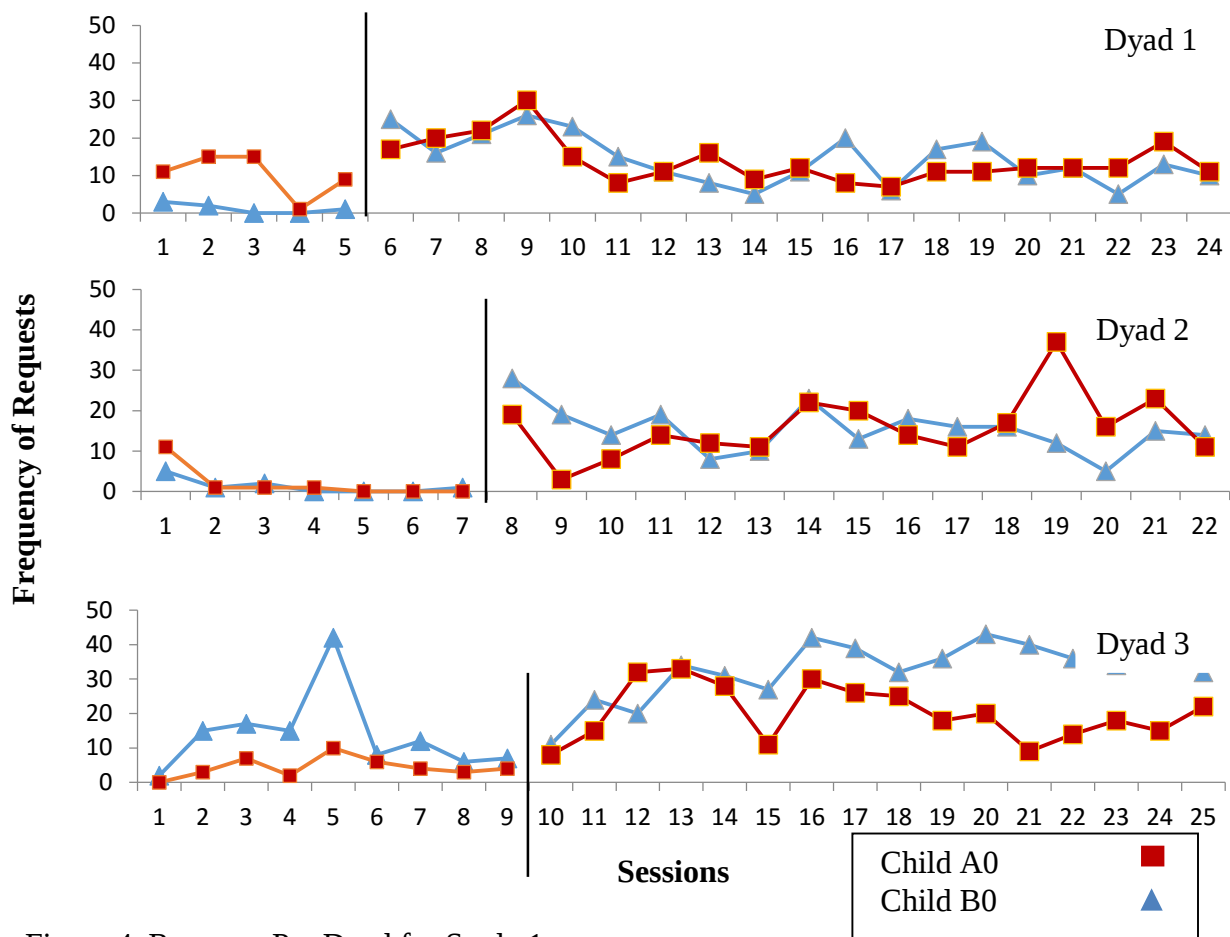


Figure 4. Requests Per Dyad for Study 1

Participants in Study 2 used fewer requests as compared to participants in Study 1 and in comparison to their own frequency of comments. The baseline and intervention frequency of requests for participants in Study 2 are presented in Figure 5. Dyads 1 and 3 had relatively flat rates of requests in baseline. Dyad 2 had variable rates of requests in baseline but ultimately averaged 4 or less requests at the end of the baseline phase.

For Dyads 1 and 3, the implementation of the intervention increased use of request for one participant but not the other. Child 1A1 and Child 2B3 produced one or no requests throughout the intervention phase. The partners for both participants (Child 2B1 and 1A3) did produce more requests than their peers. Dyad 2 participants were more consistent and more matched in their use of requests averaging between 10 and 15 requests across the phase.

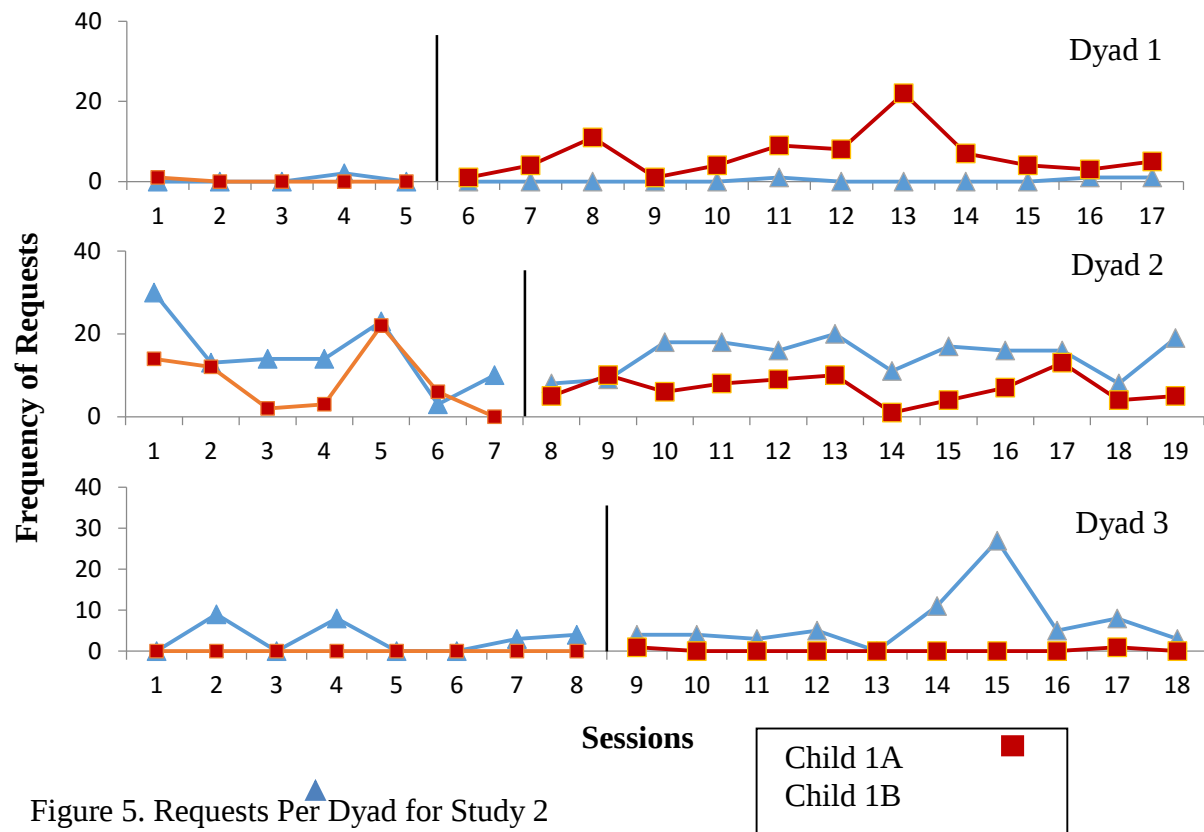


Figure 6 compares the average number of requests for both studies across dyads. Like the baseline rates across participants in both studies of comments, both groups had almost the same average requests. In the baseline phase, Study 1 participants had an average of 6 requests and Study 2 participants had an average of 5 requests. In contrast, the average number of requests during the intervention phase for Study 1 was 19 average requests across participants was higher while in Study 2, there were 7 average requests across participants.

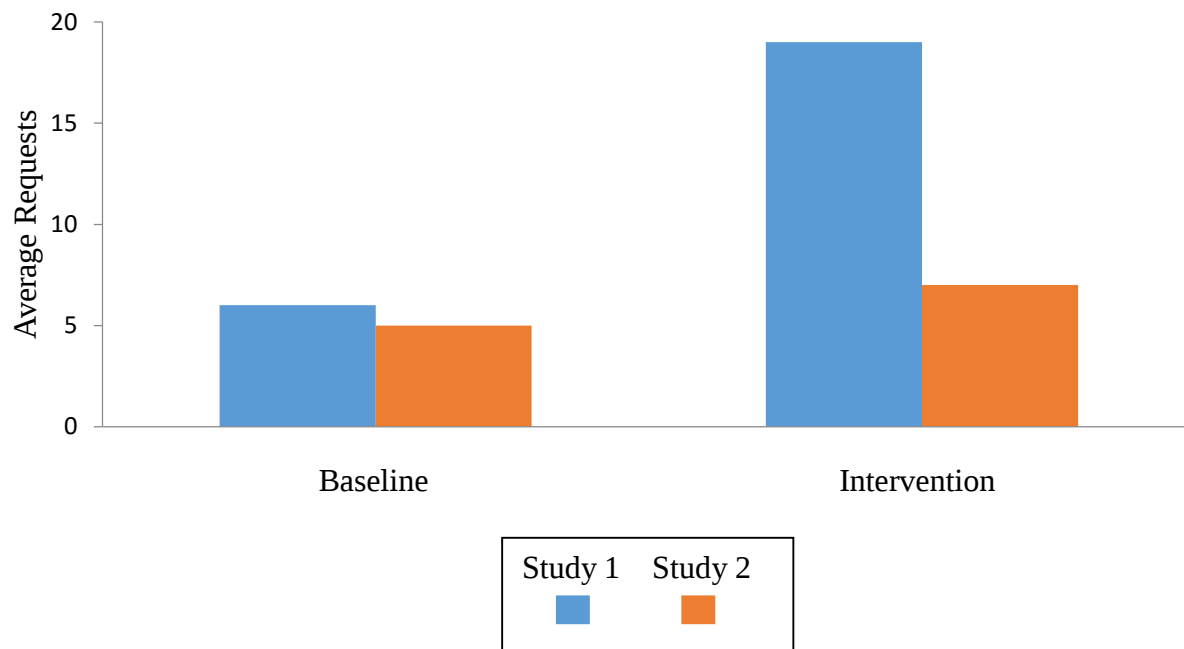


Figure 6. Comparison of Baseline and Intervention Frequency of Requests of Study 1 and Study 2

The second research question was to determine if the intervention was effective in promoting language diversity and complexity for both young children at risk for delays (Study 1) and children with autism (Study 2). Table 3 has the average total words used and the range of the total words. Table 4 displays vocabulary diversity and Table 5 displays four or more word utterances.

All participants in Study 1 had gains in the intervention phase in total words used. Across participants, the average total words used in baseline were 51 words. The average words used in intervention across participants were 150 words. Comparing gains between dyads, Dyad 2 participants had the greatest gains with an average of nine words used in baseline and an average of 127 words used in intervention.

Participants in Study 2 had an average of 69 different words in baseline and 109 different words in intervention. An interesting pattern developed within each of the dyads. One participant from each dyad had triple digit words produced in both the baseline and intervention phases while the other participant had double digit word production across both phases. The imbalance may have been due to the repetition of words by a single participant; therefore to better understand this occurrence, vocabulary diversity was calculated.

Table 3

Average Total Words Used in Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	47 (6-83)	176 (111-224)	Child 1A1	23 (4-66)	41 (13-103)
Child B01	89 (33-156)	161 (63-216)	Child 2B1	39 (22-65)	108 (48-169)
Child A02	8 (0-23)	136 (101-179)	Child 1A2	201 (49-327)	262 (109-366)
Child B02	10 (0-31)	118 (39-172)	Child 2B2	102 (17-226)	98 (45-138)
Child A03	87 (21-256)	144 (117-175)	Child 1A3	37 (4-84)	113 (63-137)
Child B03	68 (2-131)	169 (47-192)	Child 2B3	14 (2-38)	35 (5-79)

Table 4
Vocabulary Diversity For Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	25 (6-44)	75 (47-105)	Child 1A1	8 (4-15)	15 (8-27)
Child B01	40 (23-62)	76 (42-108)	Child 2B1	20 (12-31)	46 (27-71)
Child A02	7 (0-19)	62 (44-82)	Child 1A2	79 (34-113)	96 (57-131)
Child B02	10 (0-29)	60 (20-83)	Child 2B2	34 (7-54)	39 (27-60)
Child A03	40 (20-62)	67 (52-103)	Child 1A3	14 (0-33)	35 (24-48)
Child B03	33 (2-52)	69 (33-88)	Child 2B3	6 (1-17)	14 (4-35)

Vocabulary diversity across studies is displayed in Table 4. As with the measure of total words used, there were gains across all participants from baseline to intervention for this measure. In Study 1, participants used an average of 25 different words in baseline as compared to 68 different words in intervention. Participants in Study 2 used an average of 26 different words in baseline and an average of 40 different words in intervention. The gains for this measure were similar for both study participants.

Another indicator of vocabulary diversity is the use of four or more word utterances. In Study 1, on average, all participants had gains in use of four or more words from baseline to intervention. The ranges provided indicate consistent increased shifts between the two phases. There were fewer changes for all participants in Study 2 for this measure. The average number of four or more word utterances was unchanged from three of the participants and there were decreases in the average number of four or more word utterances for two of the participants. Of the three measures used to determine language diversity and complexity, total words and diversity of words had changes that indicate the intervention did promote language diversity and complexity.

Table 5

Four-or-More-Word Utterances for Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	8 (0-15)	36 (15-53)	Child 1A1	1 (0-4)	1 (1-3)
Child B01	17 (6-37)	32 (8-51)	Child 2B1	2 (2-3)	3 (2-6)
Child A02	1 (0-3)	23 (15-31)	Child 1A2	8 (7-12)	7 (3-12)
Child B02	2 (0-8)	22 (5-52)	Child 2B2	4 (1-6)	3 (2-5)
Child A03	15 (2-41)	30 (15-48)	Child 1A3	4 (0-11)	4 (3-6)
Child B03	12 (0-20)	42 (7-61)	Child 2B3	2 (0-4)	2 (0-2)

Discussion

The purpose of this study was to examine the how consistent strategies impacted diverse participant populations in the area of social communication. The results of the intervention indicated gains were made across all participants on a range of measures specific to the domain of social communication. The potential relevance of this study was to identify interventions that are parsimonious and provide teachers with a best fit model that can be used with a range of populations. An additional aspect of this study is the identification and use of strategies that adhere to recommended practices for professionals may work with distinctly diverse populations.

Social communication has a range of definitions and can consist of many skills but for the purposes of this study, the cognitive social learning model developed by Ladd and Mize (1983) and adapted by Elliot and Gresham (1993) was the conceptual basis for the intervention. The intervention incorporated the key elements of this model: 1) the interventionist provides the participants with instruction of the use of specific social behaviors, 2) once instruction is completed, the participants have the opportunity to rehearse the behaviors, 3) after practice, the interventionist provides feedback and reinforcement on the use of the skills, and 4) once the skills have been demonstrated by the participants, there are opportunities for maintenance and generalization.

The determination of the effectiveness of the intervention was based on specific skills: the use of comments and requests and language diversity and complexity across two distinct participant

groups: children at-risk for delays and children with Autism Spectrum Disorders. There were two distinct investigations implementing the same intervention. There were consistencies between the studies in the structure and process. They were the co-equal status of the participants grouped in dyads, consistent measures, and experimental design.

In addition to the structural consistencies across studies, there were also consistencies in the results of each of the studies across measures. Results indicated that there were gains across measures for the participants for both studies. Participants in Study 1 had consistent gains from the baseline phase to the intervention phase for all measures. Participants in Study 2 had gains from the baseline phase to the intervention phase for the majority of the measures with exceptions in requesting.

There were gains in commenting and requesting for both participant groups. Comparing baseline averages to intervention averages across studies, the most substantial gains were specific to comments. Although both participant groups had gains in requests when comparing the two phases, participants in Study 1 used more requests, on average, than participants in Study 2.

Comments and requests are the building blocks of social communication (Meadan, Halle, Ostrosky & DeStefano, 2008). Promoting these skills at an early age increase the likelihood of not only social development but children's overall development (Noonan & McCromick, 2014). Linking the strategies implemented in these studies to recommended practices provides further validation.

For young children at-risk for developmental delays or have a diagnosed disability, interventions with a focus on social competency need to be flexible and allow for implementation in a range of settings and groupings. The current studies explored a range of options in terms of settings and participant pairings. In the first study, the participants were at-risk for delays and paired in dyads. Both participants were at-risk for delays, which is a novel approach as the more characteristic grouping is with a typical peer. In the second study, both participants had a diagnosis of autism. Again, this pairing option was not characteristic of studies that have focused on the promotion of social skills for individuals with autism (Wang, Parilla, & Cui, 2012; Reichow, Steiner, & Volkmar, 2013)

In addition to alternate grouping, the settings for each of the studies utilized both regulated settings that allowed the participants to acquire skills that would increase the likelihood of sustained social engagement such as developing a plan for social engagement, acquiring specific phrases or actions that sustain interactions, and reflecting on the social interaction. The ability to practice in a regulated setting and then transition to a classroom setting with a range of peers increases the likelihood of both the generalization and maintenance of behaviors.

There were limitations in both studies that would have provided additional information to the effectiveness of the interventions. First, a social validity measure of teachers or other professionals that work with these populations could have been conducted to determine if the strategies used could be effective in a range of settings and implemented by a range of professionals (teachers, parents, paraprofessionals). Second, generalization and maintenance

measures would have provided further evidence of the long term effects of the interventions for the participants.

Professional educators that are focused on informing their practice seek information that is relevant to their current instructional needs. Identifying instructional strategies that can be adapted and implemented with diverse student populations requires knowledge of best practices as well as the ability to discern those strategies that are evidence based. The results of these studies identify an intervention that is practical and evidence based and promotes social communication skills that impact overall student development.

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Home-School Collaboration for Students with ASDs: Parents' Perspectives

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Abstract

Parent-teacher collaboration for students with autism spectrum disorders (ASDs) has become increasingly important due to the rise of students being diagnosed with ASDs. Today's schools are being challenged with creating educational programs to best meet the need of this rising special needs population. This paper explores parent and special education school personnel collaboration to benefit the educational outcomes of this student population. This qualitative study examined 17 parents of school-aged children with varying ASDs using surveys and semi-structured interviews. Results indicated that parents viewed their current parent-teacher relationships as both positive and negative and found home-school communication to be an important method for keeping informed about their child's school progress. This study also revealed that parents of children with ASDs consider lack of teacher preparation in educating this student population as a barrier to effective home-school collaboration. Suggestions for further research were recommended.

Home-School Collaboration for Students with ASDs: Parents' Perspectives

"Coming together is the beginning. Keeping together is progress. Working together is success."
- Henry Ford

According to the Individuals with Disabilities Education Act (IDEA), collaboration between special educators and families of students with disabilities has been both encouraged and mandated (Laura, 2012). Parent participation is one of this law's major principles and the law specifies guidelines and timelines on required parent participation in their exceptional child's education. Parents are required to participate in I.E.P. meetings and collaborate with special education school personnel in order to determine issues such as the need for assessment and potential special education services (NICHCY, 2010). Parents are considered key players in these collaborative processes; however, research has suggested that some parents have played a passive role (Stroggilos & Xancathou, 2006). According to Fish (2008) I.E. P. meetings are an ideal time for parents and educators to facilitate quality collaboration. Teachers have been encouraged to involve parents in applying their unique experiences and understanding to the education of children with disabilities, whose educational needs may differ substantively from other children. (Cook, Shephard, Cook, & Cook, 2012).

The importance of home – school collaboration is also expressed in the No Child Left Behind Act (NCLB) of 2001. According to Section 1118 of the ESEA Section 9101 (32), NCLB is to encourage parental involvement in their child’s educational program. Educators are required to effectively communicate strategies that parents can utilize in the home environment to further enhance generalization of skills being taught in the school environment. This is especially important for students on the autism spectrum, as many skills require frequent reinforcement for the students to be successful academically, behaviorally, and socially (Hays, 2005).

The benefits of home-school collaboration have been clearly documented over the years. Such benefits of this union include students earning higher grades, performing better on tests, attending school more regularly, having better behavior, and showing more positive attitudes toward themselves and toward school when parents and teachers work together (Canter, n.d.). It seems as though establishing this type of partnership would be the answer to many problems schools are experiencing today. However, establishing the home-school connection has not always been easy. Research has indicated that parents tended to seek help only when a problem was discovered requiring communication with other I.E.P. team members. Williams-Diehm, Brandes, Chestnut, & Haring (2014) reported that parents have difficulty in communicating and seeking advice from professionals other than direct service delivery teachers because they are often absent from the I.E.P. meetings where communication occurs and relationships are established. Parents have also reported that they feel intimidated, do not feel welcomed at their child's school, and do not know how to contribute in a meaningful way (Parent/Professional Collaboration, 2007).

To ensure greater success of students with disabilities into the inclusive environment, collaboration is essential between the teacher and parents. According to the U.S. Department of Education (2013), research has indicated an increased prevalence of students being diagnosed with autism spectrum disorders with most requiring some special education services. Such disorders include 3 distinct types: Asperger's Syndrome, PDD-NOS, and Autistic Disorder (CDC, 2014). ASDs are now considered the fastest growing developmental disorder in the United States with their prevalence skyrocketing (CDC, 2012). Such an increase places unique demands on schools to develop appropriate I.E.P.s for this expanding student population. Questions that must be addressed in such programming include: What type of placement should the child receive? How many hours will he receive special education? Regular education? What related services will he receive? While I.E.P. teams convene to make these critical educational decisions for students with ASDs, one I.E.P. member possesses a great deal of information that aids in this decision-making process: the parent. According to Smith (2001) parents' participation increases the teacher's knowledge of the child's environment, increases the school's understanding of the child, and improves communication between the home and the school. Based on the importance of home-school collaboration and the increased prevalence of students with ASDs entering the public schools, a question that arises is: How well are parents and special education school personnel collaborating to benefit the educational outcomes of these students with ASDs?

Purpose of the Study

The purpose of this study was to examine parents' perspectives of the collaboration that exists between themselves and special education school personnel at their child with an ASD's school. This paper provides a synthesis of how parents view their existing collaborative efforts.

Method

Purposive sampling was used in this study. Purposive sampling, one of the most common sampling strategies, groups participants according to preselected criteria relevant to a particular research question (Mack, Woodsong, MacQueen, Guest, & Namey, 2005). For this study, parents of children with ASDs in grades Pre-K-12 were purposefully selected. Data collection for this study occurred at two separate times. The first data collection was obtained from an electronic open-ended survey sent to participants in various states. The second data collection included an open-ended survey (both electronic and paper and pencil format) and semi-structured in-person interviews obtained at the 2014 Texas Parent-to-Parent conference (San Marcos, Texas) where the researchers were presenting on the topic of home-school collaboration for students with ASDs. Triangulation of persons was employed by interviewing parents of children with varying ASDs at several different grades levels.

Participants

Nineteen parents of children with ASDs were asked to participate in this study and seventeen parents consented. The ASDs represented in this study included Asperger's Syndrome, PDD-NOS, and Autistic Disorder. Some participants had more than one child on the autism spectrum. The age range of the children varied from two years-old to fourteen years-old. The children attended public, charter, and private schools. Parents included in this study were both married and single. Family size ranged from no siblings to four siblings. Participants for this study were from North Carolina, New Jersey, Texas, Georgia, and Kentucky. Ethnicities represented were Caucasian, Hispanic, and African-American.

Materials

All participants were asked to complete a two-part questionnaire. Part One of the questionnaire contained 10 items designed to ascertain the participants' state of residence, ethnicity, family size, number of children on the autism spectrum, child's type of autism spectrum disorder, gender of the child with an ASD, age of the child with an ASD, type of school (private, public, charter or home schooled) the child currently attends, and the service delivery model he receives. Part Two of the questionnaire asked parents to respond to each of the following questions in an open-ended format:

1. How would you describe the current relationship between you and your child's special education school personnel (teachers, therapists, paraprofessionals, etc)?
2. What are the advantages of regular communication with your child's special education school personnel?
3. What are the greatest challenges you currently face when collaborating with special education school personnel?

The questionnaire took approximately 15 minutes to complete. Participants who completed the questionnaire on-site at the 2014 Texas Parent-to-Parent conference were briefly interviewed to provide follow-up information for the purposes of clarity to their answers provided on the questionnaire. All respondents were informed of the nature and the purpose of the study. Confidentiality and anonymity issues were explained.

Data Collection and Analysis

The data from the questionnaire was hand-coded into SPSS to perform tabulation for basic descriptive statistics. Specifically, each wave of data was analyzed. The data was then translated into tables.

A content analysis of the interviews was performed. Using a content analysis allowed the researchers to examine themes present in the study. The data for this study were a self-reporting of the experiences by parents of children with ASDs with special education school personnel. Data were coded by grouping related data together and establishing a pattern of responses.

Results

Descriptive statistics were assessed for each wave of data collection. The first wave of data was collected via an online survey (N=10). The second wave of stats was collected at a conference in San Marcos, Texas (N=7).

Table 1

Descriptive Statistics for questionnaires completed by first wave (on-line)

	N	Percentage
State		
Georgia	1	10%
Kentucky	1	10%
New Jersey	1	10%
North Carolina	3	30%
Texas	4	40%
Gender		
Male	11	73%
Female	4	27%
Ethnicity		
Black	1	10%
Hispanic	1	10%
White	8	80%

Autism Spectrum Diagnosis

Asperger's	3	30%
Autistic Disorder	4	40%
Pervasive Developmental Disorder	3	30%
Type of School Attending		
Charter	1	10%
Home schooled	2	20%
Private	2	20%
Public	5	50%
Preferred Form of Communication		
Communication Notebook	3	30%
Email	8	80%
Face to Face	5	50%
Phone Call	5	50%

There are several findings to be discussed when comparing Table 1 and Table 2. Of primary interest is the geographic and ethnic diversity that exists between the two waves of data. While data from wave 1 (on-line questionnaires) provided a more robust geographical sample, it did not provide as ethnically diverse a sample as wave 2 (conference). Another difference to be noted is the variance of responses related to preferred forms of communication. Specifically, online questionnaire participants preferred, at a slightly high rate, to have email and phone call communications, whereas questionnaires completed by conference attendants reported a slightly high preference of receiving communication via communication notebook and face to face formats. A limitation of the current study is that the data does not support analyzing differences between the different waves of data.

Table 2
Descriptive Statistics for questionnaires completed by second wave (at Texas Parent to Parent conference, San Marcos, Texas)

	N	Percentage
State		
Texas	7	100%
Gender		
Male	8	100%
Female	0	0%
Ethnicity		
Hispanic	3	43%
White	4	57%

Austism Spectrum Diagnosis

Asperger's	0	0%
Autistic Disorder	5	71%
Pervasive Developmental Disorder	2	29%
Type of School Attending		
Charter	1	14%
Public	6	86%
Preferred Form of Communication		
Communication Notebook	4	57%
Email	5	71%
Face to Face	4	57%
Phone Call	3	43%

Table 3 summarized information from all questionnaire participants, a combination of both wave 1 (on-line) and wave 2 (conference). Given the current emphasis in education policy to encourage educators to provide services in LRE (the least restrictive environment), 70% of questionnaires indicated students were receiving services either completely or partially in the general education setting. On the self-report questionnaire, the vast majority of the parents of students with autism spectrum disorders indicated the communication received from the teacher was both positive and negative in nature. However, 18% of participants reported the communication from the teacher was basically negative in nature. Finally, it should be noted the communications from the teachers were mainly focused on academic and behavior issues, while about a third of communications centered on concerns about the students self-help skills or social skills.

Table 3
Summary data from all waves

Setting special education services are being delivered		
Combination (both)	9	52%
ECI (Early Childhood Intervention)	1	6%
General Education	3	18%
Special Education	3	18%
None (homeschooled)	1	6%
Frequency of Communication with Teacher		
Daily	10	59%
Bi-weekly	1	6%
Weekly	6	35%
As needed or parent initiated	4	24%
Self-reported Preferred Frequency of Communication with Teacher		
Daily	7	41%

Weekly	6	35%
Monthly	1	6%
As Needed	3	18%

What type of information is basically shared from the teacher?

Negative	3	18%
Positive	0	0%
Both	14	82%

Discussion with the teacher is generally regarding _____.

Academics	10	59%
Behavior	12	71%
Self-Help	6	35%
Social Skills	5	29%

This study focused on parent perspectives of home-school collaboration for their child with an ASD. Certain themes emerged from the data. The first theme that emerged was that the majority of participants indicated they had a positive relationship with their child's special education school personnel. Eleven out of the 17 parents indicated that their current relationship was positive. When asked to describe her current relationship, one participant responded:

Good! Some teachers are more involved than others. Most communicate well by email. We have good feelings toward one another- respected and valued.

The second theme that emerged was that several participants shared that the primary advantage of home-school communication was that it gives parents an idea of how their child is progressing at school and informs them about what can be done at home to support school learning. In response to this question, one participant remarked:

It helps me to stay up to date with the goings-on in class. Learn the positive and negative news. Develop more of a relationship and understanding with teachers.

Another revealed:

Having regular communication is crucial to the success of the child. If something is not dealt with promptly with these children it can take weeks or even months to correct a behavior...

The third theme that emerged from this study was with regard to the challenges parents face when collaborating with school personnel. Several participants commented that their child's special education teachers were not properly trained to work with children with ASDs.

The greatest challenge we face with the school personnel is that the teachers are not trained to work with ASD students. If we did not have knowledge of the rights of our child, the school system would not provide what is necessary for him to receive a free

and appropriate education. It concerns me that my child's teacher does not know much about working with children with ASDs. She has told me herself she has limited knowledge about teaching our kids. This leaves parents feeling unsure about the quality of instruction that our child is receiving.

Discussion

The question remains: How well are parents and special education school personnel collaborating to benefit the educational outcome of children on the autism spectrum? This study supports the benefits of maintaining home-school relationships for this student population by having a positive parent-teacher relationship (American Federation of Teachers, 2007). More specifically, parent-teacher communication is beneficial in providing information that parents want and need to know about how their exceptional child is progressing. Both of these factors would suggest that home-school collaboration for students with ASDs is looking up.

However, a significant concern is raised with respect to the challenges of home-school relationships as perceived by these parents. Parents viewed the teachers' lack of preparation when teaching students with ASDs as a challenge to building a collaborative relationship. The findings of the study are somewhat consistent with previous research conducted on teacher preparation for students with autism spectrum disorders. While some studies indicate that the majority of teachers graduate from college with minimal training in evidenced-based practices for teaching children with ASDs studies (Loiacono & Allen, 2008), others indicate that teachers have the proper training to educate students with ASDs but not in an inclusive setting (Hayes, Baylot, Williamson, Black, & Winsor, 2013). This notion raises significant concern as more and more students on the autism spectrum are being educated alongside their typical peers. Research states that more than 25% of students with ASDs spend the majority of their school day in general education classes (McLeskey, Rosenberg, & Wrestling, 2010). With ASDs on the rise, what can be done to better prepare regular education teachers for this current and future challenge? How does teacher preparation affect home-school collaboration for students with ASDs?

Limitations

This study has explored current parents' perspectives of home-school collaboration in the field of autism spectrum disorders. While the findings provide a better understanding of parents' current perspectives on this topic, there are limitations that should be noted. This study was limited to three regions in the United States: Southwest, Southeast, and Northeast. It is possible that parental experiences might differ in other areas. Another limitation of this study is not all ethnic groups were represented.

Conclusion and Future Research

This research informs us about parents' perspectives on home-school collaboration for students with ASDs. It reinforces the notion that parents of children with ASDs do have positive home-school relationships and that they value communication between themselves and their child's special education school personnel. Further research could be extended to take a closer look at the various ways in which home-school collaboration efforts could be strengthened. As this study

reached three of the five regions within the United States, additional research could be explored to measure perceptions of home-school collaboration in all regions. Another area in which home-school collaboration revolves around is transition planning. Therefore, an additional angle to explore is parents' perceptions of preparedness of their child for both entering school and entering society upon school completion.

The challenge of special education teacher preparation as it relates to parent-teacher collaboration turns the focus of this study in another possible direction. To what extent are special education teachers prepared to meet their unique challenges? How does their lack of preparation when educating students with ASDs impact the home-school collaboration that is essential for their success? Further studies are recommended to investigate special education teacher preparation for students with ASDs and how they impact current home-school collaboration for this student population.

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About the Authors

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Dr. Charlotte Fontenot received a BS in Education, Curriculum and Instruction; Elementary Self Contained and Elementary Math, Texas Southern University; MEd in Generic Special Education from Texas Southern University; MEd in Education Administration at Prairie View A & M University; and her EdD in Educational Leadership, from Sam Houston State University. Dr. Fontenot has worked in the higher education system for over 7 years, including her current position as an Assistant Professor of Special Education for the College of Education and Behavioral Sciences at Houston Baptist University. Dr. Fontenot's teaching focus stems around broadening the knowledge base of educators possessing zeal in servicing students with unique needs under the special education umbrella. During her service in the public school system, she taught as a Preschool Program for Children with Disabilities and Fifth grade educator, as well as serving as a district-wide Behavior Support Specialist. Dr. Fontenot's research interests are in

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Dr. John Travis Spoede, Jr. received a BA in International Studies with a minor in Chemistry from Baylor University; MEd in Counseling from the University of Houston-Victoria; his ATCP in Special Education from Prairie View A & M University; and his PhD in Educational Psychology and Individual Differences with a specialty in Research, Measurement and Statistic, from University of Houston. Dr. Spoede currently serves as the Director, Center for Research and Doctoral Studies, and an Assistant Professor of Education for the College of Education and Behavioral Sciences at Houston Baptist University. Dr. Spoede teaches a wide variety of graduate and undergraduate courses including Special Education, Education, School Counseling and Counseling preparation, and Psychology. Dr. Spoede spent 11 years serving in the public school system, where he taught special education in both inclusion and self-contained settings, was a special education department chair and served as a school counselor. Additionally, Dr. Spoede has worked with students and adults with exceptionalities in his private practice as a Licensed Professional Counselor-Supervisor in the state of Texas. Some of Dr. Spoede's research interests are in the areas of Special Education related to technology, current trends and psycho-social factors.

Appendix

PARENT SURVEY AND COVER LETTER

January 15, 2014

Dear Participant,

I am writing to tell you about a study being conducted on families of students with autism spectrum disorders (ASDs). As special education professionals, my colleague and I are interested in improving collaboration between the home and school environments for students with ASDs. Your participation in this study is strictly voluntary. You may withdraw from it at any time. All information will remain confidential. Your name and your school's information will not be indicated in the results of this study.

If you are completing this study, please sign the consent form at the bottom of this page and return via email to mhouser@wcupa.edu by January 18, 2014.. You can also contact the researchers: Dr. Mary A. Houser at mhouser@wcupa.edu and Dr. Charlotte Fontenot at cfontenot@hbu.edu for additional information, if needed.

You do not have to respond if you are not interested in this study. If you do not respond, no one will contact you.

Thank you for your consideration.

Please copy and paste this address into your URL to begin the questionnaire:

https://docs.google.com/forms/d/1UNsLNwM-iQuyfAfeM7Vq_9CdUXVuYfGcG8zokuCr6nk/viewform#start=openform

Sincerely,

Mary A. Houser, EdD

Charlotte L. Fontenot, EdD

Consent

I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature _____ Date: _____

OPT-IN FORM

[INSERT NAME OF STUDY]

Please complete this form and return via email to: mhouser@wcupa.edu

- ☐ I am interested in learning more about this study. Please contact me using the following information:

Name: _____

Telephone(s): _____

Best time and day to call: _____

Email: _____@_____

Parent Survey

Home--School Collaboration for Students with ASDs: Parents' Perspectives

Survey Instructions: Please respond to each of the following statements accordingly

State
Ethnicity
Type of school Private School, specializing in learning differences Public setting, Pre-K - 12 Home Schooled
Service Delivery Model. Describe where your child receives services. Regular Ed Special Ed Combination of both
Family size (check all that apply) Mom Dad 1 -2 siblings 3 or more siblings
What is the Age of your child with ASD?
What is the Gender of your child with ASD?
What is the Grade level of your child with ASD?
What are your preferred methods of receiving communication from your child's teacher/school? Face to face Telephone call Email Communication Notebook
How often do you receive communication from the teacher? Daily Weekly Monthly
How often would you prefer to receive communication?
What type of information is basically discussed? Positive

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Validating an Observation Protocol to Measure Special Education Teacher Effectiveness

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Abstract

This study used Kane's (2013) Interpretation/Use Argument (IUA) to measure validity on the Recognizing Effective Special Education Teachers (RESET) observation tool. The RESET observation tool is designed to evaluate special education teacher effectiveness using evidence-based instructional practices as the basis for evaluation. In alignment with other studies (Bell et al., 2012), we applied and interpreted Kane's (2006) four inferences for trait observation: scoring, generalization, extrapolation, and decision rules. Results from this study show that acceptable levels of validity are promising for the RESET observation tool. Because the RESET observation tool is premised on the idea that by increasing the use of evidence-based practices, student achievement will also increase, further investigations into the relationship between fidelity of implementation of instruction and student achievement will be critical for moving project work forward.

Validating an Observation Protocol to Measure Special Education Teacher Effectiveness

Special education teacher evaluation systems are of high interest nationally because they will be used to support judgments about the quality of teaching that students with disabilities receive. With this purpose in mind, it follows that a special education teacher evaluation system should be based on a conceptual framework that defines an effective special education teacher as one who employs evidence-based practices to improve student outcomes (Johnson & Semmelroth, 2014a). Through an evaluation system that emphasizes the use of evidence-based instruction, special education teachers will prioritize the use of practices that are most likely to positively impact student learning, and ultimately, outcomes for students with disabilities will improve (Cook, Tankersley, & Landrum, 2009).

An evaluation system designed on this framework requires the use of an observation protocol that captures the trait of effective special education teaching. A trait, as defined by Kane (2006), is a disposition to behave or perform in some way under a range of circumstances. To capture the trait of effective special education teaching, an observation protocol should specify the components of evidence-based practices (EBP) to be incorporated into practice, and should provide a mechanism through which special education teachers receive feedback on their observed instruction relative to the desired EBP. An examination of the effects of instruction on outcomes should demonstrate a high correlation between the use of EBP and student growth. It is upon this basic connection between effective instructional practice and student outcome data that

the Recognizing Effective Special Education Teachers (RESET) observation system was developed (Johnson & Semmelroth, 2014; Semmelroth, 2013; Semmelroth & Johnson, 2014).

There are two main purposes of the RESET observation system: 1) to evaluate special education teacher effectiveness and 2) to improve special education teacher instruction in the classroom. The focus of RESET differs markedly from the current emphasis on value-added models (VAM), which have as their primary purpose determining teacher attribution to student outcomes as measured by performance on state standardized assessments. The distinction is important, because special education has been and continues to be a high demand field, with high turnover and attrition rates (Connelly & Graham, 2009), and with high percentages of emergency or alternate-route certified teachers (McLeskey, Tyler, & Flippin, 2004). Models of teacher evaluation that attempt only to differentiate between effective and ineffective teachers based primarily on student test scores (e.g. VAM) may not be easily applied to special education for a variety of measurement reasons (Buzick & Laitusis, 2010; Holdheide, Browder, Warren, Buzick, & Jones, 2012) and will do little to address the critical shortages in special education. Therefore, we argue that a special education teacher evaluation system should draw on the extensive research base in special education specifying evidence based practices and the resulting effects on student growth.

Establishing Validity of a Special Education Teacher Evaluation System

Prior to adopting a high stakes teacher evaluation system, it is critical to evaluate its psychometric defensibility to ensure that the system will accomplish what it purports to accomplish while limiting the unintended, negative consequences (Herlihy et al., 2014). In a recent review of state teacher evaluation systems, Herlihy et al. (2014) note that few states had specified programs of research to examine the effects of implementing their teacher evaluation system. Considering the stakes attached, we argue, as others have (e.g., Bell et al., 2012; Herlihy et al., 2014), that regardless of the model of evaluation system adopted, it is imperative to apply the same assessment standards to teacher evaluation systems as have been applied to other areas of educational assessment.

However, given the challenges of measuring a construct as complex as effective special education teaching, traditional approaches to establishing psychometric soundness may be insufficient. Because observation-based measures require a series of inferences to be made about a small number of performances to the universe of possible performances of a complex construct, they are arguably best validated through more comprehensive approaches. One such approach to validity is Kane's (2006) argument-based approach. In Kane's model, there are two types of arguments to be specified in a validation effort: the interpretive/use argument (IUA) and the validity argument (Kane, 2013). The IUA presents "the network of inferences and assumptions leading from the observed performances to the conclusions and decisions based on the performances" (Kane, 2013, p. 23). The validity argument evaluates those inferences and assumptions using empirical data and analytic reasoning. Kane summarized the argument-based approach to validity succinctly, "The approach is quite simple: state what is being claimed and evaluate the claims being made" (Kane, 2006, p. 451).

Specific IUA and validity arguments must be viewed in light of the proposed uses of the resulting scores on a measure. This involves a straight-forward, two-step process: 1) the development of a clear statement of the claims inherent in the proposed interpretations and uses of the measure and resulting scores, and 2) a critical evaluation of these claims. Bell et al. (2012) outline an application of Kane's argument based approach to validity in a recent article on observing and evaluating algebra teachers. Following Kane's approach and Bell et al.'s application of his approach, the following inferences should comprise the IUA for a special education teacher observation system: 1) scoring, 2) generalization, 3) extrapolation, and 4) decision rules (Bell et al., 2012; Kane, 2013). Each of these inferences will be explained within the context of the RESET special education teacher evaluation system, following a brief description of RESET.

Recognizing Effective Special Education Teachers (RESET) Observation Protocol.

RESET is a state-sponsored project that was developed to meaningfully include special education teachers into a state's teacher evaluation system. The RESET project was designed to 1) define what an effective special education teacher is, and 2) to create an evaluation system that reliably identifies effective special education teachers and provides them with feedback to improve their practice. To develop the definition of an effective special education teacher, we first considered the complexity of the role. Special education teachers work under a variety of conditions, with a heterogeneous population, and support student progress towards individualized goals. In addition to providing individualized instruction, special education teachers manage caseloads, coordinate related services, and provide consultation in the general education classroom. However, when developing the definition of effective special education teaching however, we focused on instructional practice because it is the single component of a special education teacher's responsibility that has a documented, direct, and substantial impact on student outcomes.

Based on this rationale, the following definition was created to guide the conceptual framework of the RESET observation protocol: effective special education teachers are able to identify a student's strengths and needs, implement evidence-based instructional practices and demonstrate student growth (Johnson & Semmelroth, 2012; Semmelroth, Johnson, & Allred, 2013). Therefore, the RESET observation protocol was designed to collect observations of special education teacher's instructional practice and to evaluate these observations according to specifications developed from the research explaining the critical components of a variety of evidence-based practices for students with disabilities. A significant body of research has established a number of effective instructional practices to meet the needs of students with disabilities (see for example, Browder, Ahlgrim-Dezell, Spooner, Mims, & Baker, 2009; Browder & Cooper-Duffy, 2003; Chard, Ketterlin-Geller, Baker, Doabler, & Apichatabutra, 2009; Cook & Odom, 2013; Fuchs & Fuchs, 2005; Gersten et al., 2009; National Autism Center, 2009; Odom, 2009; Spooner, Knight, Browder, & Smith, 2012). This body of research guided the development of detailed rubrics that are the primary component of the RESET observation protocol and are used to evaluate a special education teacher's instructional practice. RESET is flexible enough to be used across special education settings because it includes rubrics for a substantial and growing number of evidence-based practices, and specific enough on its focus on EBP to provide targeted, individualized feedback for special education teachers.

To evaluate a teacher using RESET, special education teachers are video-taped across multiple lessons using the Teachscape video capture system. Then, trained raters use the associated rubrics to assign a score and provide feedback on a teacher's instructional practice. In its current design, RESET relies on the use of a four-point scale to align with Danielson's Framework for Teaching (FFT; Danielson, 2013), because RESET was developed in a state that adopted FFT for general education teachers. More detailed information about the scoring process is included in the methods section. To date, over 4,000 minutes of special education instruction across a variety of settings have been used to inform the continued development of RESET. Current research studies have focused largely on establishing reliability and determining the optimal number of raters and observations to ensure reliable results. Using generalizability theory to examine data, initial research suggests that optimal results are reached when evaluations are based on four observations and four raters (Semmelroth, 2013; Semmelroth & Johnson, 2014). These results are consistent with those reported in large-scale studies of teacher observation systems (Hill, Charalambous, & Kraft, 2012; Ho & Kane, 2013). Given that this may not be feasible for implementation, current studies are underway to determine whether more rigorous rater training efforts could reduce the number of raters required to obtain acceptable thresholds of reliability.

Interpretive/Use Argument (IUA) Inferences. To examine the validity of RESET in accomplishing its dual purposes of identifying effective special education teachers and providing feedback on instructional practice, we applied Kane's IUA. As outlined by Kane (2006, 2013) the IUA for observation protocols includes four major inferences: 1) scoring, 2) generalization, 3) extrapolation, and 4) decision rules. Each inference relies on several assumptions explained below (Kane, 2006).

Scoring: Test performances are communicated through scoring systems that assign scores to observed performances. Assumptions about scoring include that 1) the scoring rule is appropriate; 2) the scoring rule is applied accurately and consistently; 3) the scoring is bias free; and 4) the data fit the scoring model. Multiple sources of data can provide evidence for the scoring inference, including reviewing scoring distributions of scored samples, conducting reliability studies, and confirmatory factor-analysis. For the RESET observation protocol, this would include engaging in activities such as reviewing rater consistency with master coded observations, and examining score distributions across samples – especially in light of evidence suggesting that many teacher observation systems result in “the widget effects” (i.e., by evaluating all teachers as above average, all teacher performances lose variation and become interchangeable) (Mead, Rotherham, & Brown, 2012; Weisberg, Sexton, Mulhern, & Keeling, 2009).

Generalization: Observation systems require users to be able to generalize from a limited domain of observations to the universe of all possible observations of that teacher's practice. Therefore, assumptions about generalization include that 1) the sample adequately represents the universe of all possible observations, and 2) unexpected error is accounted for. Generalizability studies and reliability indices provide empirical support for the generalizability of scores across raters and over samples of test items (Kane, 2013). Most observation systems will include multiple sources of variance, and G-studies can provide estimates of variance components associated with the universe of possible observations (Brennan, 2001). In an ideal scenario, the main source of variance in an observation system would be the different teachers being observed.

However, variance from raters, lessons, items and interactions among these factors can account for variance in the observed scores, and it is critical to understand the contextual factors that influence performance. If we do not understand the degree to which contextual factors shape the scores received during observation, it will be difficult to justify resulting decisions (Bell et al., 2012).

Extrapolation: Tests are used to evaluate how well people can perform certain activities over some range of conditions. For practical reasons, it is generally not feasible to employ samples of the performance of interest under all possible conditions, or when measuring more complex constructs, to represent the full range of tasks that comprise the larger construct. In the case of special education teaching for example, it is extremely challenging to consistently quantify student outcomes, yet improved outcomes for students with disabilities is a reasonable indication of teacher effectiveness. RESET is premised on the idea that if special education teachers can reliably implement EBP, they should realize gains in student outcomes consistent with effect sizes reported in the research. Therefore, an extrapolation inference could be examined through data examining student outcomes (in terms of effect sizes to account for the variety of individualized student goals and measures) achieved when EBP are employed.

Another indicator of effective special education teaching is the development of Individualized Education Plans that outline the instructional practices and individual goals for students. It would be time consuming to include a comprehensive review of Individualized Education Plans (IEPs) within an evaluation system. The assumption of RESET is that if a special education teacher is effectively delivering EBP, the IEPs of the students will reflect goals and methods consistent with relevant EBPs. In this case, the extrapolation inference could be validated through a review of IEPs and analysis of the relationship between IEPs and implementation of EBP. The specific assumptions underlying the extrapolation inference include that 1) the score on all lessons is related to the teaching quality special education teachers are able to enact, and 2) there are not systematic errors that undermine the extrapolation to overall teaching quality (Kane, 2013).

Decision rules: The IUA for decisions will involve a chain of inferences that begins with the observed performances which lead to statements about a trait, and then to decisions based on the estimated values (scores) of that trait. In other words, based on the score assigned to the special education teacher observation, we are making claims about a teacher's effectiveness. Decision rules related to special education teacher evaluation might include decisions about promoting, retaining or mentoring a special education teacher. Decision rules are therefore, typically evaluated in terms of both their expected and unexpected consequences. As Herlihy et al. (2014) note however, this is the least well-developed aspect of most teacher evaluation systems nationally. Assumptions underlying the decision rules include that the decisions associated with the observed scores and performances are appropriate, and that the properties of the observed scores support the implications associated with the judgments of teaching performance.

The Validity Argument

Once the IUA for an observation protocol is developed, the validity argument evaluates those inferences and assumptions using empirical data and analytic reasoning. Different kinds of inferences will require different kinds of analysis for their evaluation. The IUA provides a framework for identifying the empirical studies to be included in the validation process, and then

the validation process provides a critical appraisal of the IUA's coherence and plausibility, with the understanding that new evidence could lead to a reconsideration of this conclusion (Kane, 2013).

Observation systems for special education teacher evaluation hold significant promise as a means for identifying special education teachers who are effective, and for improving the instructional practice of special education teachers. However, prior to their implementation, it is critical to understand whether the inferences made from the scores assigned to an observation constitute a valid statement about the quality of a special education teacher. Drawing on Kane's argument-based approach to validity, and its application to observation protocols (Bell et al., 2012), the purpose of the current study was to establish the IUA and evaluate initial empirical evidence to examine the scoring and generalization inferences for the RESET observation protocol. In our application of Kane's argument based approach to RESET, we viewed establishing validity of the scoring and generalization inferences as prerequisites to examining extrapolation and decision inferences. Without consistent scoring procedures that generalize across observations, it would be premature to examine evidence regarding RESETs extrapolation to other areas of teacher quality or to examine the consequences of the decisions and resulting implications. After describing and reporting the results of our examination of evidence of the scoring and generalization inferences, we outline next steps based on those findings, as well as describe next steps for examining the extrapolation and decision inferences.

Methods

Validation of the IUA requires multiple approaches to data collection and evaluation. All of the analyses conducted in this study were based on the video observations of special education teachers, and the ratings assigned to the video observations by trained mentor special education teachers. In this section, we describe the special education teacher participants who provided the video taped lessons, the special education teacher raters who evaluated the lessons, and the RESET observation protocol. Because each of the IUA inferences requires multiple types of analysis, the analyses used for the validity argument are included in the presentation of results.

Participants

Special Education Teacher Participants. A total of 19 special education teachers from five districts contributed a total of 4,082 minutes of video taped-lessons across a variety of special education settings. To recruit special education teacher participants, we contacted the special education directors of five of the larger school districts in the state. In our request for participants, we asked special education directors to help identify special education teachers who were highly skilled, as well as novice special education teachers, so that we would be sure to have exemplar instructional videos across the range of possible scores on RESET. Once a special education teacher agreed to participate, we also received consent from the parents of students in the classroom to video record lessons. All of the participating special education teachers were Caucasian females, ranging in experience in teaching from 1 to 15 years, with a mean of 9.5 years of experience. 28% held graduate degrees in education. Each teacher had a minimum of five lessons captured.

Raters. Five special education teachers were invited to participate as raters in two sessions to evaluate the videos of special education classroom instruction collected from the 2011-12 and 2012-13 school years via the Teachscape 360-degree video system. Raters were selected through communication with special education directors. Predetermined criteria were observed to ensure that invited raters represented a balanced sample of the range of content, placement and grade level found in special education, and that the invited raters had a minimum of five years of teaching experience. Table 1 provides rater demographics, including current teaching assignment, total years teaching and highest level of education completed. Additionally, the lead author scored each of the video recorded lessons individually to develop a master coded set of scores. The master coding served as a benchmark against which consistency and inter-rater reliability were evaluated for participating raters.

Table 1

<i>Rater Teaching Background and Experience</i>			
Rater	Teaching Assignment	Years of Experience	Education
1	Secondary Resource	10+	Master's
2	Elementary EBD/Self-contained	30+	Master's
3	Secondary Resource	3	Master's
4	Elementary Resource	15+	Bachelor's
5	University Teacher Supervisor	3	Master's

Measures

RESET Observation Protocol. The RESET observation protocol is a special education teacher evaluation system guided by the idea that the increased use of evidence-based instructional practices will lead to increases in student outcomes. RESET is comprised of three subscales: 1) Lesson Objective (LO), 2) EBP Implementation (EBP), and 3) Whole Lesson Summary (WL). Each item for each subscale is scored on a 1-4 scale in order to align with the Danielson (2013) scoring system. The LO subscale determines the clarity of the lesson objective, and consists of three items. The EBP subscale consists of rubrics that were developed using the criteria and key characteristics of various evidence-based instructional practices identified in the existing special education literature (Cook & Odom, 2013; Gersten et al., 2005; Horner et al., 2005; Odom et al., 2005). Most of the EBP rubrics contain between 4-6 criteria, each assigned a score on the 1-4 scale. The WL subscale consists of three items designed to provide a broad evaluative score of the special education teacher's performance throughout the lesson. Inter-rater agreement for RESET has ranged from .72 to .95, with a median agreement of .85 (Sammelroth & Johnson, 2014). Generalizability studies examining sources of variance for RESET have resulted in promising G-coefficients, ranging from .79 - .86 (Johnson & Semmelroth, 2014b).

Procedures

Video recorded lessons were collected of the 19 participating special education teachers during the 2011-12 and 2012-13 school years. Using the Teachscape video capture system, a total of 4,082 minutes of instruction was captured from the participating teachers over a minimum of

five lessons. Each rater scored each lesson. This was done to mitigate potential bias by assigning specific raters to particular teachers, and in order to help identify the optimal number of raters to receive acceptable levels of reliability. Raters attended a one-day training on scoring RESET. Training consisted of explaining the purpose and design of RESET, and orienting raters to the 45-page user manual that explains the structure and scoring procedures for RESET. Then, raters individually evaluated two training videos. The results of the training videos were compiled, and disagreements with the master-coded scores were discussed as a group to reach consensus on scores. Interrater agreement achieved during the training sessions ranged from .72 to .95 across subscales.

Raters then evaluated each video in random order. The order of videos was randomly presented to mitigate the possibility of a teacher x rater interaction (e.g. from viewing the same teacher five times in a row), and to reduce the possibility of an order effect. Raters completed their evaluations over a three-day period in a designated coding area. The authors were available to answer questions and to help resolve any technical issues. Scoring was input using the Qualtrics data system. Raters entered their scores for each video, and then the data was exported from Qualtrics to a database for analysis. Each video recorded lesson was assigned a unique identification number that allowed us to connect observations of the same teacher. Each rater's score for each item for each observation were collected in the database for analysis, along with scores for each lesson assigned by a master coder. A variety of analyses were performed for each inference of the IUA, and are discussed in the following section.

Results

Scoring Inference

Observation systems rely on the assignment of scores as an indication of the quality of the observed performance. The assumptions about the scoring system of RESET include that: 1) the scoring rule is appropriate; 2) the scoring rule is applied accurately and consistently; 3) the scoring is bias free; and 4) the data fit the scoring model. Below we discuss the analysis and the subsequent results of examining each of these assumptions using this data set.

Appropriateness of scoring rules. To determine the appropriateness of the scoring rules, we examined the score distribution across all evaluated observations ($n = 216$). Figure 1 displays the scoring distribution for each item of RESET, which depicts a high number of items clustered around the lowest scores, and in some cases, none of the items receiving a score above 2. Upon first review, this was considered problematic because of the lack of representation of all possible points across the scoring rubric. This does not necessarily undermine the appropriateness of the scoring inference because it might be reasonable for actual practice to be clustered around particular score points (Bell et al., 2012). Converging evidence to ensure that the skewed scores reflect actual instructional quality and not scoring error was found by comparing the raters' distribution of scores to the distribution of scores obtained by the master rater (Figure 2), which also clustered around these two scores. This suggests that the quality of observed performances of the sample was generally low overall.

Figure 1. Scoring distribution for RESET items, n = 216 evaluations

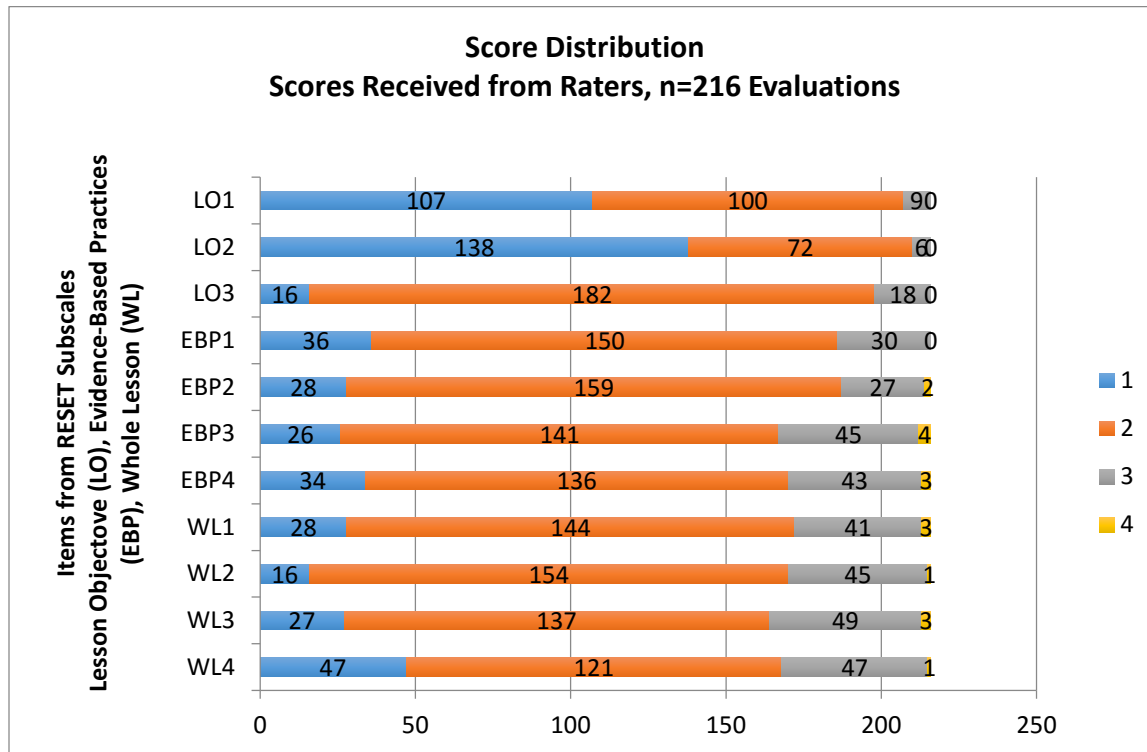
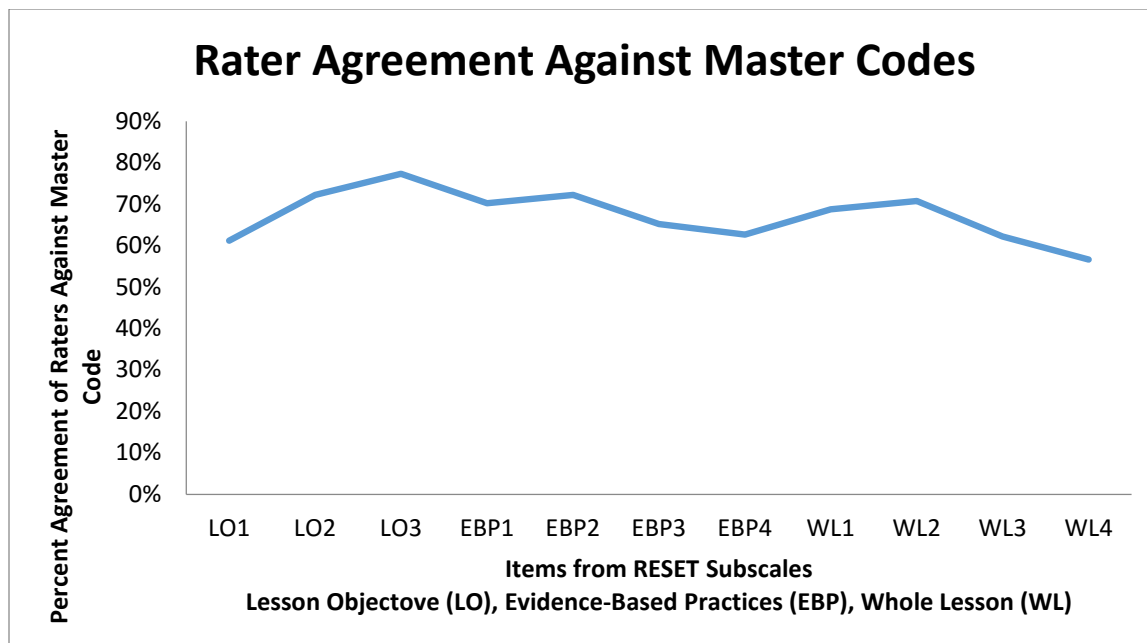


Figure 2. Rater agreement against master codes, n = 216 evaluations



To further assess the appropriateness of the scoring rules, we ran a correlation analysis to examine correlations among items within subscales. These results are presented in Table 2. In general, items belonging to the same subscale were more correlated to one another than they were to items belonging to other subscales. Correlations of items within subscales were statistically significant and moderate, ranging from .42 - .75, with the strongest correlations in subscale 3, Whole Lesson Summary.

Table 2

<i>Correlations of Items from RESET Observation Tool Subscale</i>											
	LO1	LO2	LO3	EBP1	EBP2	EBP3	EBP4	WL1	WL2	WL3	WL4
LO1	1	.49	.42	.28	.23	.38	.22	.19	.21	.28	.26
LO2		1	.46	.35	.25	.34	.27	.29	.27	.26	.32
LO3			1	.38	.39	.39	.35	.38	.35	.39	.35
EBP1				1	.59	.51	.53	.56	.51	.59	.61
EBP2					1	.52	.64	.62	.46	.60	.52
EBP3						1	.55	.52	.54	.49	.56
EBP4							1	.58	.55	.60	.66
WL1								1	.75	.70	.67
WL2									1	.66	.61
WL3										1	.71
WL4											1

All correlations were significant at the $p < .005$ level (2-tailed)

Note: Lesson Objective (LO), Evidence-Based Practices (EBP), Whole Lesson (WL)

Accurate and consistent application of scoring rules. To examine the accuracy of raters, we compared their scores against a master code (Figure 2). Using the master code, agreement rates varied between 57-77% for all scores, with the highest level of agreement for the LO subscale. To measure consistency, we reviewed the results of a generalizability theory analysis to examine the sources of variance for the scores obtained on the observations (Brennan, 2001; Shavelson & Webb, 1991). In our g-study, potential sources of variance included teachers, occasions within teachers, raters, items and interactions among these variables. To evaluate the consistency of application of scoring rules, we examined the variance attributed to raters, and found that it was low, accounting from between 2.5 – 8.2% of the variance. These results suggest that the scoring rule is applied accurately and consistently across raters.

The scoring is bias-free. There are two main sources of potential bias for the scoring of RESET: 1) the assignment of raters to teachers, and 2) the rater assignment of scores. All raters evaluated all teachers and videos, thus addressing the first potential source of bias. Our G-study provides some data to make a determination regarding the second source of bias, rater assignment of scores (Table 3). First, the amount of variance accounted for by Item x Rater interaction was very low across subscales. Additionally, there was a low percentage of variance accounted for by teacher x item x rater interactions. However, the amount of variance accounted for by a teacher x rater interaction was of some concern, ranging from 8.2 – 15.5% across the three subscales.

Table 3

Describing Variance Components for a I x R x (O:T) Generalizability Study

Source	Description	Lesson Objective	Evidence-Based Practice	Whole Lesson Summary
Teacher (T)	“True score” variance	9.5%	16.7%	15.8%
Item (I)	Some items are more difficult than others.	17.2%	0.1%	0%
Rater (R)	Some raters score more critically than others.	2.6%	5.6%	8.2%
Occasions (O:T)	Confounded with teacher score dependence on lessons.	4.1%	6%	1.7%
T x I	Some teachers score higher on certain items.	1.4%	4.6%	1.4%
T x R	Some raters score certain teachers higher.	8.2%	10.9%	15.5%
I x R	Some raters score certain items higher.	4.8%	0%	0.6%
T x I x R	Some raters score higher certain teachers on certain items.	2.4%	2.9%	0.9%
I x (O:T)	Some items receive higher scores on certain lessons. Confounded with teacher score dependence.	1.3%	0.9%	0.8%

(O:T) x R	Some raters score certain lessons higher. Confounded with teacher score dependence.	20.2%	21.3%	18.9%
Residual (O:T) x I x R, e	Error variance	28.2%	31%	36.3%
G-Coefficients	Relative (Absolute)	.79 (.77)	.84 (.81)	.86 (.82)

The data fit the scoring model. Confirmatory factor analyses (Table 4) were conducted on scores within each of the subscales. The results showed a two-factor solution best fit the scoring model (chi squared = 1268.93, $p < .000$), where the LO subscale constituted one factor, and the WL and EBP subscales loaded on the other. This suggests that the extent to which the teacher implements EBP is strongly related to the overall evaluation of the whole lesson, which is a reasonable finding, and consistent with the conceptual framework used to develop RESET.

Table 4

Results of a Confirmatory Factor Analysis of the Three Subscales of RESET

	<i>Factor 1</i>	<i>Factor 2</i>
W1	.85	.14
W3	.83	.18
W4	.81	.20
EBP4	.79	.16
W2	.79	.15
EBP2	.75	.19
EBP1	.71	.29
EBP3	.63	.39
LO1		.83
LO2	.16	.80
LO3	.32	.68

chi squared = 1268.93, $p < .000$

Note: Lesson Objective (LO), Evidence-Based Practices (EBP), Whole Lesson (WL)

Generalization Inference

For the generalization inference, it is important to determine the extent to which the observed performance is representative of all areas to which we wish to generalize. Two main assumptions about the generalization inference must be tested: 1) the sample adequately represents the universe of all possible observations, and 2) unexpected error is accounted for. To examine evidence for the generalization inference, we used a G-study approach (Brennan, 2001; Shavelson & Webb, 1991) to estimate the sources of variance in RESET. Table 4 reports the results of our G-study and the relative g-coefficient, which range from .79 - .86 across the three subscales. The g-coefficient is an indication to which we can conclude that the results are generalizable to the population of all elements that could have been used to develop the measurement instrument. This conclusion is generally determined reasonable if the reliability coefficient is at least .80 (Cardinet, Johnson, & Pini, 2010; Shavelson & Webb, 1991).

The largest sources of variance included the teacher being observed, the interaction of occasion (or lesson) with the rater, and the residual or error variance. Residual error is unexplained error, which in our results was the largest source of variation across all three subscales. Substantial residual error suggest that multiple observations will be needed to generalize with any degree of accuracy from the observations to general statements about a special education teacher's effectiveness. Interactions of teachers with raters constituted the next highest source of variance, which suggests that either more training, more calibration or more precise scoring rules or a

combination of the three are needed to reduce the interaction. Finally, the observed teachers were the third largest source of variance. Ideally, they would constitute the largest source of variance. Variance due to lessons was low, ranging from 1.7 to 6%, indicating that scores assigned to teachers generalize across lessons. All of these results however, must be interpreted cautiously, given the restriction of range of scores in the data set.

Discussion

Given the rapid pace at which teacher evaluation systems are being adopted and used to make high stakes decisions, it is critical to ensure that these measures are psychometrically defensible. Comprehensive approaches to establishing validity are needed, especially if observation scores are to be used for high-stakes decisions regarding special education teachers' promotion, retention and professional development. Following Bell et al.'s (2012) application of Kane's (2006) validity argument approach to observation protocols, the purpose of this study was to examine initial evidence regarding the scoring and generalization inferences of a special education observation protocol grounded in the evaluation of teachers' use of evidence-based instructional practices. Empirical examination of the scoring and generalization inferences was viewed as the first step in the process of validation of a special education teacher observation system. Our rationale for beginning with these two inferences is that a consistent scoring system that generalizes to the universe of observations is a necessary precursor to examining broader implications of a measure's use. In this section, we discuss the findings from our analysis in the context of current research on teacher observation systems, and outline potential next steps in collecting validity evidence for the extrapolation and decision IUAs for RESET.

Application of IUA Inferences

The RESET observation protocol was developed to provide a means by which special education teachers would receive feedback on their use of EBP within an evaluation system aligned with Danielson's FFT. To accomplish this, we focused on the instructional domain of the FFT framework, developed rubrics that explicate the components of a variety of EBP, and developed a scoring scheme consistent with the Danielson model. We also relied on the use of special education teachers as raters following the recommendations of Holdheide et al. (2012), to integrate the use of peer reviewers who have the appropriate qualifications and experience to make accurate judgments about teacher performance. Initial evidence shows that we can draw on what we know about EBP to develop an observation protocol with sufficient flexibility to evaluate special education teachers across a variety of contexts. The audit of the scores assigned to this sample indicated that we were able to achieve acceptable levels of consistency and agreement with master coded evaluations. This was an encouraging finding because one of the concerns about developing special education teacher evaluation systems is that they should not be separate or parallel to the general education teacher evaluation system, but rather, should be relevant for special education teachers but consistent with the overall framework in use for general education teachers (Holdheide, Hayes, & Goe, 2013).

However, our review of the scoring distribution was less encouraging. In this sample, the majority of scores received were on the low end of the scoring distribution. This finding was of particular concern because in our recruitment of participating special education teachers, we worked with special education directors to try to recruit a broad sampling of special education

teachers to include both highly skilled and novice teachers. The sample of observations that comprised our data set reflected an overall low quality of special education consistent with findings reported in classroom observation studies indicating that children do not always receive special education services that can reasonably be expected to mitigate the effects of their disabilities (Morgan, Frisco, Farkas, & Hibel, 2008). We interpret this finding in two ways. First, this finding suggests that future validation efforts will need to include a broader sampling process to help ensure a representation of all possible score values. Alternatively, the low distribution of scores validates one of the primary purposes of RESET, which was to design a system that would improve the instructional practice of special education teachers by drawing attention to the use of EBP and providing specific feedback to teachers. That so many special education teachers scored so poorly suggests that this evaluation system is needed. If it is the case that many special education teachers are performing on the lower end of the spectrum, we may need to develop a scoring scale that is more sensitive to differentiating across the lower levels of performance in order to help document growth and to provide finer-grain feedback to teachers for improvement.

The results of our CFA also provided useful insights for the continued development of RESET. RESET includes three subscales: a) lesson objective (LO), b) evidence-based practice (EBP), and c) whole lesson (WL) evaluation. The purpose of the LO subscale is to evaluate the extent to which special education teachers are able to communicate to their students the goal of the lesson, and to align instructional practice with that objective. The EBP subscale provides the evaluation of the use of evidence-based instructional practices. The WL subscale was developed to determine whether an overall rating of teacher performance during the lesson would correlate with the finer-grain scores on the other subscales. We wanted to test if higher levels of reliability on evaluations of teacher performance are achieved when based on overall evaluative judgments of teacher practice rather than scoring the components of instructional practice.

The results of our CFA indicated a two-factor solution best fit the data, with the EBP and WL subscales loading on a common factor. Initially, we were disappointed in this finding, and questioned whether the WL subscale might be redundant. However, as we examined our findings further in the context of next steps for implementation, we believe that the common loading of these two subscales may help to solve an important concern of implementing RESET in practice. Our analyses to date have been conducted using experienced special education teachers as raters. In the early stages of development, we felt this was important because we did not want to introduce scoring error due to a rater's lack of knowledge about EBP in special education. Evaluations conducted by trained peer evaluators are believed to enhance the credibility of the evaluation process and to provide valuable feedback to improve performance (Holdheide et al., 2013), yet school administrators often want to evaluate staff for whom they have responsibility of supervising. Future studies that examine the consistency of scoring on the WL subscale when evaluated by administrators compared to scoring when evaluated by experienced special education teachers may inform how to include administrators in the evaluation process while ensuring that special education teachers receive expert feedback on their instructional practice. This strategy can leverage the expertise of special education raters while creating a culture of continued learning and collaboration between administrators and district special education staff (Holdheide et al., 2013). If results on the WL subscale are consistent across raters, administrators, who have limited time and expertise to do in-depth evaluations of special

education teacher instruction, could evaluate teachers using the WL subscale only. Then, mentor teachers or special education directors could provide the more detailed evaluation and feedback on the components of instructional practice to special education teachers.

Generalization Inference and RESET Project Work. A critical assumption of any observation protocol is that we can generalize inferences about performance from a small set of observations to the universe of all possible observations (Kane, 2006). Although the g coefficients achieved in this study were in the acceptable range of $> .80$ (Shavelson & Webb, 1991), the distribution of variance was of some concern. In an ideal observation system, the primary source of variance would be the teachers being observed, with limited variance due to raters, observations, interactions of these factors, and residual error. In this data set, variance due to teachers was the third largest source of variance, but only accounted for between 10 to 17%. Upon further examination of the score distribution however, this may be due to the limited distribution of scores. Further studies that include a broader distribution of scores are needed. The residual, or error, in this study indicated that between 28 to 36% of the variance comes from contextual factors currently unaccounted for. This finding is consistent with results of observation protocol analyses reported elsewhere and leads us to draw conclusions similar to those reported by Bell et al. (2012). Further investigation of the contextual factors that affect teacher effectiveness is needed to ensure that we can justify the decisions made as a result of our observation protocols.

In earlier work on RESET, we found that four observations evaluated by four raters is optimal for achieving acceptable levels of reliability (Johnson & Semmelroth, 2013; Semmelroth & Johnson, 2014). This is consistent with results reported by other teacher evaluation systems (Bell et al., 2012; Hill, Charalambous, & Kraft, 2012; Ho & Kane, 2013; Kane & Staiger, 2012) that multiple observations are needed to achieve acceptable levels of reliability about a teacher's performance. Given the logistical challenges of implementing an evaluation system that requires multiple observations per teacher however, the appeal of more direct models, such as VAM are clear. It is significantly more expedient to determine teacher effectiveness based on student performance on standardized assessments. However, the challenges of applying VAM models not only in general, but especially to special education teachers are well documented (Baker et al., 2010; Buzick & Laitusis, 2010; Holdheide et al., 2012; Johnson & Semmelroth, 2014a; Jones & Brownell, 2014). And, as we have argued elsewhere, given the challenges faced in the special education teaching profession, a focus on improving instructional practice is absolutely necessary if we are to improve outcomes for students with disabilities (Johnson & Semmelroth, 2012, 2014a; Semmelroth, Johnson, & Allred, 2013).

Implications of Extrapolation and Decision Inferences. The underlying conceptual framework of RESET is that if special education teachers routinely employ evidence-based instructional practices in their teaching, outcomes for students with disabilities will improve.

Teacher evaluation models based primarily on student outcomes are insufficient for the evaluation of special education teachers because of the complexities of determining the percentage of their contribution to student outcomes, and because the performance of students with disabilities is typically assessed using a variety of outcomes (Johnson & Semmelroth, 2014a). Additionally, special education teachers enter the field without adequate preparation to implement evidence-based practice with fidelity therefore, an evaluation tool will need to focus on evidence-based instructional practice as a way to increase the effectiveness of special

education teachers (Johnson & Semmelroth, 2014a). Finally, measures of instructional practice should correlate highly with measures of student growth, and this is the main premise upon which RESET is based. Through the use of research-based instructional practice, students with disabilities should realize levels of growth consistent with those reported in the research. In other words, high levels of fidelity of implementation of an instructional practice should correspond with levels of student growth commensurate with those reported in the research. Next steps for validating the use of RESET include testing these underlying assumptions of the conceptual framework. This will be accomplished by collecting data on student performance and linking measures of growth to the evaluation of the teachers' use of EBP. Our hypothesis is that teachers who are more adept at implementing relevant instructional practices will help their students realize growth in performance consistent with the effect sizes reported in the research.

Although the correlation between fidelity of implementation and student growth seems intuitive, Kane and Staiger (2012) reported small correlations (.19) between VAM and FFT. There are several plausible explanations for the low correlations, one of which is the restriction of range in Kane and Staiger's (2012) data set because of the distribution of scores on FFT. Disproportionate numbers of teachers were rated as proficient or distinguished on most items on FFT, suggesting that evaluations of teacher practice did not reliably discriminate among those who were skilled versus those who were not. Another plausible explanation is that the two measures tap such different elements of teaching, that measures of both are needed. Although RESET is designed to have a more direct alignment between instructional practice and student outcome, the results reported by Kane and Staiger (2012) suggest that further investigation of the relationship between instructional implementation and student growth is critical. In continuing the validation process, studies that examine the relationship of high levels of implementation of EBP and the growth that students with disabilities are able to achieve will be a significant component of establishing the psychometric defensibility of RESET. Finally, the underlying assumption of RESET is that attention must be drawn to the use of EBP in order for teachers to improve practice. Validation studies that examine the effect on teacher practice over time will establish whether the decisions made based on RESET support this assumption.

Conclusions

Teacher evaluation systems are being used to make high-stakes decisions about teacher performance, retention and pay, yet few systems have been examined to determine their psychometric defensibility to warrant these decisions (Herlihy et al., 2014) especially those developed for special education teachers. This paper described one model of special education teacher evaluation and examined initial evidence to determine its reliability and validity. The results are promising, but significantly more work is needed to develop a system that is both useful and fair. If we are to be successful in improving the practice of special education teachers, we will need to ensure that our evaluation systems: 1) reliably discriminate between effective and ineffective special education teachers, 2) measure and provide targeted, specific, corrective feedback for teacher instructional practice, and 3) include the use of individualized student growth rates to define teacher effectiveness. Most importantly, we must ensure that our evaluation system leads to sound decisions regarding instructional practice, and ultimately services provided to students with disabilities.

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***Teaching Play Skills Through the Use of Assistive Technology and Instructional Strategies:
A National Survey***

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Abstract

Play is often considered the main occupation of early childhood. Despite the importance of play, young children with disabilities may not achieve the same experiences as their typically developing counterparts. Literature supports the use of specific instructional strategies to promote the acquisition of play skills. In addition to utilizing specific instructional strategies to teach play skills, assistive technology (AT) can support positive outcomes. The authors conducted a survey study in order to advance our understanding of early childhood special education professionals' knowledge and use of instructional strategies and AT to teach play skills to young children with disabilities. The participants' reported knowledge and use of instructional strategies to teach play skills to young children with disabilities was high relative to their knowledge and use of AT. Furthermore, early childhood special education professionals reported that they did not vary their use of instructional strategies based on the AT tool. Implications of these findings for research and practice are discussed.

***Teaching Play Skills Through the Use of Assistive Technology and Instructional Strategies:
A National Survey***

Play is often considered the main occupation of early childhood and has been acknowledged as a human right of every child by the Office of the United Nations High Commission for Human Rights (1989). Researchers, theorists, and educators promote play and social interaction as essential components of healthy child development (Ginsburg, 2007; Heidemann & Hewitt, 2010; Samuelsson & Johansson, 2006). As children play, they practice and become proficient at a range of skills and roles needed for later life (Mistrett, Lane, & Goetz, 2000; Parham, 2008). It is through play that children learn about human relationships, explore objects in the environment, learn to solve problems, make decisions, persevere, acquire pre-literacy skills, lead and follow others, and experience acceptance (e.g., Knox, 2010; Parham, 2008; Terpstra, Higgins, & Pierce, 2002).

Despite the importance of play, young children with disabilities may not achieve the same experiences as their typically developing counterparts. Researchers have described the range of play skills seen in children with disabilities as limited and passive, with rates of play less frequent than typically developing peers (e.g., Florey, 1971; Lane & Mistrett, 1996; Li, 1981; Missiuna & Pollock, 1991; Mistrett et al., 2000). Given that children with disabilities may experience physical, cognitive, and social delays and may therefore struggle to participate in play and social interactions, it is important that early childhood educators utilize differentiated

methods to teach play and social interaction skills (Knox, 2010; McCormick, 2003; O'Brien, 1997; Peterson & McConnell, 1993; Terpstra, Higgins, & Pierce, 2002).

Instructional Strategies to Support the Acquisition of Play Skills

Literature supports the use of specific instructional strategies to promote the acquisition of play skills. These strategies include embedding learning opportunities into naturally occurring events (e.g., Girard, Girolametto, Weitzman, & Greenberg, 2011; Horn, Lieber, Li, Sandall, & Schwartz, 2000), developing activities that are meaningful to a child (e.g., McCormick, 2003; Terpstra et al., 2002), modifying the environment to incorporate games, songs, peers, and siblings (e.g., Chandler, 1998; Peterson & McConnell, 1993), peer and teacher modeling (e.g., McCormick, 2003; Terpstra et al., 2002), teaching the use of substitute and imaginary play objects (e.g., Heidemann & Hewitt, 2010; Peterson & McConnell, 1993), incorporating the use of prompting techniques (e.g., Barton & Pavilanis, 2012; Barton & Wolery, 2010), adults joining but letting children direct play (e.g., Berk, 2012; Heidemann & Hewitt, 2010), and using Social Stories™ (Gray, 2010; Test, Richter, Knight, & Spooner, 2011). Despite strong evidence regarding the use of specific instructional strategies to support the acquisition of play skills in early childhood learning environments, there is limited research to date examining what instructional strategies educators are familiar with, and how often these strategies are implemented in early childhood special education settings.

In addition to utilizing specific instructional strategies to teach play and social interaction skills, assistive technology (AT) can support positive outcomes if teachers understand, use, and integrate the technology into the curriculum (Council for Exceptional Children, 2010).

Assistive Technology to Support Play

The Technology-Related Assistance for Individuals with Disabilities Act of 1998 defines AT as “any item, piece of equipment or product system whether acquired commercially off the shelf, modified, or customized that is used to increase or improve functional capabilities of individuals with disabilities” (Tech Act; Public Law 100-407). AT includes both low-tech objects (i.e., graphic symbols, communication boards, adapted books, adapted play materials, positioning devices, and self-regulation objects) and high-tech objects (i.e., switch operated toys, video, tablet computers, computer peripherals, computers, and speech generating devices (SGD)). In addition to being identified as high or low tech, AT can also be described according to its functional use, including; dedicated AT to support communication, dedicated AT to support access/engagement, and non-dedicated AT.

Dedicated AT devices that have been used in early childhood environments to support communication include graphic symbols (e.g., Nelson, McDonnell, Johnston, Crompton, & Nelson, 2007; Skau & Cascella, 2006), communication boards (e.g., Lane & Mistrett, 1996; Nunes & Hanline, 2007), and speech generating devices (e.g., Campbell, Milbourne, Dugan, & Wilcox, 2006; Evans Cosbey & Johnston, 2006; Skau & Cascella, 2006; van der Meer et al., 2012). Dedicated AT devices that have been used in early childhood environments to support access and/or engagement include positioning devices (e.g., Costigan & Light, 2010; Lane & Mistrett, 1996), self-regulation objects (e.g., Hodgetts, Magill-Evans, & Misiaszek, 2011; Thompson & Johnston, 2013), adapted play materials (Hamm, Mistrett, & Goetz Ruffino, 2006; Lane & Mistrett, 1996), adapted books (e.g., Hamm et al., 2006), single switch operated toys

(e.g., Hamm et al., 2006; Lane & Mistrett, 1996), and computer peripherals (e.g., Campbell et al., 2006). Non-dedicated AT devices that have been used in early childhood environments include video (e.g., Buggey, Hoopes, Sherberger, & Williams, 2011), tablet computers (e.g., Aronin, 2013; Couse & Chen, 2010), and laptop and desktop computers (e.g., Campbell et al., 2006; More, 2008).

In summary, many of the challenges experienced by children with disabilities can be addressed through the use of AT (Parette & Stoner, 2008). However, despite promising evidence supporting the use of AT in early childhood learning environments, research examining what AT tools early childhood special education professionals are familiar with, and how often these tools are used in early childhood special education settings is lacking.

Assistive Technology Tools Used in Combination with Instructional Strategies

In addition to considering the use of instructional strategies and AT separately, it is important to consider the extent to which AT is used in combination with evidence based instructional strategies to achieve positive outcomes. This is particularly important in light of research demonstrating that the use of AT in conjunction with specific instructional strategies can be a successful method for increasing learning. For example, Nelson et al. (2007) demonstrated that the combined use of specific instructional strategies (i.e., modeling, least to most prompting) and a low-tech visual-graphic symbol (i.e., a laminated paper key that symbolized a request to enter a play situation) resulted in an increase in play initiations, as well as an increase in the amount of time spent in higher levels of play for four preschool aged children with autism. Similarly, van der Meer et al. (2012) successfully used specific instructional strategies (i.e., modeling, least to most prompting) in combination with AT (i.e., speech generating devices) to teach four children with disabilities to request desired snacks, toys, and social interaction. Finally, Evans Cosbey and Johnston (2006) demonstrated the effectiveness of a specific instructional strategy (i.e., most to least prompting) in conjunction with a single message speech generating device to teach three young students with multiple disabilities to engage in social interactions.

Despite research suggesting the effectiveness of using evidence based instructional strategies in conjunction with AT to support the development of play skills for young children with disabilities, comprehensive information related to early childhood professionals' use of instructional strategies in conjunction with AT is unknown.

In order to advance our understanding of early childhood professionals' knowledge and use of instructional strategies and AT to teach play skills to young children with disabilities, the authors conducted a survey study to address the following questions:

1. What evidence based instructional strategies do early childhood special education professionals know about and use to teach play skills to young children with disabilities?
2. What AT tools do early childhood special education professionals know about and use?
3. What instructional strategies do early childhood special education professionals use in conjunction with AT to teach play skills to young children with disabilities?

Methods

Participants and Sampling Procedures

Surveys were mailed to a random sample of 500 Division of Early Childhood (DEC) members, a division of the Council for Exceptional Children (CEC). The 500 names and addresses of DEC members were purchased from the CEC through the American List Counsel, Inc. (ALC), a company that manages, maintains, fulfills orders, and handles invoicing for the CEC direct mail file. The sample of 500 DEC members was obtained through a computer program used by ALC for the purpose of randomly selecting member names and addresses. The sampling procedure included dividing all available member names of DEC (approximately 5,259 in March 2012) by an n th number. The n th number was computed by dividing the number of DEC members (5259) by the desired sample size (500). This computation produced the number 10.59 (e.g., $5259/500 = 10.59$). This number was used by ALC to randomly select every 10th record from the file of DEC member names.

Instrumentation

A 12-page survey was developed to obtain information regarding participants' (a) knowledge and use of strategies to teach play skills to children with disabilities, (b) knowledge and use of AT, and (c) use of specific instructional strategies in conjunction with AT. The survey was developed based on a review of literature regarding (a) instructional strategies for teaching play skills, and (b) the use of AT in early childhood settings. Based upon the review of literature, the researchers identified 25 strategies for teaching play skills and 16 AT tools used in early childhood special education settings. This list of strategies and AT tools was used to create the questions posed in the context of the survey.

The survey consisted of four sections. In the first section, participants were asked specific questions related to their background and professional experiences. Questions were designed to obtain information regarding the participants' highest educational degree received, years of professional experience, current professional position, and types of children with disabilities served in their employment setting(s).

In the second section, participants were asked to indicate their level of knowledge ("very knowledgeable", "knowledgeable", "somewhat knowledgeable", and "do not know this strategy") for each of 25 strategies to teach play skills. Then, participants were asked to indicate their level of use ("very frequently", "frequently", "occasionally", "never use(d) this strategy") for each of the 25 strategies.

In the third section, participants were asked to indicate their level of knowledge ("very knowledgeable", "knowledgeable", "somewhat knowledgeable," or "do not know this tool") for each of 16 AT tools. The participants were then asked to indicate their level of use ("very frequently", "frequently", "occasionally," or "never use(d) this tool") for each of the 16 AT tools.

In the fourth section, participants were asked to provide information regarding their use of each instructional strategy in combination with each AT tool. Specifically, for each of the 16 identified AT tools, participants were asked to indicate whether they had used the AT and, if yes,

whether they had used each of the 25 specified instructional strategies in conjunction with that AT tool.

Following the initial design and development phase, a field test was conducted during which 10 professionals who currently work or have worked in the field of early childhood special education completed the draft survey. The main purpose of the field-testing was to (a) guide revisions that would improve clarity and facilitate completion of the survey, (b) acquire information regarding whether obtained results would answer the research questions, and (c) obtain an estimate of the time required to complete the survey. Based upon the feedback provided, changes were made in the format of questions and wording of directions. Field test results revealed that the estimated time for completion of the survey was 20-30 minutes. A copy of the survey is available upon request.

Mailing and Follow-up Procedures

An initial mailing and two follow-up mailings were conducted in accordance with the procedures outlined as part of the Total Design and Tailored Design Methods (Dillman, 1978; Dillman, Smyth, & Christian, 2009). Survey packets were mailed to the randomly selected DEC members. One address was invalid and was returned to the researchers via the postal service.

The initial mailing consisted of a survey booklet that included an introductory letter describing the purpose of the study and encouraging the individual to participate; a copy of the survey; a “consent to participate” letter with information from the researchers’ university Institutional Review Board (IRB); and a self-addressed stamped return envelope.

The follow-up mailings were sent after the original mailing. The first follow-up mailing was sent one week after the original mailing and consisted of a post card thanking those who had already completed and returned the survey, and encouraging those who had not done so to do so promptly. The final mailing was sent four weeks after the original mailing to individuals from whom a reply had not been received. This mailing consisted of a letter stressing the importance of their response and encouraging their participation; a new copy of the survey; a “consent to participate” letter with information from the researchers’ university Institutional Review Board (IRB), and a self-addressed, stamped envelope for returning the questionnaire.

Survey Processing and Data Analysis

A total of 108 of the 499 surveys were returned (approximately 22%). One returned survey was incomplete and therefore was not coded for data analysis. The responses to the surveys were recorded and entered on an Excel spreadsheet for analysis. In order to assess inter-rater reliability of data entry, a graduate student assistant recoded 10% of the surveys. The data entry on the recoded surveys was then compared to the original data entry. The comparison revealed an inter-rater reliability of 98.8% for data entry.

Results

The following sections provide information related to the responses obtained from survey participants. This includes data related to (a) professional background of participants, (b) participants’ knowledge and use of identified instructional strategies, (c) participants’ knowledge

and use of specified AT tools, and (d) participants' use of specified instructional strategies in conjunction with identified AT tools.

Background Information of Participants

Data related to respondents' background information was obtained from the returned surveys and was coded for data analysis (see Table 1). As noted in Table 1, the largest percentage of participants indicated that a "Master's degree" was their highest educational degree (70.1%, n=75). In terms of years of professional experience, the largest group of individuals (55.1%, n=59) reported "16+ years" of experience working in the field of early childhood special education. Among the respondents, 46.2% (n=54) indicated their current professional position as an "Early Interventionist/Early Childhood Special Educator."

Participants were also asked to indicate the types of disabilities that children were diagnosed with in their current employment settings (i.e., intellectual disability, cerebral palsy, autism spectrum disorder, Down syndrome, apraxia of speech, CVA, degenerative neurological disorders, traumatic brain injury, developmental delay, dyspraxia, sensory processing disorder, and other). The highest percentages of disability types served in participants' employment settings were "autism spectrum disorder" (17.2%, n=76), "developmental delay" (16%, n=71), and "intellectual disability" (12.6%, n=56).

Table 1

Background Information of Questionnaire Participants (n=107)

Characteristic	%	n
Degree:		
High School diploma	0	0
Associate's degree	1.9	2
Bachelor's degree	18.7	20
Master's degree	70.1	75
Doctorate degree	9.3	10
Years of professional experience in a field that serves children with disabilities:		
1-5	14.0	15
6-10	21.5	23
11-15	9.3	10
16+	55.1	59
Current Professional Positions (n=117):		
Early interventionist/ Early childhood special educator	46.2	54
Administrator in public/private education	15.4	18

Instructor in higher education program	5.1	6
Tenure track professor in higher education program	3.4	4
Early intervention/School-related service provider: Speech therapist	3.4	4
Early intervention/School-related service provider: Physical therapist	0.9	1
Characteristic	%	n
Early intervention/School-related service provider: Occupational therapist	0	0
Not currently working	3.4	4
Other	22.2	26
Disability types of individuals served in current employment settings (n=443):		
Autism spectrum disorder	17.2	76
Developmental delay	16.0	71
Intellectual disability	12.6	56
Sensory processing disorder	11.1	49
Down syndrome	9.5	42
Cerebral palsy	8.1	36
Apraxia of speech	7.4	33
Dyspraxia	3.4	15
Traumatic brain injury	5.4	24
Degenerative neurological disorders	3.8	17
CVA (stroke)	1.8	8
Currently not serving	3.6	1

Knowledge and Use of Instructional Strategies to Teach Play Skills

Table 2 summarizes participants' reported knowledge of each of 25 strategies used to teach play skills in early childhood settings. The range of responses in each of the four ranking categories across all instructional strategies was: "very knowledgeable" (range=37-73%); "knowledgeable" (range=25-52%); "somewhat knowledgeable" (range=1-25%); "do not know" (0-3%).

The instructional strategies that received the highest percentage of responses in the category of "very knowledgeable" were "encourage turn taking and sharing of play materials" (73%), "facilitate child-to-adult and child-to-child verbal interactions by talking about what you

are doing while engaged in activities” (69%), and “develop activities that are meaningful to a child” (67%). The instructional strategies that received the lowest percentage of responses in the category of “very knowledgeable” were “teach play and social interaction skills through a Social Story™” (37%), “teach a child to join a playgroup”(38%) and “teach children to use substitute or imaginary objects during play scenarios” (38%).

Table 2 also summarizes participants’ reported use of each teaching strategy. The range of responses in each of the four ranking categories across all instructional strategies was: “very frequently” (range=23-69%); “frequently” (range=24-45%); “occasionally” (range=3-45%); “never use(d) this strategy” (0-10%).

The instructional strategies that received the highest percentage of responses in the category of “very frequently” were “develop activities that are meaningful to a child” (69%), “encourage turn taking and sharing of play materials” (60%), and “facilitate child-to-adult and child-to-child verbal interactions by talking about what you are doing while engaged in activities” (58%). The instructional strategies that received the lowest percentage of responses in the category of “very frequently” were “teach play and social interaction skills through a Social Story” (23%), “teach a child to join a playgroup” (27%), and “teach children to use substitute or imaginary objects during play scenarios” (27%).

Table 2
Knowledge and Use of Instructional Strategies to Teach Play and Social Interaction Skills to Children with Disabilities

STRATEGY	Knowledge of Strategy				Use of Strategy			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Strategy
Encourage communication within and outside of children’s play roles.	58%	30%	10%	3%	51%	33%	9%	8%
Provide verbal, gestural or physical supports to encourage a child’s own attempts to join a play group.	57%	31%	8%	3%	46%	30%	19%	5%
Give a child the highest level of prompt necessary for successful completion of a skill. Decrease the level of prompting to none as quickly as possible.	57%	33%	8%	2%	50%	28%	17%	7%

STRATEGY	Knowledge of Strategy				Use of Strategy			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Strategy
Encourage communication within a play scenario by making comments that connect one child to another within the play scenario.	56%	31%	12%	1%	46%	29%	21%	4%
Encourage new play skills by playing next to a child with the same materials, but not playing with the child directly.	55%	30%	16%	0%	37%	31%	28%	4%
Facilitate play skills by joining the on-going play of children, but let them direct the control of play.	54%	30%	14%	2%	46%	27%	24%	3%
When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills.	52%	44%	4%	0%	44%	45%	10%	1%
Encourage children to resolve conflicts during play in ways that are mutually acceptable to all players.	52%	37%	12%	0%	40%	38%	21%	2%
Teach children to take on play roles.	46%	43%	11%	1%	31%	27%	34%	7%
Teach peers to demonstrate or model desired play behaviors.	45%	33%	21%	1%	31%	36%	27%	6%
Begin a play scenario, assume partial control, and teach new play behaviors inside outside of the play scenario.	42%	38%	17%	3%	33%	32%	27%	8%
Teach skills for developing positive, accepting friendships.	42%	45%	12%	1%	39%	35%	23%	3%
Encourage turn taking and sharing of play materials.	73%	26%	1%	0%	60%	31%	8%	1%
Facilitate child-to-adult and child-to-child verbal interactions by talking about what you are doing while engaged in activities.	69%	25%	6%	0%	58%	29%	10%	2%

STRATEGY	Knowledge of Strategy				Use of Strategy			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Strategy
Develop activities that are meaningful to a child.	67%	29%	4%	0%	69%	27%	3%	0%
Change or modify the environment to encourage play and social interaction.	65%	31%	4%	1%	52%	33%	15%	1%
Model or demonstrate desired play behaviors.	63%	33%	4%	0%	55%	30%	15%	0%
Develop goals that can be addressed in naturally occurring classroom or home activities.	62%	32%	6%	0%	51%	36%	12%	1%
Allow a child to attempt a skill before intervening with prompts. Give only the amount of prompting needed for the child to be successful in skill.	61%	33%	5%	1%	48%	33%	18%	1%
Modify or expand an activity to encourage the development of a specific skill.	58%	37%	5%	0%	56%	32%	12%	1%
Modify games and songs to increase opportunities for social interaction.	58%	36%	6%	0%	48%	37%	16%	0%
Teach typically developing peers and siblings strategies for interacting with a child who has disabilities.	39%	46%	12%	3%	31%	28%	32%	10%
Teach children to use substitute or imaginary objects during play scenarios.	38%	52%	10%	1%	27%	33%	32%	7%
Teach a child to join a playgroup.	38%	44%	15%	3%	27%	40%	24%	8%
Teach play and social interaction skills through a Social Story™.	37%	37%	25%	2%	23%	24%	45%	7%

Note. Not all totals equal 100%, due to rounding errors.

Knowledge and Use of Assistive Technology

Table 3 summarizes the participants' reported knowledge for each of 16 different AT tools. The range of responses in each of the four ranking categories across all AT tools were: "very

knowledgeable” (range=9-57%); “knowledgeable” (range=22-39%); “somewhat knowledgeable” (range=5-43%); “do not know this tool” (0-27%).

The AT tools that received the highest percentage of responses in the category of “very knowledgeable” were “Graphic Symbols: Photographs, picture symbols, or printed words used to support communication” (57%), and “Desk Top Computer: Personal computer stationed at one location that is mainly operated by a keyboard, mouse, or touch screen” (51%). The AT that received the lowest percentage of responses in the category of “very knowledgeable” were “Greater than [32] Message Speech Generating Device (SGD): Electronic communication system that enables individuals to communicate more than 32 messages using pre-stored or self-generated messages (i.e., dedicated SGDs: digitized and/or synthesized speech, tablet computers with software that allows for speech output)” (9%), “Computer Peripherals: Devices attached to a host computer (e.g., alternate keyboards, interface devices, joysticks, optical pointing devices, typing aids, track balls, touch screens)” (18%), and “Video: Electronically capture, record, process, store, and transmit a series of images” (20%).

Table 3 also summarizes participants’ reported use of each of the identified AT tools. The range of responses in each of the four ranking categories across all AT was: “very frequently” (range=6-50%); “frequently” (range=14-32%); “occasionally” (range=17-46%); “never use(d) this tool” (2-56%).

The AT that received the highest percentage of responses in the category of “very frequently” were “Graphic Symbols: Photographs, picture symbols or printed words, used to support communication” (50%), and “Communication Boards, Books, Charts, Cards: Boards, books, charts or cards arranged with graphic symbols to support communication” (39%). The AT that received the lowest percentage of responses in the category of “very frequently” were “Greater Than [32] Message Speech Generating Device (SGD): Electronic communication system that enables individuals to communicate more than 32 messages using pre-stored or self-generated messages (i.e., dedicated SGDs: digitized and/or synthesized speech, tablet computers with software that allows for speech output)” (6%), “Video: Electronically capture, record, process, store, and transmit a series of images” (7%), “Tablet Computer: A mobile, hand-held computer with a flat touch screen that is mainly operated by touching the screen (e.g., iPad)” (13%), and “[2-32] Message Speech Generating Device (SGD): Electronic communication system that enables individuals to communicate 2-32 messages” (13%).

Table 3
Knowledge and Use of Assistive Technology

TOOL	Knowledge of Tool				Use of Tool			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Tool
Graphic Symbols: Photographs, picture symbols or printed words, used to support receptive and/or expressive communication.	57%	38%	5%	0%	50%	30%	17%	2%
Desk Top Computer: Personal computer stationed at one location, and is mainly operated by a keyboard, mouse, or touch screen.	51%	39%	7%	3%	36%	27%	25%	12%
Lap Top Computer: Personal computer that is mobile, and is mainly operated by a keyboard and touch pad.	49%	37%	10%	3%	31%	22%	25%	21%
Communication Boards, Books, Charts, and Cards: Boards, books, charts or cards arranged with graphic symbols to support communication.	44%	46%	7%	3%	39%	32%	26%	3%
Self-Regulation Objects: Objects that promote self-regulation to help a child participate in classroom activities (e.g. weighted vest, sit-n-move cushion).	36%	33%	29%	2%	26%	25%	36%	14%
Adapted Books: Books altered to meet the needs and abilities of a child (e.g., pager turners, reads to student, Braille, enlarged pictures/print).	33%	29%	33%	5%	23%	17%	39%	22%
Single Switch Operated Toys: Toys activated by a single switch or button.	31%	34%	30%	4%	18%	14%	46%	23%
Single Message Speech Generating Device (SGD): Electronic communication system	30%	25%	28%	17%	16%	18%	36%	31%

TOOL	Knowledge of Tool				Use of Tool			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Tool
that enables individuals to communicate a single, recorded message.								
Adapted Play Materials: Toys/Materials that are modified with visual, tactile, or auditory features; stabilized, built- up, mounted to a surface, or confined in an area in order to be made easier to manipulate/operate.	28%	35%	34%	3%	14%	23%	44%	19%
Tablet Computer: A mobile, hand-held computer with a flat touch screen that is mainly operated by touching the screen (e.g., iPad).	27%	36%	29%	8%	13%	17%	37%	34%
Positioning Devices: Assistive equipment used to help assume and/or maintain positions so that a child can explore or manipulate objects in their environment.	25%	33%	35%	8%	20%	21%	33%	27%
[2-32] Message Speech Generating Device (SGD): Electronic communication system that enables individuals to communicate 2-32 messages.	23%	24%	34%	19%	13%	16%	35%	37%
Video: Electronically capture, record, process, store, and transmit a series of images.	20%	39%	32%	9%	7%	15%	44%	34%
Computer Peripherals: Devices attached to a host computer (e.g., alternate keyboards, interface devices, joysticks, optical pointing devices, typing aids, track balls, touch screens).	18%	31%	40%	12%	15%	14%	41%	30%
Greater Than [32] Message Speech Generating Device (SGD): Electronic communication system that	9%	22%	43%	27%	6%	14%	24%	56%

TOOL	Knowledge of Tool				Use of Tool			
	Very Knowledgeable	Knowledgeable	Somewhat Knowledgeable	Do Not Know This Strategy	Very Frequently	Frequently	Occasionally	Never Use(d) This Tool
enables individuals to communicate more than 32 messages using pre-stored or self-generated messages (i.e., dedicated SGDs: digitized and/or synthesized speech, tablet computers with software that allows for speech output).								

Note. Not all totals equal 100%, due to rounding errors.

Instructional Strategies Used in Combination with AT

Table 4 lists the five instructional strategies that were reported as being used most frequently in conjunction with each AT tool. When all AT tools were combined, the five most used instructional strategies were “change or modify the environment to encourage play and social interaction”, “develop activities that are meaningful to a child”, “modify or expand an activity to encourage the development of a specific skill”, “when preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills”, and “modify games and songs to increase opportunities for social interaction”, respectively.

Table 4 also illustrates the most commonly used instructional strategies when the AT tools were sub-divided according to functional use (i.e., dedicated AT to support communication, dedicated AT to support access/engagement, non-dedicated AT). Although the rankings varied, the top five strategies used in combination with dedicated AT tools to support communication (i.e., gestures, graphic symbols, communication boards, SGDs) were the same as the top five strategies used across all AT tools. Similarly, four of the five most frequently used strategies across all AT tools were also among the five most frequently used strategies used in conjunction with dedicated AT tools designed to support access/engagement (i.e., positioning devices, self-regulation objects, adapted play materials, adapted books, single switch operated toys, computer peripherals). However, “modify games and songs to increase opportunities for social interactions” was replaced by “develop goals that can be addressed in naturally occurring classroom or home activities” as the fifth most used instructional strategy in combination with dedicated AT tools to support access or engagement. Finally, although the ranked order was slightly different, the top five instructional strategies used across all AT tools were also the top five instructional strategies used in conjunction with AT tools related to non-dedicated computers and technology (i.e., video, tablet computer, lap top computer, desk top computer). However, two additional instructional strategies (i.e., “modify games and songs to increase opportunities for social interaction”, “develop goals that can be addressed in naturally occurring

classroom or home activities”) were tied with “when preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills” as the 5th most used instructional strategy that was utilized in conjunction with non-dedicated computer and technology AT tools.

Table 4

Top Five Instructional Strategies Used in Conjunction with Each Assistive Technology Tool

Function of AT	AT Tool	Top Five Most Frequently Used Strategies
Dedicated AT to Support Communication	Graphic Symbols	1. Develop activities that are meaningful to a child. 2. Change or modify the environment to encourage play and social interaction. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify or expand an activity to encourage the development of a specific skill. 5. Modify games and songs to increase opportunities for social interaction.
	Communication Boards	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify or expand an activity to encourage the development of a specific skill. 5. Modify games and songs to increase opportunities for social interaction.

Function of AT	AT Tool	Top Five Most Frequently Used Strategies
Dedicated AT to Support Communication	Single Message Speech Generating Device	1. Change or modify the environment to encourage play and social interaction. 2. Modify or expand an activity to encourage the development of a specific skill. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify games and songs to increase opportunities for social interaction. 5. Develop activities that are meaningful to a child.
	[2-32] Message Speech Generating Device	1. Change or modify the environment to encourage play and social interaction. 2. Modify or expand an activity to encourage the development of a specific skill. 3. Develop activities that are meaningful to a child. 4. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 5. Modify games and songs to increase opportunities for social interaction.
	Greater than [32] Message Speech Generating Device	1. Change or modify the environment to encourage play and social interaction. 2. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 3. Modify or expand an activity to encourage the development of a specific skill. 4. Develop goals that can be addressed in naturally occurring classroom or home activities. 5. Modify games and songs to increase opportunities for social interaction.
Dedicated AT to Support Access/Engagement	Positioning Devices	1. Develop activities that are meaningful to a child. 2. Change or modify the environment to encourage play and social interaction. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify or expand an activity to encourage the development of a specific skill. 5. Develop goals that can be addressed in naturally occurring classroom or home activities.

Function of AT	AT Tool	Top Five Most Frequently Used Strategies
Dedicated AT to Support Access/Engagement	Self-Regulation Objects	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. Develop goals that can be addressed in naturally occurring classroom or home activities. 4. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 5. Modify or expand an activity to encourage the development of a specific skill.
	Adapted Play Materials	1. Develop activities that are meaningful to a child. 2. Change or modify the environment to encourage play and social interaction. 3. Modify or expand an activity to encourage the development of a specific skill. 4. Modify games and songs to increase opportunities for social interaction. 5. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills.
	Adapted Books	1. Develop activities that are meaningful to a child. 2. Change or modify the environment to encourage play and social interaction. 3. Modify or expand an activity to encourage the development of a specific skill. 4. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 5. Teach play and social interaction skills through a Social Story (e.g., a story that follows guidelines, and describes a circumstance, skill, or concept with social cues, perspectives, and common responses for a specific situation).
	Single Switch Operated Toys	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. Modify or expand an activity to encourage the development of a specific skill. 4. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 5. Modify games and songs to increase opportunities for social interaction.

Function of AT	AT Tool	Top Five Most Frequently Used Strategies
Non-Dedicated AT	Computer Peripherals	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify or expand an activity to encourage the development of a specific skill. 5. Develop goals that can be addressed in naturally occurring classroom or home activities.
	Video	1. Modify games and songs to increase opportunities for social interaction. 2. Change or modify the environment to encourage play and social interaction. 3. Develop activities that are meaningful to a child. 4. Teach play and social interaction skills through a Social Story (e.g., a story that follows guidelines, and describes a circumstance, skill, or concept with social cues, perspectives, and common responses for a specific situation). 5. Model or demonstrate desired play behaviors.
	Tablet Computer	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. Modify or expand an activity to encourage the development of a specific skill. 4. Develop goals that can be addressed in naturally occurring classroom or home activities. 5. Teach typically developing peers or siblings strategies for interacting with a child who has disabilities.
	Laptop Computer	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. Develop goals that can be addressed in naturally occurring classroom or home activities. 4. Modify or expand an activity to encourage the development of a specific skill. 5. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills.

Function of AT	AT Tool	Top Five Most Frequently Used Strategies
Non-Dedicated AT	Desktop Computers	1. Change or modify the environment to encourage play and social interaction. 2. Develop activities that are meaningful to a child. 3. When preparing to teach new skills, initially select tasks that are low effort for the child, progressing to higher effort skills. 4. Modify or expand an activity to encourage the development of a specific skill. 5. Modify games and songs to increase opportunities for social interaction.

Discussion

Knowledge and Use of Instructional Strategies

The participants' reported knowledge of instructional strategies to teach play skills to young children with disabilities was highest in the categories of "very knowledgeable" and "knowledgeable". If these two categories are combined, the reported knowledge across all instructional strategies ranged from 74%-99%. While a large percentage of participants identified themselves as "very knowledgeable" or "knowledgeable" with regard to the identified instructional strategies, it is noteworthy to examine trends across the different types of instructional strategies. Specifically, it is interesting to note that the verb "teach" was included in the description for all instructional strategies that received less than 50% of responses indicating "very knowledgeable". Conversely, none of the instructional strategies that received greater than 50% of the responses indicating "very knowledgeable" included the verb "teach". Instead, instructional strategies that received greater than 50% of the responses indicating "very knowledgeable" included verbs such as; "encourage", "facilitate," or "demonstrate." This finding may suggest that educators feel less knowledgeable about instructional strategies that involve teaching a child a specific behavior (e.g., "teach a child to join a play group") and more knowledgeable about instructional strategies that involve manipulating the environment (e.g., "develop activities that are meaningful to a child"), or changing teacher behavior (e.g., "model or demonstrate desired play behaviors"). If this is the case, a need exists to increase educators' knowledge, or perhaps confidence in their knowledge, of instructional strategies that involve teaching specific behaviors. This need is especially important in light of research suggesting that children with disabilities may benefit from interventions that utilize explicit instruction to teach specific skills abilities (e.g., Evans Cosbey & Johnston, 2006; Nelson et al., 2007; Peterson & McConnell, 1993; van der Meer et al., 2012).

Participants' reported use of instructional strategies followed a similar pattern to their reported knowledge of instructional strategies, and it is interesting to note that the top ten instructional strategies reported as "very knowledgeable" or "knowledgeable" were also the top ten instructional strategies reported as used "very frequently" or "frequently". The design of this study does not allow for a definitive explanation regarding why "use of instructional strategies" followed a pattern that was similar to "knowledge of instructional strategies." However, one explanation could be related to a concept known as the "law of the instrument," in which Abraham Maslow (1966, p. 15) stated that "I suppose it is tempting, if the only tool you have is a

hammer, to treat everything as if it were a nail.” In terms of instructional strategies used among early childhood special education professionals, this concept could suggest that educators tend to use strategies that they know the most about. As mentioned previously, this could be a problem given that the least used strategies involved teaching specific skills despite research suggesting that children with disabilities may benefit from explicit instruction designed to teach specific skills (e.g., Evans Cosbey & Johnston, 2006; Nelson et al., 2007; Peterson & McConnell, 1993; van der Meer et al., 2012). Further research is warranted to discern whether the “law of instrument” is impacting professionals’ use of instructional strategies and if additional “tools” need to be included their toolbox. A second plausible explanation for the similar pattern of responses noted for the knowledge and use of instructional strategies may be that the strategies that educators have found to be most useful are the strategies that they have sought to learn the most about. This could suggest that the instructional strategies that were reported as being used most frequently have the highest level of social validity. If this is the case, then future research should more closely examine why some strategies have greater social validity than others.

Knowledge and Use of Assistive Technology Tools

The survey participants’ reported knowledge of AT tools was not as high as their reported knowledge of instructional strategies. If the two categories of “very knowledgeable” and “knowledgeable” are combined, the reported knowledge across all AT tools ranges between 31%-95%. This finding suggests that overall, early childhood special education professionals are less knowledgeable about AT tools than instructional strategies.

It is interesting to note that the three AT tools that received the most responses in the category of “do not know this tool,” relate to speech generating devices (SGDs). Given the significance of communication in early childhood development and research demonstrating the positive impact of SGDs in early childhood special education settings (e.g., Campbell et al., 2006; Evans-Cosbey & Johnston, 2006; Parette & Stoner, 2008; van der Meer et al., 2012), this finding is particularly important.

The survey participants’ reported use of AT tools followed a similar pattern to their reported knowledge of AT tools. It is noteworthy that four of the five AT tools that received the highest percent of responses in the category of “never used this tool” (i.e., “Greater than [32] message speech generating device (SGD), [2-32] message speech generating device (SGD)”, “single message speech generating device (SGD)”, and “computer peripherals”) are dedicated devices that are designed to be used with students in special education, rather than universally designed technology products (Judge, Floyd, & Jeffs, 2008; Rose & Myer, 2000). The more limited use of dedicated AT tools is somewhat disconcerting given research supporting their efficacy in promoting communication and play skills among children with disabilities (Campbell et al., 2006; Evans Cosbey & Johnston, 2006; Hamm, et al., 2006; Parette & Stoner, 2008; van der Meer et al., 2012).

Combined Use of AT Tools and Instructional Strategies

When examining the use of instructional strategies in conjunction with AT tools, four of the five most used strategies, regardless of the AT tool, relate to modifying the environment (e.g., “change or modify the environment to encourage play and social interaction”, “modify or expand an activity to encourage the development of a specific skill”, etc.). It is interesting to note that

when the AT tools are subdivided into categories related to their function (i.e., dedicated AT to support communication, dedicated AT to support access/engagement, non-dedicated AT related to computers/technology) the pattern of the top five instructional strategies is very similar. This suggests that early childhood special education professionals do not vary their use of instructional strategies based on the AT tool. Further research is needed to determine whether or not instructional strategies should vary based on the function of the AT tool. However, it seems plausible that while some AT tools (e.g., positioning devices, adapted play materials) can be used effectively when the primary instructional strategies relate to modifying the environment (e.g., “change or modify the environment to encourage play and social interaction”), other AT tools (e.g., communication boards, [2-32] message SGD, etc.) may require instructional strategies that involve teaching the child specific skills and or behaviors (e.g., “teach a child to join a play group”) in order to be used effectively.

Limitations

There are limitations to this study that should be taken into account when interpreting the results. First, this study provided information regarding the reported knowledge and use of specific instructional strategies and AT tools. Due to the fact that this survey was a self-report measure, information related to the extent to which these teaching methods and tools are actually being implemented in early childhood special education settings is not available. Second, the survey sample was limited to DEC members; therefore, the findings of this investigation may not generalize to all professionals in early childhood special education.

Implications

The survey respondents’ reported high levels of knowledge and use of evidence based instructional strategies for teaching play skills in early childhood special education settings is promising, and suggests that educators are utilizing evidence based instructional strategies. Although early childhood special education professionals reported high levels of knowledge and use of evidence based instructional strategies, it is noteworthy that none of the instructional strategies that received greater than 50% of the responses indicating “very knowledgeable” included the verb “teach”. This may suggest that educators feel less knowledgeable about instructional strategies that involve teaching a child a specific behavior. If this is the case, then additional training and support in this area is warranted.

Relative to their reported knowledge and use of instructional strategies, respondents’ knowledge and use of AT tools was more limited. Given the positive impact of AT in early childhood special education settings (Campbell et al., 2006; Judge, Floyd, & Jeffs, 2008; Parette & Stoner, 2008; Sadao & Robinson, 2010), further research is needed to determine the factors that are influencing this finding.

Finally, information related to respondents’ use of instructional strategies in combination with AT tools suggests that practitioners tend to use the same instructional strategy regardless of the AT tool. Further research exploring the extent to which instructional strategies should vary across AT tools is warranted. Further, if research reveals that early childhood special education professionals lack knowledge and experience in the use of a variety of instructional strategies in conjunction with AT, then opportunities for training should be increased. Conversely, if research

reveals existing instructional strategies are not effective and/or are not socially valid when used in conjunction with AT, then new strategies should be developed and empirically validated.

In summary, this survey study provides information related to early childhood special education professionals' (a) knowledge and use of evidence based instructional strategies for teaching play skills to young children with disabilities, (b) knowledge and use of AT tools, and (c) use of specified instructional strategies in conjunction with AT tools to teach play skills to young children with disabilities. This study advances the understanding of early childhood special education professionals' knowledge and use of evidence based instructional strategies and AT tools, and has the potential to help special education practitioners, administrators, and professionals in higher education understand areas in which to enhance service delivery to children with disabilities, as well as to enhance the education of current and future practitioners.

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Student Outcomes in a Blended Preschool Program
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Abstract

This case study examined the effect of quality preschool programming on child outcomes in a blended inclusive preschool program implemented in an urban school system in the piedmont of North Carolina. The blended inclusive preschool program was a newly initiated program in this district and had been in place for only 1 school year. The purpose of this study was to examine the growth of students enrolled in the program over a period of 6 months using the Learning Accomplishment Profile-Third Edition. Quality of programming was determined using the Early Childhood Environmental Rating Scale-Revised. Results of child outcomes and quality scores were analyzed using regression analyses. A case study with mixed methods was used for this study. Multiple child scores, quality programming scores, interviews and observations were used to collect data. An analysis of the data revealed that there was statistically significant growth within the means on the Learning Accomplishment Profile-Third Edition between three administrations. Each student showed growth in all areas examined. Regression analysis was used to determine the relationship between quality scores using the Early Childhood Environmental Ratings Scales-Revised and each sub-score of the Learning Accomplishment Profile-Third Edition. These analyses showed no statistical relationship between classroom quality and child outcomes.

Student Outcomes in a Blended Preschool Program

Attention to young children has increased and has, in turn, ushered in a new era for early childhood education (National Early Childhood Accountability Task Force, 2007). Parents are more concerned than ever about their children's learning, development and readiness for school. Early childhood teachers are taking on challenges of serving all children equitably and well. Policymakers are looking carefully at the outcomes reported for children participating in publicly funded early education programs. With a growing sense of accountability, teachers and policymakers want more information as they make decisions on how to foster children's early learning and development.

While early childhood has been an exciting and dynamic field, only in recent years has it begun to receive the attention that it deserves (National Early Childhood Accountability Task Force, 2007). The amount of knowledge describing how young children learn has grown rapidly, along with an understanding of the benefits of high-quality early childhood programs. With this increased attention, policymakers, teachers and the public are expected to know and to do more than ever before (Vandell, 2004).

North Carolina has a history of providing quality early education and intervention for young children. Programs such as Smart Start and More at Four evidence this and numerous other

child-centered initiatives. Public schools in North Carolina provided early education to more than 40,000 preschool children in the 2005-2006 school year (North Carolina Office of School Readiness [OSR], 2006). The Preschool Exceptional Children's Program has been mandated in all public schools since 1987. For the purposes of this study, the More at Four and Preschool Exceptional Children's Program were examined.

This study was part of the yearly evaluation of the preschool program by the local school system of this study and as required by state guidelines. This researcher was asked by the local district to conduct this study with the intent that the data and information gathered would lead to further longitudinal studies by the school system on the effects of preschool programming on future student success.

Research Questions and Purpose

The purpose of this study was to determine the impact of quality preschool programming on student growth and development in an urban school system located in the piedmont of North Carolina. The primary research questions were:

1. What differences exist on the results of the Learning Accomplishment Profile-Third Edition (LAP-3) for blended inclusive preschool students over a period of 6 months?
2. What is the relationship between quality Early Childhood Environmental Ratings Scales-Revised (ECERS-R) and outcomes on the Learning Accomplishment Profile-Third Edition for preschool students in the blended inclusive preschool program?

Case Study

Case studies are used when a researcher explores in depth a program, an event, an activity, a process, or one or more individuals (Creswell, 2003). Case studies are detailed investigations of individuals, groups, institutions or other social units. The researcher conducting a case study attempts to analyze the variables relevant to the subject under study (Polit & Hungler, 1983). The principle difference between case studies and other research studies is that the focus of attention is the individual case and not the whole population of cases. Most studies search for what is common and pervasive. However, in the case study, the focus may not be on generalization but on understanding the particulars of that case in its complexity. A case study focuses on a bounded system, usually under natural conditions, so that the system can be understood in its own habitat (Stake, 1988).

This study examined the phenomenon of the blended inclusive preschool program in the local school district in North Carolina. A case study is useful when the purpose of the study is to describe something in depth (Fitzpatrick, Sanders, & Worthen, 2004). The focus of case studies is on the case itself, to provide in-depth information and the situation at hand and not to generalize to a larger population. Examining the local preschool program will only be used for informational purposes requested from the local county and will not be used to generalize to a larger population. In this case study, the researcher explained how the blended preschool program achieved outcomes with students and the effects of quality on those outcomes.

Review of Literature

Early Childhood Education

As states have concentrated on improving the quality of early care and education, they have begun to systematically coordinate and restructure the system of providing and supporting early care and education. There has been increased collaboration that has resulted in development of early childhood systems that function across programs and agencies. Key stakeholders have included agencies that address educational services, child-care subsidies, child-care licensing, special education, health and social services, nutritional services, parent education and participation, program evaluation, and staff development. Leadership has come from various sources, including governors, legislators, and key players in state agencies.

State-funded voluntary prekindergarten programs have grown steadily over the past decade and now enroll more than one million children (Ackerman, Barnett, Brown, Hawkinson, & McGonigle, 2009). While the overall trend has been one of increasing participation in publicly-funded preschool education, access in most states is limited to select groups of disadvantaged or otherwise at-risk 4-year-olds (Ackerman et al.).

Since the enactment of the Elementary and Secondary Education Act (ESEA) in 1965, preschool services to eligible children have been an allowable use of Title I funds (United States Department of Education, 2004). Title I preschool is a program of high-quality educational experiences designed to enable young children to meet challenging state standards. Although Title I allows its preschool programs to serve children from birth up to 5-years old, most Title I preschools serve 4-year-olds only (US Dept. of Education). These programs usually follow the local school calendar and school day, and are staffed with both a licensed teacher and highly qualified teacher assistant.

Special Education

Since the 1960s, there has been a virtual avalanche of federal legislation that relates directly or indirectly to individuals with disabilities, particularly children and youth (Cryer & Clifford, 2003). Awareness of the laws that ensure equal opportunities to individuals with disabilities is vitally important for the following reasons:

- Knowledge of the language and intention of the laws empowers families to advocate more effectively for their children and strengthens their ability to participate fully as partners in their children's educational teams.
- As independence and self-sufficiency for individuals become increasingly important outcomes of special education, it is important that individuals with disabilities understand the laws and their implications for making decisions.
- Knowledge of the laws can assist professionals in understanding the entire service delivery system, ensure protection of civil rights, and improve collaboration with other agencies and families.
- Knowledge of the laws can help parents and professionals work together on behalf of children to make the equal education opportunity guaranteed by law a reality (Cryer & Clifford).

Congress originally enacted IDEA in 1975 to ensure that children with disabilities have the opportunity to receive a free, appropriate public education, just like other children. The law has been revised many times over the years. Congress passed the most recent amendments in December 2004, with final regulations published in August 2006. The IDEA Improvement Act of 2004, clarified that the age range for developmental delay is ages 3 through 9, or any subset of that range, including ages 3 through 5 (Lazara et al., 2007).

Inclusion

The National Association for the Education of Young Children (NAEYC, 2003) position statement on early childhood curriculum, assessment, and program evaluation suggested that a snapshot of children and families served by early childhood programs today would look very different than one taken in 1990. The snapshot of today would include more children with disabilities as well as more children who are immigrants, live in poverty, or whose primary home language is not English. The diversity of the children and families served by early care and education programs has increased and will probably continue to increase in the future.

In recent years, there has been increased recognition of the importance of early education by those working towards educational reform (Bowman, Burns, & Donovan, 2001; Shonkoff & Phillips, 2000). Federal development of policies that focus on state standards for prekindergarten children has increasingly linked curriculum and evaluation frameworks. The standards being developed by states should apply to children with disabilities and other special needs (Scott-Little, Kagan, & Frelow, 2003). According to the federal IDEA, children with disabilities must be included in any state- or district-wide programs that are established for typically developing children.

Quality of Childcare

In the United States approximately 13 million infants, toddlers, and preschool children are regularly in non-parental care, including 45% of children younger than 1 year (NAEYC, 2005). Because of these record numbers of children in non-parental care, the question arises: Does the quality of childcare matter? This question is linked to Belsky and Steinberg's (1978) review of 40 child-care studies.

Concerns about improving the quality of childcare are well-founded. Research consistently provides evidence for the correlation between quality of care and children's developmental outcomes. Indicators, such as adult-child ratios, consistency of caregiver, and responsive caregiving have been associated with positive developmental outcomes (Howes & Rubenstein, 1985; Howes & Stewart, 1987; Whitebook, Howes, & Phillips, 1990). Consistent findings have emerged across studies (Committee on Family and Work Policies, 2003; Vandell, 2004). In child-care environments where adult-child ratios are lower, caregivers are more stimulating, warm, responsive and supportive (National Institute of Child Health and Human Development Early Child Care Research Network [NICHD], 2000); and process quality scores are higher (NICHD; Phillips, Mekow, Scarr, McCartney, & Abbott-Shim, 2000).

Further, there is increasing evidence that engaging in positive relationships with adults can assist in protecting children from negative early experiences (NICHD, 2000). Children who receive

continual care by trained caregivers who understand and implement developmentally appropriate curriculum are better equipped for life's academic and social emotional experiences (Peisner-Feinberg et al., 2001). Fontaine, Torre, Grafwellner, and Underhill (2006) found that formal training in early childhood education produces higher quality teacher behaviors and can be linked to improved child outcomes.

Strong documentation exists for linking high-quality early childhood experiences with positive child development outcomes. Longitudinal studies demonstrate that children who engage in high-quality early care experiences, when compared to peers without this experience:

1. have greater social competency (Andersson, 1992; Howes, 1990);
2. have fewer behavioral problems in elementary school (Howes);
3. have higher levels of language development (Andersson); and
4. perform better in all school subjects (Andersson).

Methodology

In order to determine the relationship between quality preschool programming and child outcomes, this evaluation gathered a variety of types of information from a range of sources in order to provide a comprehensive look at the four identified blended classrooms in this study. The researcher gathered information on child enrollment characteristics from the school databases. Information obtained was child age, race, and disability category. Data regarding program quality was collected by a team assigned by the state of North Carolina using the Early Childhood Environmental Rating Scale-Revised and interviews with teachers conducted by the researcher. Child outcomes were measured using the Learning Accomplishment Profile-Third Edition with three administrations conducted both by teachers in the classrooms and the researcher.

Participants

A sample of children was used from each of the five classrooms of preschool children. At the start of the 2009-2010 school year permission was requested from all parents of children enrolled in the preschool inclusive blended classrooms to have their child participate in this study (Appendix A). The student population was 48, but percentage of participants may be less than the total population.

Teachers at each of the four school sites were asked to participate in an interview with the researcher. A panel of experts within the early childhood field validated the interview questions. The interview questions pertained to the observations using the ECERS-R by state personnel. The researcher hoped to triangulate data obtained through classroom quality and child outcomes by conducting the interviews.

Classroom Quality

Quality of classroom practices were observed using the ECERS-R as the main measure of quality for preschool-age children. Smart Start conducted these evaluations. The ECERS-R has been used in several major studies of early care and education over the past 20 years and is considered one of the most reliable program quality assessments in the early childhood field (Harms, Clifford, & Cryer, 1998). The measure consists of 43 items divided into seven sub-scales. Each

item is rated on a scale of 1-7, with 7 representing excellent quality. Each sub-scale consists of four to ten items that provide an overall profile of the sub-scale. The observer assigns a descriptive value on a scale of 1-7, which describes the quality of the early childhood environment for that sub-scale. Item scores are averaged together to form individual sub-scale scores as well as a composite score of overall quality. Thus, a program can earn an overall score in the range of 1-7. Typically 2.99 or less is inadequate, 3-3.99 represents minimal care, 4-4.99 is adequate, 5-5.99 is good and anything 6 or above is considered excellent (Harms et al.). Sub-scale scores can be interpreted the same way. In this evaluation, the ECERS-R score of 5 is used as representative of overall quality as defined by More at Four guidelines.

The ECERS-R was designed to assess the quality of early childhood environments and assist in the development of early childhood programming. The scale targets seven categories:

1. Space and Furnishing;
2. Personal Care Routines;
3. Language and Reasoning;
4. Activities;
5. Interactions;
6. Program Structure; and
7. Parents and Staff.

The ECERS-R should be used for groups of children in classrooms ages 2½- to 5-years old. It is a criterion-referenced tool designed to assess the quality of early childhood learning environments.

Child Outcomes

Individual assessments of a random sample of children from the four blended classroom sites were conducted three times in a 6-month period to provide child outcome data. Assessments were conducted at three separate times in a 6-month period by the researcher and classroom teacher in language and literacy skills, physical skills, general knowledge and social skills. This data provided information about the amount of developmental growth experienced by these children.

The Learning Accomplishment Profile-Third Edition (LAP-3) is a criterion-referenced assessment for children functioning in the 36-72-month age range. The purpose of the LAP-3 is to assist teachers, clinicians, and parents in assessing individual skill development of young children. The results can be used to generate a complete picture of a child's developmental progress across seven developmental domains so that individualized, developmentally-appropriate activities can be planned and implemented. This assessment can be used with children with typical and atypical development. Child

The results of the LAP-3 provide a complete picture of a child's developmental progress so that individualized, developmentally-appropriate activities can be planned, implemented and monitored. This assessment can be used with any child functioning in the 36-72-month age range including children with disabilities. The LAP-3 is not a "normed" or "standardized" instrument, so its results should not be used in isolation to determine eligibility for special services or for other purposes that require standardized instruments. However, LAP-3 results are often used in

combination with standardized instruments to determine developmental levels of functioning and eligibility for special services. Professionals often choose the LAP-3 because it gives a much more complete assessment of a child's acquired skills and emerging skills than most standardized instruments (Chapel Hill Training Outreach Project Inc., 2007).

The LAP-3 provides specific skill information for mastered and emerging skills. These results indicate broad patterns of development by domain as well as individual skill development (Hardin & Peisner-Feinberg, 2004).

Data Collection

Data for this study were collected starting at the beginning of the 2009-2010 school year. Child outcomes data were collected over a period of 6 months, the first LAP administration being completed in August 2009, the second in December 2009, and the third in February 2010. This researcher was available to conduct the assessments as requested by participating schools.

A team assigned by the state of North Carolina with all four sites being complete by November 2009 conducted the ECERS-R. Interviews with the teachers were completed after the ECERS-R evaluation to determine teachers' opinions regarding how the ECERS-R affects child outcomes.

Scores of the ECERS-R were analyzed using multiple regression analyses to determine the relationship among the sub-scores and composite. Data gathered by LAP-3 scores were analyzed using factorial repeated measure ANOVA.

Findings

Early education includes all of a child's experiences at home, in childcare and other preschool settings. Research has shown that high-quality care in the early years can benefit the development of language skills, socio-emotional skills and cognition. As more children spend time in non-familial care, the quality of the early care and education setting is of great importance. Children's experiences, and the skills and characteristics they develop during the preschool years are critically important to success in future school years (National Early Childhood Accountability Task Force, 2007).

This evaluation focused on the relationship of quality preschool programming and the impact on child outcomes. The newly blended preschool inclusive program is for children in this county who have been identified as having a disability according to federal and state guidelines or are at risk as defined by the North Carolina More at Four state guidelines. The researcher used the Early Childhood Environmental Rating Scale-Revised to determine the quality of the blended classrooms. The Learning Accomplishment Profile-Third Edition was used by the researcher to collect information on student growth and development during the 2009-2010 school year.

Data collected in this case study were acquired from a variety of sources including both qualitative and quantitative collection methods. This portion of the study reports the data collected and is organized by participant data then research questions.

Participants

A sample of children was used from each of the four blended classrooms of preschool children. At the start of the 2009-2010 school year, permission was requested from all parents of children

enrolled in the preschool inclusive blended classrooms to have their child participate in this study (Appendix A). The student population was 48, but percentage of participants was less than the total population with a total of 34 student participants at 71%. There were a total of 19 males, 15 females and a total of five disability categories—none or no diagnosed disability, developmentally delayed, autism, hearing impaired, and other. There were 14 children with no diagnosed disability, and 20 with a variety of diagnoses. There were also a number of ethnicities including Caucasian, African-American, Hispanic, Asian and Multiethnic. African-Americans made up the majority of the study with 41% of the sample. Table 1 captures the frequency and percent of gender, disability category, and ethnicity of the participants in this study.

Table 1
Gender, Disability Category and Ethnicity of Participants

	Caucasian		African-American		Hispanic		Asian		Multi	
	M	F	M	F	M	F	M	F	M	F
Developmental Delay	2	0	2	3	2	3	0	0	2	1
Autistic	1	0	2	0	0	0	0	0	0	0
Hearing Impaired	0	0	1	0	0	0	0	0	0	0
Other	0	0	0	0	0	1	0	0	0	0
None	1	1	2	4	2	3	1	0	0	0

Research Question 1

What differences exist on the results of the Learning Accomplishment Profile-Third Edition (LAP-3) for blended inclusive preschool students over a period of 6 months?

Individual assessments of the 34 participants from the four blended classroom sites were conducted at three separate times in a 6-month period by the researcher and classroom teachers in gross motor, fine motor, prewriting, cognitive, language and naming, self help, and personal social skills. This data provided information about the amount of developmental growth experienced by these children. Table 2 shows the means of all scores for the 34 participants at each of the three administrations. The mean for each administration demonstrates growth in all areas.

Table 2
Mean at Each of the Three Administrations of the LAP-3

Sub-Score	Admin 1	Admin 2	Admin 3
Gross Motor	37.4118	40.4412	43.9118
Fine Motor	26.3824	31.1765	34.7941
Prewriting	20.2941	23.6765	25.7647
Cognitive	33.5882	40.0588	45.5882
Language	33.8824	39.8824	41.8529
Self Help	33.7941	38.4118	40.9412
Personal Social	31.6176	35.7647	37.5882

A repeated measures analysis of variance was used to analyze each test area of the LAP-3 at each of the separate administrations. Repeated measures were used for analyses due to the same measurement being used three times on each of the 34 participants. Mauchly's Test of Sphericity was conducted on all seven test areas of the LAP-3. If Mauchly's Test statistic is significant $p < .05$, it is assumed that the condition of sphericity has not been met and it cannot be assumed that the variances between the three sets of scores are equal (Huck, 2004). If Mauchly's test is nonsignificant $p > .05$, then it is reasonable to conclude that the variances between the three scores are equal and sphericity was met (Huck). Table 3 conveys the Mauchly's Test of Sphericity scores for each of the seven test areas from the LAP-3.

Table 3
Mauchly's Test of Sphericity on the LAP-3

Within Subjects Effect	E		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Gross Motor	.721	.745	.500
Fine Motor	.878	.924	.500
Prewriting	.684	.703	.500
Cognitive	.912	.963	.500
Language & Naming	.756	.785	.500
Self Help	.733	.759	.500
Personal Social	.570	.577	.500

If the assumption of sphericity is violated as it is with Gross Motor (GM), Prewriting (PW), Language Naming (LN), Self Help (SH) and Personal Social (PS), due to $p < .05$, then the Huynh-Feldt correction will be used when $E > .75$ and Greenhouse-Geisser will be used when $E < .75$ (Huck, 2004). Therefore, Huynh-Feldt will be used for Language Naming and Greenhouse-Geisser for Gross Motor, Prewriting, Self Help, and Personal Social.

Once the assumption of sphericity has been corrected, and all levels are $p < .05$, then the null hypothesis of no difference in mean performance between the three times of measurement is rejected. Instead it is concluded that there is a significant difference between the three means. Table 4 displays the ANOVA with accompanying significance levels for each area with the corrected values using the Sphericity Assumed for the areas of Fine Motor and Cognitive, Greenhouse-Geisser for Gross Motor, Prewriting, Self Help and Personal Social, and Huynh-Feldt used for Language Naming. The significant values are 0.0000 for all domains assessed meaning that there is significant change between the means between each administration.

Table 4
ANOVA LAP-3

		Type III Sum of Squares	Degrees of Freedom	Mean Square	F	Sig.
Gross Motor	Greenhouse-Geisser	719.353	1.441	499.083	15.777	.000
	Error	1504.647	47.565	31.634		
	Total	2224.000	49.006	530.717		
Fine Motor	Sphericity Assumed	1210.725	2.000	605.363	32.136	.000
	Error	1243.275	66.000	18.837		
	Total	2454.000	68.000	624.200		
Prewriting	Greenhouse-Geisser	518.255	1.368	378.970	68.847	.000
	Error	248.412	45.129	5.505		
	Total	766.667	46.497	384.475		
Cognitive	Sphericity Assumed	2453.020	2.000	1226.510	12.334	.000
	Error	6562.980	66.000	99.439		
	Total	9016.000	68.000	1325.949		
Language Naming	Huynh-Feldt	1172.020	1.570	746.459	42.132	.000
	Error	917.980	51.814	17.17		
	Total	2090.000	53.384	736.629		
Self Help	Greenhouse-Geisser	893.078	1.467	608.825	10.480	.001
	Error	2812.255	48.407	58.096		
	Total	3705.333	49.874	666.921		
Personal Social	Greenhouse-Geisser	636.608	1.139	558.777	58.563	.000
	Error	358.725	37.596	9.541		
	Total	995.333	38.735	568.318		

Research Question 2

What is the relationship between quality Early Childhood Environmental Ratings Scales-Revised (ECERS-R) and outcomes on the Learning Accomplishment Profile-Third Edition for preschool students in the blended preschool classroom?

Quality of classroom practices was observed using the ECERS-R as the main measure of quality for preschool-age children. The measure consists of 43 items divided into 7 sub-scales. Each item is rated on a scale of 1-7, with 7 representing excellent quality. Each sub-scale consists of four to ten items that provide an overall profile of the sub-scale. The observer assigns a descriptive value on a scale of 1-7, which describes the quality of the early childhood environment for that sub-scale. Item scores are averaged together to form individual sub-scale scores as well as a composite score of overall quality. Thus, a program can earn an overall score

in the range of 1-7.

All four blended preschool programs involved in this study were evaluated using all seven sub-scale scores. Typically 2.99 or less is inadequate, 3-3.99 represents minimal care, 4-4.99 is adequate, 5-5.99 is good and anything 6 or above is considered excellent (Harms et al., 1998). Sub-scale scores can be interpreted the same way. In this evaluation, the ECERS-R score of 5 is used as representative of overall quality as defined by North Carolina More at Four guidelines. Table 5 outlines the individual sub-scores for all four schools as well as composite classroom quality scores. All four blended classrooms received composite scores above 5.00 representing each classroom has overall good quality as defined by More at Four. Each classroom had low scores in the areas of space and furnishings and personal care routines with scores between 4-4.99, indicating those areas were only adequate. All other areas were between 5-5.99, indicating good scores with some in the excellent range of above 6.00.

Table 5
ECERS-R Scores

	School 1	School 2	School 3	School 4
Space & Furnishing	4.80	4.90	4.75	4.25
Personal Care	4.60	4.40	4.90	3.90
Language/Reasoning	5.75	5.25	5.75	6.00
Activities	5.20	5.10	5.60	4.75
Interactions	6.00	5.60	6.60	6.50
Program Structure	5.50	5.50	6.20	6.75
Personal Social	6.50	5.90	5.50	6.60
Composite	5.50	5.20	5.60	5.50

To examine the relationship between classroom quality and child outcomes, linear regression analyses were used for all test areas of the LAP-3 with the overall classroom quality score of the ECERS-R. Table 6 outlines the regression analysis for each domain of child development assessed using the LAP-3. Using the adjusted R squared as a more conservative estimate of explanation of the variance, the overall classroom quality explains very little of child outcomes on the LAP-3. All scores except personal social have between -0 and -2%, which explains very little of the variance, yet personal social has 3% explanation of the variance.

Table 6
Regression Analysis of LAP-3 Sub-Scores and ECERS-R Composite

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Gross Motor	.168	.028	-.002	7.10193
Fine Motor	.128	.016	-.014	4.08024
Prewriting	.082	.007	-.024	6.55908
Cognitive	.228	.052	-.022	18.81021
Language & Naming	.086	.007	-.024	17.22365
Self Help	.170	.029	-.001	5.72971
Personal Social	.247	.061	.032	8.11876

To more closely examine the relationship of quality care scores and LAP-3 domain scores this researcher regressed sub-scores of the LAP-3 as the dependent variable to each sub-scale score of the ECERS-R as the independent variable. Tables B1-7 (Appendix B) capture the regression analyses for Gross Motor, Fine Motor, Prewriting, Cognitive, Language and Naming, Self Help and Personal Social, respectively, with each sub-scale score of the ECERS-R.

When the sub-scores from the LAP-3 of gross motor, prewriting, cognitive, and language and naming were regressed against all sub-scores of the ECERS-R, no areas of quality preschool programming explained more than 3% of variance positive or negative in any of those four domains of the LAP-3 (Appendix B). Fine motor analysis shows that space and furnishings explain about 10% of the variance with the rest of the sub-scores having an explanation of less than 6% of the variance. The regression analysis of personal social skills show that 16% of the variance can be explained by personal care routines, 19% can be explained with activities and 11% with parents and staff. Self-help regression analysis shows the greatest area of explanation with 25% of variance explained by parents and staff, then activities with 16% and personal care routines with 9% of variance in self-help skills. Table 7 captures the highest percentage explanations of variance.

Table 7

Sub-scores of LAP-3 Regressed against Sub-Scores of the ECERS-R

	R	R ²	Adjusted R	Standard Error of the Estimate
Fine Motor				
Space/Furnishings	.364	.105	.105	3.83197
Personal Social				
Personal Care	.440	.194	.169	7.52196
Activities	.463	.214	.190	7.42637
Parents and Staff	.372	.139	.112	7.77570
Self Help				
Personal care	.350	.123	.095	5.44672
Activities	.435	.189	.164	5.23579
Parents and Staff	.530	.281	.259	4.93038

Teacher Interviews

Teacher interviews were conducted with four of the five teachers in the four blended preschool classrooms. The researcher was the teacher of the fourth classroom and did not participate in the interview. One of the classrooms had two teachers that team teach resulting in four teacher interviews. Three questions were asked of the teachers after the ECERS-R was completed in their classrooms. A team of experts in the early childhood and early childhood special education fields validated the three questions.

1. How relevant do you think the overall score and sub-scores are in predicting child growth or outcomes?
2. What items of the evaluation gave you the greatest insight into your classroom?
3. How will the overall score or individual sub-scores change what you do in the room?

All four teachers responded in similar ways. Common themes from the interview included the response from teachers who did not feel that the ECERS-R adequately evaluated quality. They felt that the areas of the ECERS-R that were most important predictors of quality were the interactions, and language and reasoning. The only changes that they made in their rooms following the evaluation were in the areas of space and furnishing, rearranging the room or providing different areas in the room. Teacher interviews support data and evidence from this study relating to quality classroom environments and the relationship to child outcomes.

Summary

The purpose of this study was to determine the quality of the local blended preschool program and if the level of quality affected the outcomes of children enrolled in the local preschool program. Data were presented regarding the case study. LAP-3 scores for seven areas of development, ECERS-R scores for classroom quality as well as sub-scores, and teacher interviews were used to compile responses to the research questions. The information collected was used to support the case study of the interaction of quality preschool programming and child outcomes using the LAP-3.

Conclusions

Research Question 1

What differences exist on the results of the Learning Accomplishment Profile-Third Edition (LAP-3) for blended inclusive preschool students over a period of 6 months?

Examination of the mean child outcome scores on the LAP-3 (see Table 4) showed growth in all domains assessed over the 6-month period. Upon closer examination the averages of growth were adequate with 14.8% in gross motor, 24.2% in fine motor, 26.3% in prewriting, 21.3% cognitive, 18.9% in language and naming, 17.3% in self help and 15.7% in personal social. As noted by the percentages of growth, prewriting and fine motor were the strongest areas of growth with gross motor and personal social being the lowest. The ANOVA used to evaluate the student growth supports what the researcher found in examining the difference of the means.

Research Question 2

What is the relationship between quality Early Childhood Environmental Ratings Scales-Revised (ECERS-R) and outcomes on the Learning Accomplishment Profile-Third Edition for preschool students in the blended inclusive preschool program?

The blended preschool program examined met the state standard for overall quality of care with a composite score of greater than 5.00 on the Early Childhood Environmental Rating Scales-Revised. Although this score allows for an understanding of good care, it is an average of the sub-scale scores, some of which are much below the standard score of 5.00. While examining these scores there is a pattern of higher scores in language and reasoning, activities, interactions, program structure and parents and staff except in school 4 with a score of 4.75 in activities. The two lowest scores are in the area of space and furnishing, and personal care routines (see Table 7).

A study conducted by Sylva et al. (2006) has demonstrated the predictive validity of the ECERS-R in relation to children's language and social/behavioral development. In terms of construct validity, research has indicated that the ECERS-R can be broken down into two sub-scale constructs, one related to caregiver-child interaction and the other related to the quality of the early childhood environment (Scarr et. al., 1994; Sylva et al.). If the constructs of Scarr et al. are applied to the scores reported in this case study, caregiver-child interactions consistently rate in the good to excellent range and quality of the environment scores range in the adequate to good range.

The LAP-3 scores showed growth in all domains and developments, and the composite score of classroom quality was considered good by North Carolina state standards. When scores were examined using multiple and linear regression with both composite and sub-scale scores, there was no statistical evidence found that there was any relationship or explanation between the two. All correlation levels fell below 20%, which is statistically insignificant. So, it is assumed by this researcher that the relationship between the two has been proven to be non-existent.

The researcher found that the teacher interview responses regarding the ECERS-R and its lack of influence on their classrooms were confirmed by the findings that the ECERS-R quality classroom sub-scale and composite scores have no significant impact on child outcomes.

Recommendations

As a result of this case study, long-standing beliefs and research assumptions have been questioned due to the lack of relationship found in these four classrooms between classroom quality and child outcomes. This researcher had hoped to prove that quality of care positively impacted child outcomes in the blended preschool classrooms; given the data and the reports analyzed, this hypothesis has been rejected. This researcher has several recommendations for future research that could impact interpretation of the current case study results:

1. A longitudinal study could be done to follow the children in these classrooms to observe if child outcomes continue to grow. The current school district is using the data collected during this time period to continue with a longitudinal study. The researcher hopes that the information will be fruitful for future studies.

2. A cross-sectional comparison study could be done comparing children in different classrooms, at different schools and with different teachers. This should include those children in the blended preschool classrooms, More at Four classrooms, and self-contained Exceptional Children's classrooms to examine the rate of growth of students in each of those classrooms.
3. The teacher's years of experience and degree could be analyzed to see what impact those had on both outcomes and sub-scale scores of classroom quality.
4. Pre- and post-examinations using the ECERS-R allowing for classroom teachers to use the information for professional growth could show more relationships between the quality and child outcomes.

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Appendix A

LAP-3 Sub-Scores Regressed against ECERS-R Sub-Scores

Table B1

Gross Motor Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.197	.039	.009	7.06222
Personal Care Routines	.034	.001	-.030	7.19976
Language and Reasoning	.190	.036	.006	7.07311
Activities	.009	.000	-.031	7.20372
Interaction	.225	.050	.021	7.01995
Program Structure	.233	.054	.025	7.00509
Parents and Staff	.028	.001	-.030	7.20127

Table B2
Fine Motor Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.364	.132	.105	3.83197
Personal Care Routines	.272	.074	.045	3.95850
Language and Reasoning	.296	.088	.059	3.92918
Activities	.248	.061	.032	3.98564
Interaction	.165	.027	-.003	4.05779
Program Structure	.257	.066	.037	3.97574
Parents and Staff	.242	.059	.029	3.99112

Table B3
Prewriting Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.213	.045	.016	6.43006
Personal Care Routines	.265	.070	.041	6.34552
Language and Reasoning	.058	.003	-.028	6.57005
Activities	.245	.060	.031	6.38081
Interaction	.008	.000	-.031	6.58130
Program Structure	.134	.018	-.013	6.52205
Parents and Staff	.145	.021	-.009	6.51153

Table B4

Cognitive Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.283	.080	.052	
Personal Care Routines	.062	.004	.027	
Language and Reasoning	.267	.071	.042	
Activities	.002	.000	-.031	
Interaction	.307	.095	.066	
Program Structure	.326	.106	.078	
Parents and Staff	.025	.001	-.031	

Table B5

Language and Reasoning Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.235	.055	.026	16.80321
Personal Care Routines	.113	.013	-.018	17.17821
Language and Reasoning	.138	.019	-.012	17.12284
Activities	.053	.003	-.028	17.26390
Interaction	.199	.040	.010	16.94154
Program Structure	.274	.075	.046	16.62433
Parents and Staff	.046	.002	-.029	17.26972

Table B6

Self Help Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.100	.010	-.021	5.78560
Personal Care Routines	.350	.123	.095	5.44672
Language and Reasoning	.058	.003	-.028	5.80491
Activities	.435	.189	.164	5.23579
Interaction	.295	.087	.059	5.55488
Program Structure	.196	.038	.008	5.70230
Parents and Staff	.530	.281	.259	4.93038

Table B7

Personal Social Regression Analysis with Sub-Scores of the ECERS-R

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Space and Furnishings	.210	.044	.014	8.19124
Personal Care Routines	.440	.194	.169	7.52196
Language and Reasoning	.003	.000	-.031	8.37821
Activities	.463	.214	.190	7.42637
Interaction	.218	.048	.018	8.17644
Program Structure	.005	.000	-.031	8.37812
Parents and Staff	.372	.139	.112	7.77570

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***A Meta-Analytic Review of Tactile-Cued Self-Monitoring Interventions
Used by Students in Educational Settings***

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Abstract

In this meta-analytic review, we critically evaluate procedures and outcomes from nine intervention studies in which students used tactile-cued self-monitoring in educational settings. Findings suggest that most tactile-cued self-monitoring interventions have moderate to strong effects, have emerged only recently, and have not yet achieved the evidence-based status of audio-cued and visual-cued self-monitoring. At present, tactile-cued self-monitoring is a promising practice with the potential to promote a variety of outcomes in educational settings. We also identify strengths and limitations of tactile-cued self-monitoring studies, provide recommendations for future research and practice, identify limitations of this analytic literature review, and list resources for researchers and practitioners.

A Meta-Analytic Review of Tactile-Cued Self Monitoring Interventions Used by Students in Educational Settings

Technological advances and expanded use of electronic devices, such as personal digital assistants (PDAs) and smart phones, present opportunities and challenges for educators and learners (Earle, 2002; Obringer & Coffey, 2007; Williams & Pence, 2011). In this paper, we address how devices that emit tactile cues or vibrations present opportunities for educators to promote desirable outcomes for students. We present a meta-analytic literature review of interventions in which students with disabilities used an emerging form of self-monitoring, called tactile-cued self-monitoring (TCSM). First, however, we describe the theoretical basis for self-monitoring and other behavioral self-management (BSM) techniques, and we review BSM interventions, particularly those that use self-monitoring.

Cognitive-Behavioral Theory, Reactivity, and BSM Models and Techniques

Reactivity. BSM techniques, including self-monitoring, are based on the theory of cognitive-behavioral modification (CBM) (Meichenbaum, 1977). The CBM principle of reactivity describes how people can self-direct their own learning, as well as how people can control and

manage their own behavior. The principle of reactivity posits that when people become cognitively aware of their behavior and the environment, they are better positioned to change their behavior. Cognitive processes such as awareness and self-talk, and behavioral factors, such as antecedents, observable actions, and consequences link together to produce reactive effects and behavioral changes (Kanfer & Karoly, 1972; Rachlin, 1974; Skinner, 1953).

Four-component model of BSM. In 1973, Glynn, Thomas, and Shee proposed a four-component model for what they called behavioral self-control, now called BSM. The first two components of their model, *self-assessment* plus *self-recording*, constitute *self-monitoring*. In self-assessment, individuals ask themselves - covertly via self-talk or via some type of audio, visual, or other cue – a question about their current performance, such as “Am I working quickly?” Immediately afterwards, individuals self-record their response to the self-assessed question, either covertly via self-talk or via overt actions, such as checking yes or no on a self-recording form. The third and fourth components of Glynn, Thomas, and Shee’s BSM model are *self-determination of reinforcement* (i.e., specifying for oneself the types, amounts, and schedules of reinforcement) and *self-administration of reinforcement* (i.e., delivering to oneself reinforcement contingent on performance). BSM has evolved to include additional components or techniques.

BSM techniques. During the past forty years, numerous BSM techniques have emerged. One of the earliest BSM techniques was *self-verbalization*, also called *self-talk* and *self-instruction* (Meichenbaum, 1977). Self-verbalization is a process by which students covertly talk themselves through the steps of a task while doing that task. For example, students who calculate the sum of the problem $14 + 28$ might silently talk themselves through the steps, starting with, “Plus sign means add. Four plus eight equals 12. Two in the one’s column of my answer, carry the one above the ten’s place.” Educators have adapted self-verbalization or self-instruction to teach students how to perform various multi-step tasks, such as cover-copy-compare to study spelling words (Skinner, McLaughlin, & Logan, 1997).

In the 1980s, self-determination emerged as a guiding principle in the field of disabilities. Deci and Ryan (1985) defined self-determination as the process by which individuals with disabilities have “the capacity to choose and to have those choices be the determinants of one’s actions” (p. 38). Although self-determination is not a BSM component, researchers and practitioners have reported that BSM skills such as self-monitoring are necessary for *self-determination*. Researchers have developed additional BSM components, three of which are *self-evaluation*, *video self-modeling* (VSM), and *self-graphing*. In self-evaluation, learners judge the quality of their own performance (Grossi & Howard, 1998). One critical difference between self-monitoring and self-evaluation is when the learner uses the technique. Self-monitoring occurs while the learner performs a task, whereas self-evaluation occurs after the learner completes a task. In VSM, learners view videotaped or digitally recorded images of their selves performing, or appearing to perform, a particular task. VSM relies on self-as-model to promote learners’ existing behaviors, or to promote behaviors that are within the learner’s reach, or zone of proximal development (Dowrick, 1999; Hitchcock, Dowrick & Prater, 2003; Lonnecker, Brady, McPherson, & Hawkins, 1994). Finally, in self-graphing, after learners complete a task, they obtain immediate feedback then record their results on a graph (DiGangi, Maag, & Rutherford, 1991; McDougall & Brady, 1998).

Research and Evidence Base for BSM

The research and evidence base for BSM is plentiful, with most BSM interventions demonstrating moderate to strong impact across a wide range of learners, tasks, and settings (McDougall, Skouge, Farrell & Hoff, 2006). Moreover, BSM interventions have a long-standing record of efficacy for use with students who face academic difficulties and social challenges, as evidenced in reviews, analytic reviews, and meta-analytic reviews published in the 1970s (McLaughlin, 1976; O’Leary & Duby, 1979); the 1980s (Hughes, Ruhl, & Misra, 1989; Martin & Mithaug, 1986; Skiba & Casey, 1985); the 1990s (McDougall, 1998; Stage & Quiroz, 1997; Wolery & Schuster, 1997; Nelson, Smith, Young, & Dodd, 1991; the 2000s (Barry & Haraway, 2005; Hitchcock, Dowrick, & Prater, 2003; Lancioni & O’Reilly, 2001; McDougall, Skouge, Farrell, & Hoff, 2006; Mooney, Ryan, Uhing, Reid, & Epstein, 2005; and the 2010s (Joseph & Eveleigh, 2011; Yucesoy-Ozkan & Sonmez, 2011).

Self-Monitoring: The Most Prominent and Versatile BSM Technique

Self-monitoring has been the most frequently applied and most versatile of all BSM techniques and is considered an evidence-based technique with moderate to strong efficacy (McDougall, Skouge, Farrell & Hoff, 2006). Self-monitoring studies typically target outcomes for students with disabilities. However, investigators also have conducted self-monitoring studies with students who did not have disabilities. The vast majority of such studies have used single-case research designs with one to three students, rather than true- or quasi-experimental designs for large groups of students.

Self-monitoring alone and combined with other interventions. Numerous studies have used self-monitoring as a sole intervention component (Prater, Hogan, & Miller, 1992; Prater, Joy, Chilman, Temple, & Miller, 1991). Many more studies, however, have combined self-monitoring with other BSM or non-BSM components. Self-monitoring has been combined with self-determination of reinforcement, self-administration of reinforcement, and self-graphing (McDougall & Brady, 1998); praise, token reinforcement, and graphing (Edwards, Salent, Howard, Brougher, & McLaughlin, 1995); self-instruction and peer tutoring (Hogan & Prater, 1993); self-evaluation, self-recruitment of teacher attention, and self-recruitment of token reinforcement (Todd, Horner, & Sugai, 1999); goal setting, self-evaluation and self-reinforcement (Snyder & Bambara, 1997; Wehmeyer, Yeager, Bolding, Agran, & Hughes, 2003). Whether used alone or combined with other BSM or non-BSM components, self-monitoring tends to have moderate to strong efficacy.

Wide range of target behaviors. In self-monitoring studies, researchers have targeted a wide range of academic or non-academic outcomes for individual students. Oftentimes, these researchers have targeted variations of on-task behavior, off-task behavior, and time-on-task as the sole dependent variable (Crum, 2004; Glynn, Thomas, & Shee, 1973). Some scholars, however, have suggested that researchers target more tangible outcomes (e.g., academic productivity as in the number of answers written correctly) instead of, or concurrently with, collecting data on on-task behavior (McDougall, Skouge, Farrell & Hoff, 2006). Indeed, self-monitoring studies have targeted tangible academic outcomes such as math fluency, productivity, or accuracy (McDougall, Skouge, Farrell & Hoff, 2006; McDougall & Brady, 1998; Rock, 2005). In addition, many self-monitoring studies have targeted academically-related behaviors and socially-related behaviors, such as pre-K and kindergarten students’ verbal complements

during free play (Apple, Billingsley, & Schwartz, 2005); middle school students' appropriate touching, direction following, and contributions to classroom activities (Agran, Blanchard, Wehmeyer & Hughes, 2002); and organizational skills and initiating conversations (Agran, Blanchard, Wehmeyer & Hughes, 2001). Overall, across various target behaviors, settings, and participants, self-monitoring interventions have produced moderate to strong outcomes.

Rationales for Using Self-Monitoring and Other BSM Techniques

Rationales for teaching students to use self-monitoring and other BSM techniques include potential and actual benefits for students and teachers, as well as promoting inclusion of students with disabilities in general education settings (McDougall, Skouge, Farrell, & Hoff, 2006).

Benefits for students. Christie, Hiss, and Lozanoff (1984) noted that BSM "has offered the promise of a set of procedures to modify undesirable behavior without relying on external agents (such as parents, teachers, peers) to administer reinforcement and punishment contingencies" (p. 392). Rooney, Hallahan, and Lloyd (1984) indicated that BSM "encourages the child to become a more responsible agent in the education process [and] engenders initiative and independence" (p. 360). In addition, BSM reduces dependence on external agents, such as teachers and parents, for reinforcement, control, and guidance (Nelson, Smith, Young, & Dodd, 1991; Workman & Hector, 1976) and helps students "learn and behave in the absence of adult oversight" (Prater, Hogan & Miller, 1992, p. 44). BSM also helps students meet teachers' expectations to perform routinely in general education settings, including arriving punctually for class, having materials ready, completing tasks accurately, and completing homework (Clees, 1994-5). Hogan and Prater (1993) note that BSM promotes self-regulation, responsibility, and skills that students use throughout their lifetime. BSM also reduces excessive or coercive adult control (Dunlap, Dunlap, Koegel, & Koegel, 1991; Falk, Dunlap & Kern, 1996). In addition, BSM promotes active involvement and counteracts inactive learning styles, strategy deficiencies, inattentiveness, and passivity (Hallahan, Marshall, & Lloyd, 1981; Prater, Joy, Chilman, Temple, & Miller, 1991; Rooney, Hallahan, & Lloyd, 1984).

Benefits for teachers. BSM 'frees up' time for teachers to teach lessons, rather than having to manage problem behaviors (Rosenbaum & Drabman, 1979; Trammel, Schloss & Alper, 1994). BSM also requires less adult supervision compared to teacher-directed strategies (Dunlap, Dunlap, Koegel, & Koegel, 1991). Finally, BSM improves efficiency by saving teachers' time and money (Clees, 1994-5; Gardner, Clees, & Cole, 1983).

Promoting inclusion. For the following reasons, numerous authors have proposed that BSM techniques have the potential to promote inclusion of students with disabilities in general education settings (Edwards, Salent, Howard, Brougher, & McLaughlin, 1995; McDougall, Skouge, Farrell, & Hoff, 2006; McDougall, 1998; Rooney, Hallahan, & Lloyd, 1984). First, BSM techniques are adaptable and easy enough to implement (Dunlap, Dunlap, Koegel, & Koegel, 1991) such that general education teachers might implement BSM as opposed to more intrusive procedures (Hogan & Prater, 1993; Prater, Hogan, & Miller, 1992; Rooney, Hallahan, & Lloyd, 1984). Second, BSM techniques are portable across settings (Thoreson & Mahoney, 1974). Third, BSM techniques can promote maintenance and generalization of performance special education settings to general education classrooms (Falk, Dunlap & Kern, 1996; Osborne, Kiburz & Miller, 1986; Rhode, Morgan, & Young, 1983).

Conclusions Based on BSM and Self-Monitoring Research Literature

Based on findings from the BSM literature, we conclude that self-monitoring is an evidence-based BSM technique that promotes moderate to strong improvements for a range of academic and non-academic tasks. To date, audio-cued self-monitoring and visually cued self-monitoring are two, long-standing, evidence-based forms of self-monitoring. However, researchers and practitioners have expressed concerns that the audio and visual cues used in these types of self-monitoring interventions might distract people who are not using, that is, who do not need to use these explicit self-monitoring techniques (McDougall, 1998). Moreover, researchers and practitioners have posited that the overt nature of such cues might stigmatize or bother users, for example, the student who uses an audio-cued or visually cued version of self-monitoring while in the presence of classmates (Amato-Zech, Hoff, & Doepke, 2006). The covert, non-intrusive nature of TCSM might alleviate the aforementioned concerns about audio-cued and visually cued forms of self-monitoring, while retaining the efficacy of audio- and visually cued self-monitoring. Compared to numerous audio- and visually-cued self-monitoring interventions, TCSM interventions in educational settings have been “rarely used” (McDougall, Skouge, Farrell, & Hoff, 2006, p. 44). Consequently, we examined how researchers have responded to recommendations to study the impact of TCSM in educational settings.

Purposes of this Analytic Literature Review

Based on our review of the literature, particularly recommendations from prior syntheses of BSM intervention studies, the purposes of our meta-analytic review were to analyze, synthesize, and evaluate processes and outcomes of intervention studies that have investigated the use of TCSM in educational settings and to provide recommendations for researchers and practitioners. The research questions that guided our review were as follows.

1. To what extent and how have researchers investigated the use of TCSM by students in educational settings? More specifically, how have TCSM techniques been implemented (e.g., by what individuals, using what procedures, for what outcomes)?
2. How effective have TCSM techniques been in improving outcomes for individuals in educational settings?
3. To what extent have TCSM interventions been implemented with quality, as evidenced by indicators of procedural integrity and treatment fidelity?

Method

Search Process

We searched for TCSM intervention studies using *EBSCOhost* and *Google Scholar*. With *EBSCOhost*, we used the databases Academic Search Premier, ERIC, Professional Development Collection, and Psychology and Behavioral Sciences Collection. We also searched for published reviews of self-monitoring and TCSM. In addition, we inspected reference lists of TCSM articles that qualified for our review. Our initial web-based searches used the terms *tactile-cued* and *self-monitoring*. Subsequent searches combined one or both of the preceding terms with other terms, including *general education*, *special education*, *disabilities*, *emotional*, *behavioral*, *disorders*, *disturbance*, *impairment*, *autism*, *speech*, *hearing*, *visual*, *mental retardation*, *developmental disabilities*, *attention deficit*, and *hyperactivity*. We read and eliminated all search-generated abstracts for articles that clearly failed to qualify for this review. Then, we obtained, screened, and read full-text articles for all remaining abstracts.

Criteria for Selecting TCSM Studies

We used the following inclusion and exclusion criteria to identify studies that qualified for this analytic literature review.

1. Study participants included at least one individual.
2. Study settings included at least one educational setting. Educational settings included formal settings, such as schools and classrooms, as well as informal settings where education or training took place.
3. Dependent variables included quantitative measures of educational or related variables, such as academic engagement, performance of tasks or skills, and social behaviors. We excluded descriptive studies without quantitative measure, as well as studies that reported only qualitative measures, verbal reports, or anecdotal information. We also excluded studies that targeted only non-educational outcomes, such as physiological measures.
4. Interventions included some form of TCSM, either as the sole component of the intervention, or as one of multiple components of an intervention package.
5. Participants in the studies used a TCSM device that emitted vibrations. The device could be commercially produced, such as the MotivAider or the Watchminder, or not commercially produced.
6. The vibrations produced by the TCSM device had to serve as cues for participants to self-monitor their then-current behavior. We excluded studies in which a tactile cue served only as an initial prompt for the participant to initiate a behavior, rather than to periodically self-monitor a behavior that they performed at the time of the cues. See, for example, Blicha and Belifore (2013) in which an elementary student with ADHD used a single vibration from a Watchminder, as a prompt, to get his homework folder.
7. The design could use a true- or quasi-experimental group design, or a single-case research design. If study authors used a single-case research design, the study had to include a minimum of two phases or conditions.
8. Studies had to be published in professional journals from 1973 through 2013 inclusive. We selected 1973 because that was the year that Glynn, Thomas, and Shee (1973) published the first cued self-monitoring intervention study in an educational setting. We excluded TCSM studies published as theses or dissertations.

Framework for Organizing, Presenting, and Analyzing Information

In order to organize, present, and analyze information from TCSM studies that qualified for this analytic literature review, we adapted and revised slightly the framework used by McDougall, Skouge, Farrell, and Hoff (2006). This framework is evident in the direct link between the wording we used for (a) column headings in Tables 1 and 2, and (b) subsection headings that appear in *Findings for Descriptive Variables* and in *Findings for Intervention Efficacy, Procedural Integrity, and Outcome Variables*. We operationally defined each variable of interest, that is, each column heading in Tables 1 and 2, by constructing and using directions for how to enter information from the nine studies that qualified for this review into columns of Tables 1 and 2. These directions are available upon request to the first author. We used the following method of iterative consensus to enter and verify data entries in Tables 1 and 2.

Step 1. First and second author independently entered data.

Step 2. First and second authors compared entries and resolved discrepancies.

Step 3. Third author independently entered data.

Step 4. First and third authors compared entries and resolved discrepancies.

Next, we analyzed data entries within each column to identify patterns, commonalities, and differences across the nine qualifying studies for each of the variables of interests (column headings) that appear in Tables 1 and 2. In Table 2, consistent with standards for evaluating efficacy of interventions in studies that use single-case research designs, we used visual inspection of graphed data to evaluate experimental control of the intervention over the dependent variable. That is, we visually inspected graphed data for changes in means, changes in trends, changes in level, stability-variability, latency, and overlap (Kazdin, 1982). We also searched for author-reported effect sizes. Only two studies included any type of effect size, so we adopted the following procedures to calculate and report effect sizes in Tables 3 and 4.

Effect size indices within each study. In Table 3, we report three types of effect size indices, specifically, percentage of non-overlapping data (*PND*), percentage of data exceeding the median (*PEM*), and the Phi coefficient (ϕ). *PND* and *PEM* are simple indices that quantify change, for a dependent variable measure, based on non-overlapping data between adjacent phases in studies that use single-case research designs (Parker, Vannest, & Davis, 2011). *PND* and *PEM* values of 90% to 100%, 70% to < 90%, 50% to < 70%, and < 50%, respectively, indicate highly effective, moderately effective, mildly effective, and ineffective (Scruggs, Mastropieri, Cook, & Escobar 1986). For Phi, we calculated the square root of the quantity, chi-square, divided by *N*, where *N* equaled the total number of sessions in adjacent baseline-to-intervention phases. Thus, we first had to calculate chi-square values, which we did by using Moods median test on data from adjacent baseline and intervention phases placed into 2 x 2 contingency tables. Unless denoted by an asterisk in Table 3, we used Yates correction for continuity to adjust downward all chi-square values. That is, most studies had relatively few data points in one or more phases, which resulted in expected frequencies of less than 5 in at least one of the four cells of the 2 x 2 contingency tables. Per Cohen (1988), Phi values of 0.10, 0.30, and 0.50, respectively, suggest small, medium, and large effect sizes.

The number of effect sizes we reported for each study depended on type of research design, that is, number of adjacent phase comparisons, number of students, and number of dependent variables within a study. Our first and third authors independently calculated *PND* and *PEM* indices for each study. Then they used the method of consensus to resolve discrepancies. In some studies, graphed data appeared in published journal articles without sufficient precision to calculate *PND* and *PEM*. In those cases, we requested and obtained from authors of those studies the numerical values for each session, participant, and dependent variable.

Overall effect size index for each study. In Table 3, we also report an overall effect size for each study. A study's overall effect size equaled the weighted (by number of sessions) mean of each Phi for all adjacent baseline-to-intervention (A-B and A₁-B₁) phase comparisons in that study. See Table 4. Overall effect size excludes Phi for any adjacent intervention-to-baseline (B-A₁) phase comparisons.

Table 1 <i>Descriptive Information for Tactile-Cued Self-Monitoring Studies</i>						
Authors, Year	Participants	Setting	Dependent Variable	Dependent Variable Measurement	Independent Variable with Type of Cue	Research Design
Amato-Zech, Hoff, & Doepke, 2006	2M, 1F Age 11 2 Spch&LI + SLD 1 Spch&LI + ED No Information	SPED Reasoning & Writing Class Elementary School No Information Midwest USA	On-Task & Off-Task Behavior	% of 15-sec partial intervals	TCSM of attention using MotivAider & self-recording form: "Yes (No), I was (not) paying attention"	ABAB
Anderson & Wheldall, 2003	2F, 1M Age 10, 12, 11 ADHD, dyspraxia & learning difficulties; PDD; mild intellectual & moderate language delay No Information	SPED "independent folder work" "University school for children with special learning needs" No Information No Information (Australia?)	On-Task Behaviour	% of 15 momentary time sampling obs. (10-sec. x 3 participants in sequence = 1 obs. per participant every 30 sec.)	TCSM using Watchminder (vibration & display "PAY ATTN") & self-recording booklet (check box for either on-task or off-task)	MB across participants with embedded reversal
Boswell, Knight, & Spriggs, 2013	1M Age 11 Moderate Int. Disab. Caucasian	SPED Math Middle School Rural Southern USA	- On-Task Behavior - Math Fluency	- % of 3-min momentary time sampling obs. - correct digits written per min	TCSM using MotivAider , visual cue card, self-recording form: "Am I working?" plus reinforcement for SM accuracy	ABAB
Farrell & McDougall, 2008	4M, 2F Ages 15(5), 14(1) SLD Math (4) ADHD/Tourette(1) SED, ADHD & bi-polar	Basic Math Class High School Suburban Western USA	Math Fluency - correct rate - incorrect rate - accuracy	- correct (written) digits/min - incorrect (written) digits/min - % of digits written correctly	TCSM using Motivator & VCSM of Pace w/ Goal Setting & Self-Graphing:	MB across participants with embedded range-bound changing criterion

	Caucasian				Circled problem working on @ each cue to determine if behind, on, or ahead of pace	
Legge, DeBar, & Alber-Morgan, 2010	3M Ages 11(2), 13(1) Autism(2), Cerebral Palsy(1) No Information	SPED Math No Information Rural No Information	- On-Task Behavior - Accuracy of Self-Recording	- % of 2-min momentary time sampling obs. - % of agreements between student & experimenter	TCSM using MotivAider & self-recording form: “eyes on work” “in my seat” “doing work”	MB across participants
McDougall, Morrison, & Awana, 2012 (Study 1 of 2)	1M Age 15 ADHD Portuguese	GE Algebra High School Suburban Oahu, HI, USA	Algebra Productivity	% of steps for which student wrote correct responses	TCSM of productivity using MotivAider & self-recording form: “Am I completing my bellwork?”	AB
McDougall, Morrison, & Awana, 2012 (Study 2 of 2)	1M Age 12 ED Hawaiian	SPED English Middle School Urban Oahu, HI, USA	Task Completion	# of minutes student took to write answers to all required items on word-of-day task	TCSM of productivity using MotivAider & self-recording form: “Am I working?”	AB
Moore, Anderson, Glassenbury, Lang, & Didden, 2013	3M Age between 12-13 Low average ability (2) and average ability performing below potential No information	GE Humanities (combined English Literacy and Social Studies) No information No information No information	On-Task Behavior	% of 15-sec momentary time sampling observations	TCSM using MotivAider & self-recording form: write tick for on-task, cross for off-task; plus self-graphing of ticks on cumulative graph	MB across participants with follow-up sessions three and four weeks after final session of last intervention
State & Kern, 2012	1M Age 14 Asperger’s Caucasian	- Conference Room at School - Living Room at Home No Information No Information No Information	- Inappropriate Social Interactions - Inappropriate Noises - Appropriate Social Interactions	% of 15-sec partial-intervals	TCSM using vibrating wristwatch & self-recording sheet: “Did I have appropriate interactions?” versus Video Feedback w/token reinforcement	MB across 2 settings (student-teacher dyad & student-peer dyad) with embedded ABCBC or ABC depending on design element. See Table 3 note.

Note: ADHD = attention deficit hyperactivity disorder; ED = emotional disturbance; F = female; GE = general education; hmwk. = homework; LD = learning disability; M = male; SED = severe emotional disturbance; SM = self-monitoring; SPED = special education; TCSM = tactile-cued self-monitoring; VSCM = visual-cued self-monitoring; w/ = with

Table 2

Intervention Efficacy, Procedural Integrity and Outcome Measures for Tactile-Cued Self-Monitoring Studies

Authors, Year	Intervention Efficacy	Procedural Integrity	Reliability of Dependent Variable	Maintenance Probes/Follow-Up	Generalization	Social Validity of DV Changes
Amato-Zech, Hoff, & Doepke, 2006	EC = moderate to strong ES = not reported PND = not reported PEM = not reported	IT: not measured ⁻⁻ AD: 100% for 46% of intervention sessions using 5-item checklist	On-Task: M=96% (92-100% range) IOA for 18% of total sessions Off-Task: M=81% (0-100% range) IOA No Kappa ⁻⁻	not conducted ⁻⁻	Moderate-mixed Probes, in math, 10-12% of sessions in each baseline & intervention phase	Subjective evaluation via educators' (positive) & participants' (positive) responses on Intervention Rating Profile
Anderson & Wheldall, 2003	EC = mixed ES = not reported PND = not reported PEM = not reported	IT: not measured ⁻⁻ AD: not measured ⁻⁻	On-Task Behaviour: M = 93% IOA for 25% of data sessions "during baseline" M = 90% (79-96% range) for 25% of data sessions across all phases No Kappa ⁻⁻	Weak-Moderate & Variable 2 probes after end of the final intervention phase Alice & Nicholas: 20 & 27 days Amanda: 27 & 34 days	not conducted ⁺	
Boswell, Knight, & Spriggs, 2013	EC = moderate to strong ES = not reported PND = not reported PEM = not reported	IT: 100% for student (11-item checklist) & EA (16-item checklist) AD: 100% for 38% of intervention	On-Task: M = 98% point-by-point agreement for 65% of sessions No Kappa ⁻⁻	not conducted ⁺	not conducted ⁺	Subjective evaluation via EA's (positive) & participant's (moderate) ratings

		sessions using 8-item checklist	Math Fluency: 100% agreement for 100% of sessions			of adapted scale items
Farrell & McDougall, 2008	EC = moderate to strong ES = not reported PND = not reported PEM = not reported	IT: 100% for 100% of training sessions using 7-item observational checklist AD: 100% for 72% of baseline sessions, using 5-item checklist; 100% for 72% of intervention sessions using 8-item checklist	Correct Digits: 99.7% interscorer agreement for 100% of total sessions Incorrect Digits: 98.3% interscorer agreement for 100% of total sessions No Kappa ⁺⁺	Strong Probes 1 & 2 weeks after end of final intervention phase	not conducted ⁺⁺	Social comparison (strong) Subjective evaluation via students' oral responses to 16-item questionnaire (positive)
Legge, DeBar, & Alber-Morgan, 2010	EC = strong ES = not reported PND = not reported PEM = not reported	IT: not measured – AD: 100% for 21% of baseline sessions; 45% of intervention sessions.	On-Task Behavior: Means for IOA ranged from 73 – 92% for 20-25% of baseline sessions; 98-100% for 20-29% of intervention sessions No Kappa ⁺⁺	Strong 1 probe/week, 3 consecutive weeks, after last session of fading phase	not conducted ⁺	Not conducted --
McDougall, Morrison, & Awana, 2012 (Study 1 of 2)	EC = cannot evaluate/AB design ES = not reported PND = 100% PEM = not reported	IT: not measured ⁺ AD: not measured ⁺	Algebra Productivity: 100% point-by-point agreement for 100% total sessions No Kappa ⁺⁺	not conducted ⁺	not conducted; ⁺	Subjective evaluation by participant (positive)
McDougall, Morrison, & Awana, 2012 (Study 2 of 2)	EC = cannot evaluate/AB design ES = not reported PND = 100% PEM = not reported	IT: not measured ⁺ AD: not measured ⁺	Task Completion (duration): 100% IOA for 100% of total sessions Kappa not relevant	not conducted ⁺	not conducted; ⁺	Subjective evaluation by participant (positive)
Moore, Anderson, Glassenbury, Lang, & Didden, 2013	EC = strong ES = not reported PND = not reported PEM = not reported	IT: not measured ⁺⁺ AD: not measured ⁺⁺	On-Task Behavior: M = 94% IOA for 25% of all sessions; ranges 92-98%, 92-	Strong Probes 3 & 4 weeks after end of intervention phase	not conducted ⁺	Subjective evaluation by participants and their teachers

			100%, 94-100% for 3 participants No Kappa ⁻⁻			(positive)
State & Kern, 2012	EC = *not applicable ES = not reported PND = not reported PEM = not reported	IT: not measured ⁻⁻ AD: not measured ⁻⁻	- Inappropriate Social Interactions: M = 85% (59-100% range) - Inappropriate Noises: M = 91% (73-100% range) - Appropriate Social Interactions: M = 72% (59-100%) [for "30% of the sessions"] No Kappa ⁻⁻	not conducted ⁺	not conducted; ⁺	Subjective evaluation via student's response (moderate) to School Intervention Rating Form

Note: AD = adherence to ongoing procedures by student-participants or teachers-adults during baseline, intervention, or maintenance phases; EA = educational assistant; ES = effect size (*phi*, *d*, or other); EC = experimental control based on visual inspection of graphed data; IOA = interobserver agreement; IT = initial training of students; M = Mean; PEM = percentage of data points exceeding median; PND = percentage of non-overlapping data; * = study did not include any direct comparison of TCSM efficacy from a baseline phase to a subsequent TCSM-only intervention phase. + = study's authors acknowledged limitation; -- = study's authors did not acknowledge limitation.

Findings for Descriptive Variables

Table 1 and the following paragraphs summarize findings for descriptive variables from the nine TCSM intervention studies that qualified for this review.

Authors and Year of Publication

From 1973 through 2013, eight journal articles with a total of nine studies qualified for this analytical literature review. None of the articles were sole-authored. Three articles had two authors, four articles had three authors, and one article had five authors. Zero TCSM studies were published from 1973 through 2002. Anderson and Wheldall (2003) were first to publish a study when they investigated the impact of the Watchminder. Three years later, Amato-Zech, Hoff, and Doepke (2006) were first to publish a study using a MotivAider. The seven remaining studies were published in 2008 ($n = 1$), 2010 ($n = 1$), 2012 ($n = 3$), and 2013 ($n = 2$). Thus, five of the nine studies were published during the final two years of the 1973 – 2013 review period.

Participants

Number. The nine studies included a total of 22 participants (*range* = 1 to 6 participants). Four studies had one participant, four studies had three participants, and one study had six participants.

Gender and age. Seventeen of 22 participants (77%) were male and 5 participants (23%) were female. The 22 participants ranged in age from 10 years old to 15 years old. In order of frequency, participants' age in years included 11 ($n = 7$), 15 ($n = 6$), 12 ($n = 5$), 14 ($n = 2$), 13 ($n = 1$), and 12 ($n = 1$).

Disability status. Eight of the nine studies included one or more participants with at least one disability. The other study included students without disabilities whom the authors described as having low average and average ability. Three studies included one or more participants with multiple disabilities. Seven studies included one or more participants with a single disability. In order of magnitude (with number of participants indicated in parentheses), authors of qualifying studies reported that participants had the following disabilities: LD or SLD (6), Speech and Language Impairments or Moderate Language (4), ADHD (4), Emotional Disturbance or Serious Emotional Disturbance (3), Autism (2), Asperger's Syndrome (1), Tourette's Syndrome (1), Bi-polar (1), Moderate Intellectual Disability, mild intellectual disability (1), dyspraxia (1), Pervasive Developmental Disability, and Cerebral Palsy (1). Finally, authors of one study included the term *learning difficulties*.

Settings

Eight of the nine studies had a singular (school) setting. The one remaining study had two settings, including a conference room at school and a living room at the student's home. Authors of the *school only* studies identified the respective settings as special education classroom ($n = 5$), general education classroom ($n = 2$), and basic classroom ($n = 1$). Classes by subject included math ($n = 3$ studies), as well as Algebra, English, Reasoning and Writing, Humanities (English and Social Studies combined), and independent folder work ($n = 1$ study each).

School level. Two studies were conducted at elementary schools, two at middle schools, and two at high schools. Authors of three studies did not indicate school level.

Community settings. Two studies occurred in suburban communities, two in rural communities, and two in an urban community. Authors of the three remaining studies did not indicate the community setting.

Region. Two studies were conducted in Hawai'i, one in Midwest USA, one in Southern USA, and one in Western USA. Authors of the four remaining studies did not identify the region.

Dependent Variables

Five of nine studies targeted multiple dependent variables and the other four studies targeted a single target behavior. Dependent variables targeted most frequently, with number of studies in parentheses, included variations of on-task, engaged, and disruptive behaviors (6), math fluency (2) homework tasks or homework completion (2), algebra productivity (1), self-recording accuracy (1), and social interactions (1). Teachers or researchers – not student-participants - selected the dependent variable in each of the nine studies.

Measurement of Dependent Variables

Researchers used various ways to measure dependent variables. Four studies used momentary time sampling and two studies utilized partial interval recording. Three studies reported percentages to measure accuracy. Two studies reported rate measures and one study reported duration. One study used percentage of agreement as a measure of a dependent variable.

Independent Variables

Seven studies used the MotivAider to produce tactile cues and two studies used a wristwatch to produce tactile cues. TCSM was the sole intervention component in five studies. Four studies combined TCSM with at least one other component, including goal setting, video-cued self-monitoring, and self-graphing (Farrell & McDougall, 2008); a visual cue card plus reinforcement for self-monitoring accuracy (Boswell, Knight, & Spriggs, 2013); self-graphing (Moore et al, 2013). State and Kern (2012) compared the impact of two multi-component interventions - TCSM plus token reinforcement versus video feedback plus token reinforcement.

Research Designs

Each of the nine TCSM studies used a single-case research design. Two studies used the ABAB, two studies used the AB, and two studies used a simple multiple baseline across participants. In the three remaining studies, the researchers embedded one or more single-case designs within a multiple baseline design. Of those three combined designs, one study embedded a reversal design, another embedded the range-bound changing criterion design, and another embedded an ABCBC and ABC design. Eight of the nine studies used designs that included one or more baseline phases adjacent to one or more TCSM phases. One study (State & Kern, 2012) used a design that did not allow us to compare a participant's performance across adjacent baseline and TCSM phases. That study was unique in that it compared the impact of two types of interventions (video feedback versus in-vivo TCSM), rather than investigating the impact of TCSM versus baseline conditions.

Findings for Intervention Efficacy, Procedural Integrity, and Outcome Variables

The following paragraphs summarize findings for intervention efficacy, procedural integrity, and outcome variables.

Intervention Efficacy

Our findings here are based on results listed in the Intervention Efficacy column of Table 2 and on effect sizes displayed in Tables 3 and 4. Findings for intervention efficacy are based on 8 of the 9 studies that qualified for this meta-analytic review. We did not evaluate efficacy for State and Kern (2012) because that study did not include any adjacent phases whereby a baseline phase immediately preceded a TCSM-only intervention phase.

Experimental control per visual inspection of graphed data. Based on visual inspection of graphed data, experimental control of the target behavior was strong in two studies, moderate-to-strong in three studies, and mixed in one study. Two other studies used the A-B design, which did not permit conclusions about experimental control of the intervention over the target behavior.

Effect size indices. Other than one *PND* index (100%) reported in each of two studies, authors did not report effect sizes of any type. Because authors reported only 2 of 34 possible *PNDs*, 0 of 34 possible *PEMs*, and 0 of 34 possible *Phis* for the main effect of TCSM, we calculated these *PND*, *PEMs*, and *Phi* indices. See Tables 3 and 4.

PNDs ranged from 0% to 100% ($Md = 95.5\%$). Of 34 *PNDs* we calculated, (a) 18 *PNDs* (17 *PNDs* = 100% and 1 *PND* = 91%) indicated very effective interventions; (b) four *PNDs* indicated moderately effective interventions; (c) four *PNDs* indicated mildly effective interventions; and (d) eight *PNDs* indicated ineffective interventions. *PEMs* ranged from 0% to 100% ($Md = 100\%$). Of 34 *PEMs* we calculated, (a) 27 *PEMs* (26 *PEMs* = 100% and 1 *PEMs* = 93%) indicated very effective interventions; (b) four *PEMs* indicated moderately effective interventions; (c) two *PEMs* indicated mildly effective interventions; and (d) one *PEM* indicated an ineffective intervention. *Phi*s ranged from 0.18 to 0.89 ($Md = 0.65$). Of 34 *Phis* we calculated, magnitude of effect sizes were large ($n = 23$), medium ($n = 5$), small ($n = 4$) and near zero ($n = 2$).

Of the 34 *Phis* we calculated, 27 represented comparisons for *instituting TCSM*, that is, compared a student's performance from (a) an initial baseline phase versus the subsequent initial intervention phase, or (b) a return-to-baseline phase versus the subsequent phase in which researchers re-instituted the TCSM intervention. See Table 4. The remaining 7 of 34 *Phis* represented *removing TCSM*, that is, compared a student's performance from an initial intervention phase to the subsequent return-to-baseline phase when the TCSM was removed. For the aforementioned 27 *instituting TCSM* comparisons, *Phi* ranged from 0.18 to 0.89 ($Md = 0.74$), with magnitude of effect sizes being large ($n = 22$), medium ($n = 2$), and small ($n = 3$). For the aforementioned 7 *removing TCSM* comparisons, *Phi* ranged from 0.00 to 0.53 ($Md = 0.32$), with magnitude of effect sizes being large ($n = 1$), medium ($n = 3$), and small ($n = 1$), and zero ($n = 2$). Not surprisingly, *Phis* for these 7 *removing TCSM* comparisons were generally smaller than *Phis* for the 27 *instituting TCSM* comparisons. That is, each of the 7 *Phis* compared performance in studies that used an ABAB (reversal) design when the initial intervention phase was compared to

the return-to-baseline phase. In studies that use an ABAB design, a student's performance might not revert to levels seen in the initial baseline, especially if the target behavior is not prone to being unlearned (Kazdin, 1982). Finally, for each of the eight studies that compared a student's performance during one or more baseline phases to one or more subsequent TCSM phases, we calculated an overall effect size. The overall weighted *Phis* for those eight studies (0.49, 0.51, 0.61, 0.64, 0.76, 0.78, 0.80, and 0.84, respectively) indicated seven studies had a large effect size and one study had a medium effect size.

Table 3

Effect Sizes - PND, PEM and Phi

Author, Year	% of Nonoverlapping Data Points (PND)	% of Data Points Exceeding Median (PEM)	Individual & Overall Phi Subsequent to Moods Median Test
Amato-Zech, Hoff, & Doepke, 2006	Jack: A-B = 100% (9/9) B-A₁ = 44% (4/9) A₁-B₁ = 100% (8/8) David: A-B = 100% (9/9) B-A₁ = 22% (2/9) A₁-B₁ = 100% (7/7) Allison A-B = 100% (10/10) B-A₁ = 60% (6/10) A₁-B₁ = 88% (7/8)	Jack: A-B = 100% (9/9) B-A₁ = 56% (5/9) A₁-B₁ = 100% (8/8) David: A-B = 100% (9/9) B-A₁ = 77% (7/9) A₁-B₁ = 100% (7/7) Allison A-B = 100% (10/10) B-A₁ = 70% (7/10) A₁-B₁ = 100% (8/8)	Jack: A-B = 0.89 B-A₁ = 0.00 A₁-B₁ = 0.87 David: A-B = 0.80 B-A₁ = 0.00 A₁-B₁ = 0.86 Allison A-B = 0.85* B-A₁ = 0.19 A₁-B₁ = 0.74 Overall = 0.84
Anderson & Wheldall, 2003	Alice:	Alice:	Alice:

	A-B = 100% (8/8) B-A₁ = 25% (2/8) A₁-B₁ = 50% (4/8) Amanda: A-B = 75% (6/8) B-A₁ = 63% (5/8) A₁-B₁ = 100% (5/5) Nicholas: A-B = 0% (0/8) B-A₁ = 13% (1/8) A₁-B₁ = 17% (1/6)	A-B = 100% (8/8) B-A₁ = 100% (8/8) A₁-B₁ = 100% (8/8) Amanda: A-B = 88% (7/8) B-A₁ = 75% (6/8) A₁-B₁ = 100% (5/5) Nicholas: A-B = 100% (8/8) B-A₁ = 100% (8/8) A₁-B₁ = 67% (4/6)	A-B = 0.63 B-A₁ = 0.53 A₁-B₁ = 0.60 Amanda: A-B = 0.73 B-A₁ = 0.41 A₁-B₁ = 0.80 Nicholas: A-B = 0.23 B-A₁ = 0.32 A₁-B₁ = 0.18 Overall = 0.51
Boswell, Knight, & Spriggs, 2013	Sam: A-B = 100% (5/5) B-A₁ = 100% (5/5) A₁-B₁ = 100% (3/3)	Sam: A-B = 100% (5/5) B-A₁ = 100% (5/5) A₁-B₁ = 100% (3/3)	Sam: A-B = 0.82 B-A₁ = 0.42 A₁-B₁ = 0.67 Overall = 0.76
Farrell & McDougall, 2008	Jeff: A- B₁₋₄ = 100% (17/17) Ronnie: A- B₁₋₃ = 47% (8/17) Anisa: A- B₁₋₄ = 69% (9/13) Shaun:	Jeff: A- B₁₋₄ = 100% (17/17) Ronnie: A- B₁₋₃ = 100% (17/17) Anisa: A- B₁₋₄ = 100% (13/13)	Jeff: A- B₁₋₄ = 0.50 Ronnie: A- B₁₋₃ = 0.37 Anisa: A- B₁₋₄ = 0.75* Shaun:

	A- B ₁₋₃ = 86% (12/14) Peter: A- B ₁₋₃ = 91% (10/11)	Shaun: A- B ₁₋₃ = 93% (13/14) Peter: A- B ₁₋₃ = 100% (11/11)	A- B ₁₋₃ = 0.77* Peter: A- B ₁₋₃ = 0.83* Overall = 0.64
Legge, DeBar, & Alber-Morgan, 2010	Joshua: A-B = 100% (15/15) Matt: A-B = 89% (8/9) Adam: A-B = 0% (0/3)	Joshua: A-B = 100% (15/15) Matt: A-B = 100% (9/9) Adam: A-B = 0% (0/3)	Joshua: A-B = 0.46 Matt: A-B = 0.71 Adam: A-B = 0.28 Overall = 0.49
McDougall, Morrison, & Awana, 2012 (1st of 2)	Gabriel: A-B = 100% (5/5)	Gabriel: A-B = 100% (5/5)	Gabriel: A-B = 0.78 Overall = 0.78
McDougall, Morrison, & Awana, 2012 (2nd of 2)	Kawika: A-B = 100% (5/5)	Kawika: A-B = 100% (5/5)	Kawika: A-B = 0.80 Overall = 0.80
Moore, Anderson, Glassenbury, Lang, & Didden, 2013	Abe: A-B = 100% (8/8) Ben: A-B = 100% (8/8) Chaz: A-B = 100% (5/5)	Abe: A-B = 100% (8/8) Ben: A-B = 100% (8/8) Chaz: A-B = 100% (5/5)	Abe: A-B = 0.53 Ben: A-B = 0.74 Chaz: A-B = 0.54

			Overall = 0.61
State & Kern, 2012	Not applicable	Not applicable	Not applicable

Note: Phi = square root of the quantity, chi-square divided by N , with Phi having been calculated with Moods median test. Unless denoted by an asterisk, we used Yates correction for continuity to adjust downward all chi-square values because most studies had relatively few data points in one or more phases, which resulted in expected frequencies of less than 5 in at least one of the four cells of the 2 x 2 contingency tables. A study's overall effect size equals the weighted (by number of sessions) mean of each effect size for all adjacent baseline-to-intervention (A-B and A₁-B₁) phase comparisons in a study. Overall effect size excludes effect sizes for any adjacent intervention-to-baseline (B-A₁) phase comparisons. We did not report any effect size indices for State and Kern (2012) because the research design had zero adjacent phase comparisons for baseline versus TCSM-only intervention. State and Kern was the only study that compared TCSM to another type of intervention. We opted not to report any effect size indices for State and Kern to maintain equivalence when interpreting values displayed here in Table 3.

Table 4
Distributions for 3 Effect Size Indices by Magnitude: Initiating TCSM Versus Removing TCSM

Magnitude Of Effect Size	Initiation TCSM: A-B, A ₁ -B ₁ ($n = 27$)			Removing TCSM: B-A ₁ ($n = 7$)			Total Comparisons ($N = 34$ each Index)		
	PND	PEM	Phi	PND	PEM	Phi	PND	PEM	Phi
Large	17	24	22	1	3	1	18	27	23
Medium	4	1	2	0	3	3	4	4	5
Small	2	1	3	2	1	1	4	2	4
Near Zero	4	1	0	4	0	2	8	1	2
Total	27	27	27	7	7	7	34	34	34

Procedural Integrity

We identified whether authors reported numerical indices for two aspects of procedural integrity, that is, adherence to initial training procedures, and treatment fidelity or adherence to ongoing intervention procedures (Mertens, 1998). Seven of nine studies did not include a numerical index to quantify adherence to initial training procedures. Both of two remaining studies included a numerical index of 100% for adherence to initial training procedures. Both of those studies utilized observational checklists. Four of nine studies included one or more numerical indices for treatment fidelity, that is, for adherence to ongoing intervention procedures. In each case, the index equaled 100% based on observations using a checklist. Frequency of use of such checklists ranged from 21% to 72% of the sessions within a particular phase of a study. Of the four studies in which authors reported indices for adherence to ongoing intervention procedures, two studies included an index for the baseline phase and an index for the intervention phase, and two studies reported an index for only the intervention phases. Authors of five of the nine studies that

qualified for this review did not report an index to quantify adherence to ongoing intervention procedures.

Interobserver Agreement or Reliability Indices for Dependent Variables

Each of the nine studies included indices of interobserver (IO) agreement or inter-scorer agreement (hereafter reliability) for dependent variable measures. Means reported for reliability of each and every dependent variable measured within a particular study, exceeded 97% in four of the nine studies. Means reported for reliability of dependent variables measured within the five remaining studies were, respectively, 81% and 96%; 73% to 92% and 98% to 100%; 85%, 91%, and 72%; 93% and 79% to 96%; and 94%. Of the eight studies that could have used Kappa to adjust for chance agreement, zero studies reported Kappa.

The nine studies varied in how frequently researchers collected reliability data. In four of nine studies, authors reported having collected reliability data for 100% of all sessions, total sessions, or all baseline and intervention sessions. Another study's author reported having collected reliability data for 65% of sessions (for on-task behavior) and 100% of sessions (for math fluency). Authors of the four remaining studies reported having collected reliability data for approximately 20 % to 30% of sessions.

Maintenance Probes or Follow-Up

Five on the nine studies included no maintenance data. Investigators in the four remaining studies formally assessed maintenance of changes in participants' target behaviors. Maintenance was strong in three of those four studies and weak-to-moderate in the other study.

Generalization

Of the nine studies, only Amato-Zech, Hoff, and Doepke (2006) reported generalization data. Results for generalization in the aforementioned study were moderate and mixed.

Social Validity of Changes in Target Behaviors

Investigators in eight of nine studies reported results for social validity of improvements in participants' target behaviors by using one or both of two common methods – the subjective evaluation method or the social comparison method. Six of those eight studies employed only the subjective evaluation method, whereas the other two studies utilized both of the methods. Of the eight studies that reported results for subjective evaluation, those results were positive with very few exceptions. Participant-students were the source of the data in each of those eight studies. Four of those eight studies also used teachers or educational assistants as data sources for subjective evaluation. In the two studies that included the social comparison method, results strongly support social validity in one study and were mixed in the other study.

Discussion

In this section, we discuss findings in response to three research questions that guided our review and we critically evaluate the strengths and weaknesses of the nine TCSM studies. We also provide recommendations for researchers based on the aforementioned strengths and weaknesses and we note limitations of our review. Finally, we list BSM and TCSM resources for researchers and practitioners.

Extent and Nature of TCSM Intervention Studies (Research Question 1)

Given that Glynn, Thomas, and Shee (1973) published their seminal audio-cued self-monitoring study four decades ago, and that audio-cued and visually cued self-monitoring have achieved status as evidence-based practices, TCSM intervention studies are relative newcomers to the BSM literature. Indeed, the “oldest” TCSM intervention studies include (a) Anderson and Wheldall (2003), who were first to publish a qualifying TCSM study when they investigated the impact of the Watchminder, and (b) Amato-Zech, Hoff, and Doepke (2006), who were first to investigate the impact of TCSM using the MotivAider. Moreover, of the nine TCSM studies we reviewed, five of those studies were published very recently (2012 – 2013). Thus, TCSM seems to be gathering interest quite recently among researchers. Some researchers appear to have heeded recommendations, from authors of previous BSM reviews, to investigate use of TCSM in educational settings (McDougall, 1998; McDougall, Skouge, Farrell, & Hoff, 2006).

Researchers have started to investigate students’ use of TCSM, but across a relatively limited range of ages and settings. For example, the 22 participants across the nine qualifying studies ranged in age from 10 to 15 years old. Thus, we recommend that researchers expand age range to include children in early elementary grades, as well as high schools. In addition, math and algebra ($n = 4$ studies) constituted the only academic subjects that served as the setting in more than one study. Thus, we recommend that researchers expand the range of academic subjects in which participants apply TCSM. Finally, given the small number of TCSM studies ($N = 9$) conducted to date, it is not surprising that researchers have targeted dependent variables of a relatively restricted range – and that a number of these dependent variables have been investigated in only one study to date. Thus, we recommend that researchers expand the range and depth of dependent variables (target behaviors), including replication or extension studies. We also recommend that researchers attempt to increase the “self” in self-monitoring interventions, for example, by having students identify the task or behavior that they self-monitor. In each of the nine studies that we reviewed, researchers or teachers determined the target behaviors. In future studies participants could decide themselves, or with guidance from adults, which academic and non-academic behaviors shall be the target of TCSM interventions.

To date, researchers – as in prior audio-cued and visual-cued versions of self-monitoring – have investigated the impact of TCSM alone and in combination with other intervention components. Five of the nine studies in this review used TCSM as the sole intervention and four studies combined TCSM with at least one other intervention component. We recommend that researchers continue to design and investigate TCSM alone and in combination with other components, such as self-graphing. For multi-component TCSM interventions, we recommend that researchers consider using dismantling strategies (Kazdin, 1982). In such studies, researchers initiate the first intervention phase of the study using TCSM plus other intervention components. Then, they remove individual intervention components during successive phases of the intervention to determine if participants maintain or improve upon the gains they demonstrated during the first phase of the intervention. We also recommend that researchers examine the extensive literature on multi-component audio-cued and visually-cued self-monitoring, and consider combining TCSM with other intervention components that have been shown to be effective. In particular, the BSM literature suggests that self-graphing is an effective, easy to use, and malleable technique, which merits being combined with self-monitoring (McDougall, Skouge, Farrell & Hoff, 2006).

To date, no published studies have compared the efficacy of TCSM to other forms of self-monitoring, including audio-cued and visual-cued self-monitoring. Thus, we recommend that researchers consider implementing such comparative studies. We suspect, however, that differences in students' performance will be negligible. The literature to date suggests moderate to strong outcomes for most self-monitoring interventions, regardless of the type of cue. Advantages of TCSM versus other forms of self-monitoring will probably be related to benefits that can accrue given the more covert and private nature of tactile cues (Amato-Zech, Hoff, & Doepke, 2006). Finally, we recommend that researchers investigate TCSM of pace. To date, only one study has investigated students' self-monitoring of the pace at which they were performing (i.e., writing answers to math problems). Much more common in published self-monitoring studies is having students self-monitor their on-task behavior ("Am I paying attention?") or their work productivity ("Am I working?"). Self-monitoring of pace requires that students monitor their ongoing performance against a precise standard, to ascertain if they are behind pace, on pace, or ahead of pace. Self-monitoring of pace might help students who, when assigned independent practice tasks, (a) produce answers erratically rather than consistently throughout the assigned period, (b) produce too many error responses based on answering too quickly, and (c) produce errorless responses, but too few responses.

Efficacy of TCSM Studies (Research Question 2)

Most of the nine TCSM interventions that we reviewed demonstrated moderate to strong efficacy. Visual inspection of graphed data indicated that five studies demonstrated strong or moderate-to-strong experimental control. Mixed control was evident in another study and the three remaining studies used designs that did not permit us to evaluate experimental control via visual inspection of graphed data. TCSM efficacy was moderate to very strong for 22 of 34 (65%) *PNDs*, 31 of 34 (91%) *PEMs*, and 28 of 34 (82%) *Phis* we calculated. For the following reasons, however, researchers should conduct additional studies before we can reach definitive conclusions about the overall efficacy of TCSM in educational settings. First, too few TCSM studies with rigorous single-case research designs have been published to date. Of the nine studies that we analyzed, each of which used a single-case design, only seven studies used research designs amenable to evaluating experimental control via visual inspection of graphed data. Moreover, we excluded another study (State & Kern, 2012) because it did not include adjacent phases in which baseline immediately preceded a TCSM-only phase. Second, TCSM studies, like the vast majority of studies that use single-case research designs, very infrequently include any effect size index. Third, researchers might consider using true-experimental group research designs, when appropriate, to investigate the efficacy of TCSM. In conclusion, results from TCSM interventions are promising. Efficacy of TCSM, however, has not yet achieved the evidence-based status attained by more established versions of self-monitoring, that is, audio-cued and visually-cued self-monitoring.

Quality of Implementation of TCSM Studies (Research Question 3)

Among our most interesting findings are those in response to the third major research question that guided this review: To what extent have TCSM interventions been implemented with quality, as evidenced by indicators of procedural integrity and treatment fidelity? We conclude that the quality of TCSM interventions to date has varied considerably. Moreover, our findings reflect some of the patterns reported in previous BSM reviews, in particular, McDougall,

Skouge, Farrell, and Hoff (2006), and McDougall (1998). In the following section, we evaluate how researchers did and did not attend to elements summarized in Table 2.

As displayed in column 2 of Table 2, we evaluated two aspects of procedural integrity. The first aspect was initial training (IT) of TCSM, which typically occurred between the last session of the baseline phase and the first session of the intervention phase. The second aspect was adherence (AD) to ongoing procedures by student-participants or teachers-adults during baseline, intervention, or maintenance phases. Authors of only two of the nine qualifying studies reported data to evaluate the integrity of initial training procedures. In the seven remaining studies, authors of only two studies noted, as a limitation of their study, their failure to collect data on integrity of initial training procedures. Findings were more favorable for adherence to ongoing procedures, at least for intervention phases of the studies. Four of eight studies reported data to evaluate adherence to ongoing procedures. In the five remaining studies, authors of two studies noted, as a limitation of their study, not collecting data on adherence to ongoing procedures. Interestingly, even in the four studies where authors collected data on the integrity of ongoing procedures, they tended to collect such data during intervention and maintenance phases, but only two studies reported such data for baseline phases. Thus, most researchers did not collect data that would enable them to evaluate the extent to which baseline protocols were or were not followed. Overall, we recommend that researchers collect data to evaluate the integrity of initial TCSM training, as well as the ongoing procedures for each phase of a study, including baseline and intervention phases. Without such data about procedural integrity, we believe that researchers cannot conclude credibly that interventions are responsible for outcomes.

In contrast to infrequent data collection for the two aforementioned aspects of procedural integrity, authors of the nine TCSM studies routinely collected and reported data on the reliability of measurement for dependent variables. Nonetheless, room for improvement remains. The majority of the studies used observational recording systems and reported traditional indices for interobserver agreement. Those traditional indices suggested that reliability was strong in nearly all of the studies. However, of the eight studies that could have used Kappa to adjust for chance agreements, none did so. Thus, we recommend that researchers who use traditional indices to report interobserver agreement also report Kappa.

Findings for maintenance and generalization provide further guidance for future research. Four of the nine qualifying studies reported outcomes for maintenance of target behaviors and only one of nine studies reported outcomes for generalization. Of the five studies that did not report outcomes for maintenance, authors of four studies acknowledged lack of maintenance data as a limitation. Of the eight studies that did not report outcomes for generalization, authors of seven studies acknowledged that limitation. In conclusion, we recommend that researchers consistently collect and report data on maintenance and generalization. Given that cued self-monitoring interventions lend easily to fading procedures (i.e., reducing the frequency of cues, or increasing the time that elapses between cues), we are somewhat surprised by the lack of maintenance phases, fading procedures, or maintenance probes in the studies that we reviewed. The research literature, however, suggests that one reason why researchers fail to address maintenance is that they begin their studies too late in the school year (McDougall, Skouge, Farrell, & Hoff, 2006). Indeed, as authors noted explicitly in one of the studies that we reviewed, the school year ended before they could collect maintenance data.

Finally, findings about social validity suggest that, with one exception, authors of the nine TCSM studies collected data that enabled them to evaluate the social validity of improvements in participants' target behaviors. This suggests that authors are well on their way to establishing, as a routine or minimal expectation, the practice of evaluating social validity. However, findings also indicate that researchers underutilized the social comparison method. Only two of the nine TCSM studies in our review reported social comparison data. This finding is consistent with findings from other research syntheses, which reported that the social comparison method appears to be underutilized (McDougall, Skouge, Farrell, & Hoff, 2006; Pierce, Reid, & Epstein, 2004). Moreover, consistent with research syntheses of single-case intervention studies, we found that authors almost universally reported positive results when they used the subjective evaluation method to evaluate social validity. It is possible that subjective evaluation procedures tend to elicit positive responses. The wording of items, nature of relationships between who asks and who answers subjective evaluation questions, and social desirability of positive responses could bias results in a favorable direction. Consequently, we recommend that authors increase use of the social comparison method when evaluating social validity. Obtaining such data could provide a more comprehensive picture of the social validity of changes in participants' target behaviors.

One additional finding emerged when we inspected the graphed data from the qualifying studies. Most authors adhered to graphing conventions. However, we noted some error patterns. Some authors connected data points from non-consecutive sessions within a phase. Some graphs appeared with session numbers misaligned to tic marks on the x-axis. At least one graph mislabeled the y-axis by indicating percentage of observation intervals rather than percentage of momentary time sampling observations. Finally, a number of graphs appeared with the zero value for the y-axis appearing on, rather than slightly above, the x-axis.

In conclusion, compared to earlier BSM studies, TCSM researchers have improved upon the procedural integrity and quality indicators listed as column headings in Table 2. However, further improvements are needed. In our current review, for the 33 limitations that we identified and reported in Table 2, authors of those studies explicitly noted 15 (45%) of those limitations and failed to note 18 (55%) of those limitations. This represents a marked improvement in authors' self-acknowledged study limitations based on a finding from an earlier BSM analytic literature review conducted by McDougall, Skouge, Farrell, and Hoff (2006): "We found that for each author-reported weakness ... authors failed to report five other weaknesses ... Thus, we recommend that researchers be vigilant and identify explicitly, in a limitations section, the methodological and procedural weaknesses of their studies" (p. 46).

Limitations of Our Meta-Analytic Review of TCSM Intervention Studies

Three limitations of our meta-analytic review are as follows. First, we did not evaluate reliability of data entries into the cells of Tables 1 and 2. Instead, we used a method of iterative consensus as we describe in the Methods section. Second, we did not report findings about how much time participants in each study expended while performing the target behavior. Doing so would have allowed us to evaluate the extent to which authors of the nine studies followed guidelines for effective use of cued self-monitoring. The BSM literature suggests that when students learn to self-monitor, they should do so for relatively brief periods of time such as a few minutes rather

than for hours or the entire school day (McDougall, 2002). Third, we did not report findings to evaluate the economic cost and the effort expended by teachers, students, and researchers. The extent to which practitioners adopt interventions might depend on such factors.

BSM Resources for Practitioners

Many resources are available for practitioners, including articles on how-to-teach BSM (Alberto & Sharpton, 1987; Daly & Ranalli, 2003; Dunlap, Dunlap, Koegel, & Koegel, 1991; Frith & Armstrong, 1986; Gunter, Miller, Venn, Thomas, & House, 2002; Hughes, Ruhl, & Peterson, 1988; Johnson & Johnson, 1999; Lee, Palmer, & Wehmeyer, 2009; Liberty & Paeth, 1990; McConnell, 1999; Schloss, 1987; Young, West, Li, & Peterson 1997). Additional resources include instructional videos (McDougall, 2003); books and booklets (Agran, 1997; King-Sears, & Carpenter, 1997; King-Sears, Wehmeyer, & Copeland, 2003); and guides and manuals (Dowrick, 1991; Young, West, Smith, & Morgan, 1995). For TCSM, Flaute, Peterson, Van Norman, Riffle, and Eakins (2005) have described 20 ways to use the MotivAider to improve performance of students and teachers.

Conclusion

We conclude here by re-iterating major findings and recommendations from our meta-analytic review. TCSM appears to be a promising practice that typically produces moderate-to-strong outcomes. TCSM, however, has not yet achieved the evidenced-based status of more established forms of self-monitoring, that is, audio-cued and visual-cued self-monitoring. We suspect that TCSM will achieve evidenced-based status when researchers attend to the following. First, utilize more frequently than in the past, research designs that enable evaluation of experimental control. Second, implement high quality studies by attending to procedural integrity elements, as recommended in this review and a prior review (McDougall, Skouge, Farrell, and Hoff (2006). Third, authors could report appropriate effect size indices, as well as links to raw data. Doing so would bolster – not replace – visual inspection of graphed data as a means to evaluate intervention efficacy in studies that use single-case designs. Providing links to raw data could make it easier and more routine for researchers to independently analyze and verify the efficacy of interventions in published studies (McDougall, Narkon, & Wells, 2011). Finally, research and practice suggest that resources are a necessary but not sufficient condition for applying BSM techniques in educational settings. If TCSM is to achieve evidence-based research status and widespread use in schools, then we believe that educators will require adequate training and support (see Wehmeyer, Agran, & Hughes, 2000, and Agran & Alper, 2000). Thus, we recommend that teacher preparation programs, as well as professional development and advanced programs for general education and special education teachers, provide training in how to use BSM techniques, including TCSM.

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(Superscripts indicate the TCSM intervention studies that qualified for this review.)

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Teachers' Knowledge of Special Education Policies and Practices

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Abstract

The Individuals with Disabilities Education Act (IDEA) greatly improved the educational opportunities for students with disabilities. Teachers require knowledge of the law to deliver necessary and appropriate services to students with disabilities. The purpose of this quantitative study was to examine teachers' knowledge of special education policies and procedures as outlined in IDEA, possible factors associated with teachers' accurate knowledge, and whether or not teachers accurately perceive their knowledge. A sample of 111 Missouri public school teachers completed an online survey. Overall, the findings revealed that teachers lack knowledge of special education policies and procedures; however, special education teachers demonstrated more accurate knowledge than general education teachers. The most significant predictors of accurate knowledge were completing more special education courses and having positive attitudes toward inclusion. Discussion of these findings and implications for training are provided in terms of improving teachers' knowledge and implementation of IDEA.

Teachers' Knowledge of Special Education Policies and Practices

In 1975, Congress passed the Education of All Handicapped Children Act (EAHCA), Public Law (P.L.) 94-142. In the 1990 amendments to EAHCA, the title of the law changed to the Individuals with Disabilities Education Act (IDEA). The law ensures that children with an eligible disability receive a free, appropriate public education (FAPE) and related services designed to meet their unique needs. It also protects the rights of students and their parents and assists states and localities in their efforts to provide education of all children with disabilities.

Although several laws impact the education of individuals with disabilities, IDEA greatly increased the educational responsibility placed on states to educate students with disabilities by combining a bill of rights for children with disabilities with federal funding (Murdick, Gartin, & Crabtree, 2007). According to several scholars, the subchapters of IDEA contain six major principles; these principles assist with facilitating a thorough understanding of the law (Murdick et al., 2007; Yell, 2012). The six principles include: zero reject, nondiscriminatory evaluation, program development, least restrictive environment, procedural due process, and parental participation (Murdick et al, 2007).

According to the principle of zero reject, all students with disabilities are eligible for services to a free and appropriate education. The principle of nondiscriminatory evaluation requires school testing procedures to be racially or culturally nondiscriminatory and that trained and knowledgeable people administer the assessments in all areas of suspected disability. The program development principle comprises the collaborative process between the school and parents to develop a written document designating the individualized educational services for a

student with a disability in order for that student to receive a beneficial education. The fourth principle, Least Restrictive Environment, focuses on the assumption that the preferred placement for students with disabilities is in the general education classroom with supplementary aids and services. Another principle, procedural due process, guarantees the rights of all persons involved in the provision of educational services for children with disabilities. Lastly, the principle of parental participation mandates that schools provide parents with the opportunity to participate in issues pertaining to their child's evaluation, placement, and IEP development

Prior to the passage of IDEA, schools limited access for students with disabilities to educational opportunities in two major ways. First, many public schools excluded students (Katsiyannis, Yell, & Bradley, 2001; U.S. Department of Education, 2010b; Yell, Katsiyannis, & Hazelkorn, 2007). For example, congressional findings in 1974 indicated that more than 1.75 million students with disabilities did not receive educational services (Katsiyannis et al., 2001; Yell et al., 2007). Secondly, in the 1970s, millions of children with disabilities received inadequate or inappropriate educational services from public schools (Katsiyannis et al., 2001; U.S. Department of Education, 2000; Yell et al., 2007). For instance, before IDEA, students with disabilities who enrolled in public schools seldom interacted with students without disabilities and often received educational services inconsistently (Kober, 2002; U.S. Department of Education, 1995).

Overall, IDEA granted students with disabilities an enforceable substantive right to a FAPE in the least restrictive environment (Katsiyannis et al., 2001). Eventually, the legal rights provided by IDEA led to inclusion or the push for educating students with disabilities in general education classrooms to the greatest extent possible. According to the U.S. Department of Education (2010b), the conditions for children with disabilities greatly improved following the passage of IDEA. Over the past few decades, the number of children with disabilities accessing the general education curriculum increased (U. S. Department of Education, 2011a, Table A-7-2). In addition, data from the National Assessment of Educational Progress (NAEP) demonstrate increased reading and mathematics proficiency among fourth-grade students with disabilities (U.S. Department of Education, 2011b; U.S. Department of Education, 2011c). High school and post-secondary outcomes also improved for students with disabilities following the passage of IDEA with an increase in the high school graduation rate (U.S. Department of Education, 2008, Table 22-1), and an increase in the post-secondary enrollment rate and young adult employment rate (U.S. Department of Education, 2010b).

Due to the crucial importance of IDEA to the educational outcomes for students with disabilities, school personnel require awareness of the core principles of IDEA and of the amendments to the law. Knowledge of the law is essential for educators because they must provide students with disabilities with a meaningful education in order to comply with the law, avoid litigation, and produce successful outcomes for children with disabilities. Disagreements between parents and school districts regarding whether a child is eligible under IDEA for services or whether proposed services are appropriate for a child often lead to written complaints, mediations, and due process complaints (Zeller, 2011; Zirkel & Scala, 2010). These disagreements, in turn, cause school districts to spend time and money in order to resolve them. Knowledge of the law is not only necessary for special education teachers but it is also necessary for general education teachers, especially since the percentage of students with disabilities receiving educational services in the general education setting increased.

Unfortunately, many teachers may lack complete knowledge of IDEA and interpretation of IDEA due to the lack of adequate teacher preparation regarding students with disabilities, lack of knowledge among teachers regarding students with disabilities, the complexity of IDEA and federal regulations, the continuous changes and updates made to IDEA, and the complexity of state statutes and regulations. Nevertheless, having adequate knowledge of IDEA is pertinent for general and special education teachers because they are held accountable for proper implementation of that law. By sampling public school teachers, this research attempts to contribute to the question: what knowledge do teachers hold of special education policies and procedures as outlined in IDEA?

The researcher hypothesized that teachers lack sufficient knowledge of special education policies and procedures. Research questions included:

- Do teachers have accurate knowledge of IDEA?
- Is there a significant difference in the knowledge of IDEA between general education teachers versus special education teachers?
- Do teachers have accurate perceptions of their knowledge of IDEA?
- Does a positive correlation exist between teachers' knowledge of IDEA and the amount of training they completed in the field of special education?
- Do teachers' attitudes toward including students with disabilities in the general education classroom, amount of training they completed, and perception of their knowledge predict their actual knowledge of IDEA?

Literature Review

The increase of students with disabilities receiving services under IDEA and the increase of students with disabilities receiving services in the general education classroom creates various challenges for school officials and teachers. Much prior research addresses issues regarding students with disabilities, spanning from the study of attitudes toward students with disabilities to successful instructional techniques (Avramidis & Norwich, 2002; Chmiliar, 2009; Vaughn, Wanzek, Murray, & Roberts, 2012). Yet, little research explores educators' knowledge of special education policies and procedures and its application in the classroom.

Overall, the large body of legal knowledge produced by IDEA suggests that teachers may lack a complete understanding of special education law. The frequency of disputes regarding the education of students with disabilities is one indication of their lack of complete understanding. In a study on the characteristics of the state-by-state hearing officer system under IDEA, Zirkel and Scala (2010) surveyed special education directors of every state and the District of Columbia. From 2008 to 2009, special education directors reported the occurrence of 2,033 completed hearings that resulted in written decisions. The largest volume occurred in the District of Columbia, New York, California, New Jersey, and Pennsylvania. Zirkel and Scala's findings do have limitations since their study relied on self-reporting and results may vary depending on which representative from the state education agency completed the survey.

In a federally funded study, Zeller (2011) reported national dispute resolution data submitted by states, the District of Columbia, and territories of the United States. For the 2008- 2009 school year, jurisdictions reported the filing of 5,008 written complaints with 2,378 resulting in findings, the holding of 6,054 mediations with 2,011 resulting in agreements, and 18,020 due process complaints with 2,090 resulting in a written settlement agreements. Clearly, school districts and parents disagree, at times, about whether a child is eligible under IDEA for services or whether proposed services are appropriate for a child. Moreover, in the past, these disagreements frequently led individuals to seek legal action.

In addition to the amount of legal knowledge teachers require and the frequency of disputes, research also suggests that teachers may lack adequate preparation to instruct students with disabilities. In order to improve educators' knowledge of special education issues, legislation, researchers, and government officials emphasize the importance of teacher preparation as a means to achieve the goals of federal policy (U. S. Department of Education, 2002). In a study on teacher preparation curricula, Cooper et al. (2008) examined one teacher education program on its ability to instruct teacher candidates on how to teach students with disabilities in inclusive classroom settings. They surveyed instructors of courses required for general and special education teacher licensure. In the study, 62.4% of the faculty members surveyed described their knowledge and skill base for preparing teacher candidates to work with students with disabilities in general education settings as generally adequate, somewhat limited, or extremely limited.

In a report compiled by the Institute of Education Sciences (U.S. Department of Education, 2010a), researchers used publicly available data and interviews with state certification officials to determine general education teacher certification requirements in the nine Northeast and Islands Region jurisdictions. They found that four of the jurisdictions required teacher candidates to take a prescribed number of credit hours focused on special education. Another four jurisdictions required approved professional preparation programs to demonstrate that teacher candidates develop knowledge and skills in the area of special education but did not specify how to meet the requirements. Lastly, only two of the jurisdictions, New York and Vermont, required that general education teachers understand the legal and historical foundations of special education.

In another study regarding teacher certification, Geiger (2002) surveyed and interviewed 51 directors of licensure in state departments of education and the District of Columbia. Geiger found that 90% of the jurisdictions required or soon planned to require some preparation of general education teachers to teach students with disabilities; however, only 17 of those jurisdictions reported requiring course work in teaching students with disabilities. Geiger did not inquire about the specific state standards or course content relating to students with disabilities; therefore, it is unknown if standards incorporated IDEA. Geiger did find that 27% of the jurisdictions lacked requirements that special education teachers receive preparation in general education curriculum or pedagogy. This omission raises the concern that special education teachers may lack preparation to implement Individualized Education Programs (IEPs) related to the general education curriculum. Finally, while most jurisdictions required assessment in areas of basic skills, they did not assess candidates' knowledge and instructional expertise to instruct students with disabilities.

Not only does research indicate that teacher education programs inadequately prepare teacher candidates for educating students with disabilities, it also indicates that general education teachers possess inadequate knowledge of educating students with disabilities. After administering a needs assessment to general and special education teachers, Buell et al. (1999) found that general education teachers reported a lack of confidence with adapting materials and curriculum for students with disabilities, managing behavior problems, giving individual assistance, and writing behavioral objectives. Furthermore, in a qualitative study on middle school mathematics inclusion classrooms, DeSimone and Parmar (2006) conducted classroom observations, interviews, and surveys with seven general education teachers. After applying a constant comparative method to analyze data, they found that teachers were unclear about their responsibilities toward students with disabilities and about effective mathematics teaching strategies. In addition, teachers reported that preservice and inservice programs failed to prepare them adequately for teaching in the inclusion setting.

In another study on general education teachers' ability to teach students with physical disabilities, Singh (2001) surveyed general education teachers enrolled in the graduate special education program. Half of the teachers reported feeling incompetent and inadequately prepared to include students with physical disabilities in their classrooms. Furthermore, 94% of the teachers reported needing training in assistive and adaptive equipment for educating students with physical disabilities, and 66% of the teachers reported not receiving any inservice training for the inclusion of students with disabilities in the classroom. Despite the limitations of this study's focus on a small unrepresentative sample from one university and on self-reported data, it does raise concern regarding the ability of general education teachers to instruct students with disabilities in their classrooms.

Furthermore, in a random sample of secondary school principals, Militello, Schimmel, and Eberwein (2009) conducted a survey on legal knowledge and practices. They found that principals reported special education as an area where they received frequent threats of lawsuits. Principals also indicated special education as a law category on which they advised general and special education teachers and claimed they wanted their teachers knowledgeable about it. Hence, administrators not only expressed that special education law is vital knowledge for teachers, they also indicated it as an area of insufficient knowledge for teachers; however, Militello et al. did not directly research teachers' knowledge.

Brookshire and Klotz (2002), on the other hand, did survey general education and special education teachers on their knowledge of special education laws. The survey contained questions involving situations in which teachers chose whether a scenario met compliance or violated compliance in accordance with IDEA. They found that although special education teachers scored higher on their knowledge of special education law than general education teachers, they both lacked knowledge on the topic. Brookshire and Klotz also found that most special education teachers indicated that they had sufficient knowledge of special education law; however, they did not demonstrate that knowledge on the survey. On the other hand, most general education teachers indicated that they did not have sufficient knowledge of special education law, which was supported by their performance on the survey. Although these findings offer insight into educators' knowledge of special education law, the survey contained questions involving situations in which teachers chose whether it met compliance or violated

compliance. This format offers participants a 50% chance of guessing an answer correctly. In addition, the situation-based questions may cause confusion in comparison to more direct questions on the laws.

This combined information provides a basis for the present research. IDEA, the IDEA Regulations, and court interpretations of IDEA cover a great deal of information that teachers need to know in order to provide a legally compliant education to students with disabilities. While some research suggests teachers lack accurate knowledge of special education policies and procedures, these findings require additional support. In addition, since a multitude of factors may associate with having accurate knowledge of special education policies and procedures, this study explores possible predictors of knowledge.

Research Methods

Data Collection

For the purposes of this research, it was necessary to collect quantitative data. An online questionnaire provided data on teachers' knowledge of special education policies and procedures. Since every state in the United States has slightly different statutes, regulations, and requirements for teacher certification, the present research focused on one state, Missouri. According to the Missouri Department of Elementary and Secondary Education (n.d.), general education and special education teachers must complete coursework on topics related to special education and school organization for their certification; however, none of the listed courses specifically address special education law. Although the Missouri State Board of Education establishes a minimum criterion for certification, many institutions require additional coursework. Thus, some institutions may require teacher candidates to complete a course addressing special education law.

Sampling

The sample for the proposed study was Missouri public school teachers. As of the 2010-2011 school year, Missouri had 67,362 teachers employed as public school teachers in 522 school districts (Missouri Department of Elementary and Secondary Education, 2011). The researcher employed a chain-referral method of sampling by contacting colleagues who were currently employed teachers in the St. Louis area. The researcher made contact in person or over the phone. These teachers were the seed participants for this study and were asked to recruit their peers for the present study. After explaining the purpose of the research to the seed participants, the researcher asked them to participate in an anonymous online survey and to forward that survey to four other teachers they know who work in Missouri, creating the first wave of participants. After receiving agreement from the seed participants, the researcher sent an email with a description of the study and a link to the online survey.

When additional teachers completed the survey, they were also asked to forward the email they received to four other teachers they know who work in Missouri, creating the second wave of participants. Waves continued until participation ceased for seven days. At that time, the researcher closed the survey due to the unlikelihood that further teachers would participate. The researcher chose to ask participants to forward the email to other teachers in order to improve the likelihood that teachers would participate in the study. Receiving an email from an acquaintance

may encourage participation in the study. The researcher requested that participants forward the email to four other teachers in order to minimize the burden on the participant and also to ensure that every participant had an equal opportunity to recruit peers; thereby, minimizing the potentially biasing impact of participants with very large social networks.

Chain-referral sampling was the preferred sampling method because it allowed for easy access to a large portion of the target population. Although the target population was not a rare population, it was a difficult population to access. Surveying an entire school district requires superintendent and/or school board approval which is unlikely to be approved without a personal connection to the superintendent or school board. Surveying an entire school district also poses a bias since it only includes teachers working in that school district. Some districts may offer more professional development pertaining to special education than other districts. Likewise, surveying teachers through a professional organization also poses difficulty since it requires approval of the organization. In addition, it would offer bias because those teachers chose to join the organization and may participate in more professional development activities than other teachers.

While the chain-referral method risked introducing bias since the technique reduces the likelihood that the sample will represent an adequate cross section from the population, the researcher attempted to reduce this likelihood by recruiting specific participants. The recruited teachers represented a mixture of urban, suburban, and rural school districts surrounding St. Louis. They also represented a mixture of general education teachers, special education teachers, early childhood teachers, elementary teachers, and secondary teachers.

Survey Instrument

In order to assess teachers' knowledge of IDEA, perceived knowledge of IDEA, attitudes toward inclusion, and past training on special education policies and practices, the researcher created an online survey. The survey settings did not include barriers to prevent participants from completing the survey on multiple occasions. Altogether the survey contained 24 questions addressing knowledge of IDEA, two questions addressing participants' perception of that knowledge, two questions addressing attitudes toward inclusion, and eight demographic questions. The researcher initially addressed content validity by asking professionals in the field of special education and in the field of survey design to review questions. Questions were altered based on recommendations.

The researcher also addressed content validity by conducting a pilot study with teacher candidates enrolled at Saint Louis University (Sanders, 2011) in Missouri. Results from the pilot study indicated that teacher candidates lacked accurate knowledge of special education policies and procedures as outlined in IDEA and misperceived their lack of knowledge. The most significant predictors of accurate knowledge were completing more special education courses and having a positive attitude toward inclusion. Additionally, the study revealed no differences in knowledge between general education teacher candidates versus special education teacher candidates. Based on the pilot study results, the researcher removed or reworded several questions in order to address potential confusion and in order to more accurately assess teachers versus teacher candidates. Six questions were also added to the survey to improve the accuracy of survey results.

Data Analysis

The present study addressed several major concepts including teachers, knowledge of special education policies and procedures, perception of knowledge, training in special education, teaching area, and attitudes toward inclusion. This study considered teachers to be individuals employed as early childhood through high school teachers in public Missouri school districts.

Perception of knowledge and actual knowledge were measured through survey results from Likert scale questions. Actual knowledge of special education policies was defined as correctly answering questions pertaining to the six principles of IDEA. The survey contained four questions addressing each of the six principles of IDEA with two of the questions containing accurate information and two containing false information. Participants rated their belief in the accuracy of statements on a five point Likert scale (yes, it is accurate; it is probably accurate; uncertain; it is probably not accurate; no, it is not accurate).

The researcher preferred the use of Likert scale questions because it reduced the likelihood of participants guessing correct answers. Each response had a number assigned to it ranging from one to five. The researcher totaled all numbers to obtain a knowledge composite score. The special education knowledge component included 24 questions with 12 containing accurate information and 12 containing false information. Thus, participants had the possibility of scoring between 24 and 120 points with higher scores indicating accurate knowledge.

Perception of knowledge was participants' belief of whether or not they had knowledge of special education policies and procedures. To measure this, participants rated their agreement with having sufficient knowledge of IDEA and with receiving sufficient training on IDEA through coursework and professional development. Participants rated their level of agreement on a five point Likert scale (strongly agree, agree, uncertain, disagree, and strongly disagree). Each response had a number assigned to it ranging from one to five. The researcher totaled all numbers to obtain a perception composite score. Accuracy of perceptions was determined by comparing perception composite scores with knowledge composite scores.

The following concepts were also addressed through surveys: training in special education, teaching area, and attitudes toward inclusion. In order to address training in special education, participants choose the number of college courses and professional development activities they completed regarding special education within the past five years. To address teaching area, participants choose the level they teach including early childhood, elementary, middle school, and secondary. They also choose their main teaching assignments. Assignments included early childhood integrated, elementary integrated, special education, English/language arts, reading, social studies, history, math, fine arts, science, physical education/health, foreign language, and other.

Lastly, the researcher measured attitudes toward inclusion by asking participants to rate their level of agreement with the following statements: I believe that I usually have the skills to effectively teach most students with disabilities in the inclusion setting, and I enjoy having students with disabilities in my classroom. The researcher chose these statements in order to covertly analyze participants' attitudes. Participants rated their level of agreement on a five

point Likert scale (strongly agree, agree, uncertain, disagree, and strongly disagree). Each response had a number assigned to it ranging from one to five. The researcher totaled all numbers to obtain an attitude composite score.

Results

Demographic Characteristics

Table 1 displays demographic characteristics of the sample. Female participants accounted for 91% of the sample and male participants accounted for 9% of the sample. The majority of participants indicated their highest level of formal education completed as a Master's Degree (55.9%) or some graduate work (23.4%). Of the participants, the majority taught in the elementary school setting (55.9%), in a rural (47.7%) or suburban (45.9%) community, and had 10 or less years of experience teaching (53.1%). Lastly, general education teachers accounted for 79.3% of the sample while special education teachers accounted for 20.7% of the sample.

Table 1
Participant Characteristics as a Percentage of the Sample

Descriptive Characteristic	Responses (N = 111)
Sex	
Male	9.0
Female	91.0
Teaching area	
General education	79.3
Special education	20.7
Grade level	
Early childhood	1.8
Elementary	55.9
Middle	18.0
Secondary	24.3
Community type	
Rural	47.7
Urban	6.3
Suburban	45.9
Education level completed	
Bachelor's degree	10.8
Some graduate work	23.4
Master's degree	55.9
Specialist degree	7.2
Doctoral degree	2.7

Years teaching	
1-10 years	53.1
11-20 years	30.6
21 or more years	16.2

Responses to Questions

Table 2 presents participants responses to attitude and perception questions. In the second part of the survey, participants answered two questions addressing how they perceive their knowledge of IDEA and two questions addressing their attitude toward the inclusion of students with disabilities in the general education classroom. Participants answered these questions prior to answering knowledge based questions. The researcher coded responses from one through five with a one indicating a strong disagreement with the statement and a five indicating a strong agreement with the statement. Overall, participants indicated a high level of agreement with the statement that they enjoy having students with disabilities in their classroom ($M = 4.04$, $SD = 0.88$). They indicated a slightly lower level of agreement with the statement that they believe they have the skills to effectively teach most students with disabilities in the inclusion setting ($M = 3.73$, $SD = 0.97$). These two questions formed an inclusion attitude composite score ($M = 7.77$, $SD = 1.70$) which resulted in a slightly negative skewness of -0.69 with a range of 3 to 10.

Participants indicated an average level of agreement with having sufficient knowledge of special education policies and procedures as mandated by IDEA ($M = 3.71$, $SD = 1.02$). They indicated a slightly lower level of agreement with receiving adequate training on IDEA through coursework and professional development courses ($M = 3.35$, $SD = 1.02$). The answers to these two questions formed a knowledge perception composite score ($M = 7.06$, $SD = 1.89$) which resulted in a slightly negative skewness of -0.34 with a range of 3 to 10.

Table 2

Means, Standard Deviations, and Percentages for Attitude and Perception Statements

Statement	M (SD)	Strongly agree or agree (%)	Uncertain (%)	Strongly disagree or disagree (%)
I enjoy having students with disabilities in my classroom.	4.04 (0.88)	79.3	12.6	8.1
General Education Teachers	3.83 (0.86)	73.9	15.9	10.2
Special Education Teachers	4.83 (0.39)	100.0	0	0
I believe that I have the skills to effectively teach most students with disabilities in the inclusion setting.	3.73 (0.97)	66.7	20.7	12.6
General Education Teachers	3.50 (0.92)	59.1	25.0	15.9

Special Education Teachers	4.61 (0.58)	95.7	4.3	0
I believe that I have sufficient knowledge of special education policies and procedures as mandated by the Individuals with Disabilities Education Act (IDEA).	3.71 (1.02)	67.6	16.2	16.2
General Education Teachers	3.44 (0.96)	59.1	20.5	20.5
Special Education Teachers	4.74 (0.45)	100.0	0	0
I believe that I received adequate training on IDEA through coursework and professional development activities.	3.35 (1.02)	51.4	21.6	27.0
General Education Teachers	3.09 (0.91)	42.0	25.0	33.0
Special Education Teachers	4.35 (0.83)	87.0	8.7	4.3

In order to measure training in special education, participants indicated the number of college courses and professional development courses pertaining to special education they completed within the past five years. On average, teachers completed approximately 4 courses ($M = 4.31$, $SD = 3.66$), resulting in a slightly positive skewness of 0.84 with a range of 0 to 14. Sixteen individuals, all of whom identified themselves as general education teachers, indicated completing zero courses within the past five years. Furthermore, special education teachers claimed completing approximately 8 courses ($M = 8.45$, $SD = 3.00$) on average; whereas, general education teachers claimed completing approximately 3 courses ($M = 3.26$, $SD = 3.00$) on average.

Table 3 displays participants' composite scores for each of the IDEA principles and participants' overall knowledge composite scores. Participants could score between 4 and 16 for each principle with higher scores indicating more accurate knowledge. For overall knowledge of IDEA composite scores, which included all the principles of IDEA combined, participants' scores could range from 24 to 120 with higher scores indicating more accurate knowledge. Results for the knowledge of IDEA composite score ranged from 69 to 108 with a mean of 85.17 and a standard deviation of 7.19 (see Figure 1). The composite score also resulted in a slightly positive skewness of 0.53. Participants' performed most accurately on questions regarding the procedural due process principle ($M = 15.46$, $SD = 2.18$). Conversely, they scored least accurately on questions regarding the parental participation principle ($M = 13.55$, $SD = 2.35$) and the least restrictive environment principle ($M = 13.75$, $SD = 2.31$).

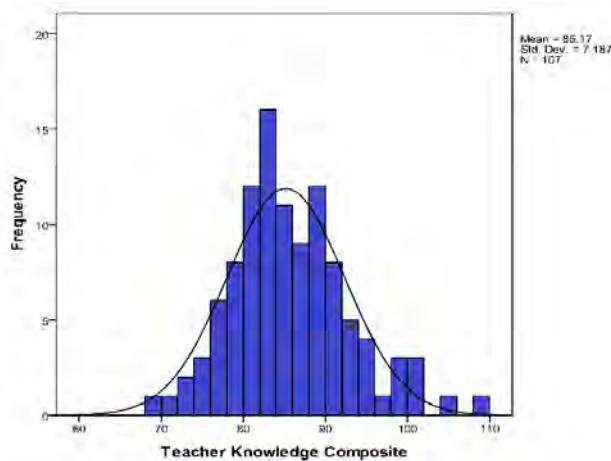


Figure 1: Histogram of knowledge composite scores

Table 3
Means and Standard Deviations for IDEA Principles

Principle	<i>M</i>	<i>SD</i>
Zero reject	14.07	2.36
Nondiscriminatory Evaluation	13.91	2.12
Program Development	14.70	2.54
Least Restrictive Environment	13.75	2.31
Procedural Due Process	15.46	2.18
Parental Participation	13.55	2.35
Knowledge Composite	85.17	7.19

Analysis of Responses

The first research question addressed whether or not teachers have accurate knowledge of IDEA. In order to assess teachers' knowledge, the researcher performed a test of one population mean using a test value of 90 on the knowledge composite score. The test value of 90 was chosen because a score of 90 demonstrates 75% accuracy on the assessment. Therefore, statistically significant results indicate that the group performed significantly different from the test value of

90. The t-test revealed a statistically significant difference between knowledge composite scores and the test value, $t(106) = -6.95, p < .001$ (two tailed). Thus, teachers performed significantly lower than a score of 90 indicating they lack accurate knowledge of special education policies and procedures.

The second research question addressed whether or not there is a significant difference in the knowledge of IDEA between general education teachers versus special education teachers. An independent samples t-test was conducted to evaluate the mean difference between general education teachers and special education teachers on their knowledge, perception of their knowledge, and attitude toward inclusion. The t-test revealed a significant difference for knowledge composite scores for general education teachers ($M = 83.19, SD = 5.56$) and special education teachers ($M = 92.82, SD = 7.74$) between the two groups, $t(105) = -6.65, p < .001$ (two tailed). In addition, a t-test revealed a significant difference for perception of knowledge between general education teachers ($M = 6.53, SD = 1.70$) and special education teachers ($M = 9.09, SD = 1.04$), $t(109) = -6.85, p < .001$ (two tailed). A third t-test revealed a significant difference in attitudes toward inclusion between general education teachers ($M = 7.33, SD = 1.60$) and special education teachers ($M = 9.43, SD = 0.79$), $t(109) = -6.12, p < .001$. Thus, special education teachers have significantly higher knowledge composite scores than general education teachers. Also, special education teachers' perception of their knowledge and their attitude toward inclusion of students with disabilities in the general education classroom are significantly more positive than general education teachers' perceptions and attitudes.

The third research question addressed whether or not teachers have accurate perceptions of their knowledge of IDEA. In order to answer this question, the researcher conducted an ANOVA to explore the difference in knowledge composite scores among different levels of agreement with having sufficient knowledge of IDEA. Due to the few responses in the strongly disagree category, the researcher recoded levels of agreement into three categories (agree, uncertain, and disagree). A statistical difference was found for knowledge between groups, $F_{2,104} = 5.10, p < .01$. Post-hoc comparisons using the Tukey HSD test indicated that the mean knowledge score for agreement with having sufficient knowledge ($M = 86.58, SD = 7.64$) was significantly different from the mean score of indicating uncertainty with having sufficient knowledge ($M = 81.00, SD = 5.17$). The disagreement group ($M = 83.78, SD = 5.15$) did not differ statistically from either of the other groups. The statistical difference indicates that teachers may accurately perceive their knowledge of IDEA if they indicate that they believe they have accurate knowledge or if they indicate they are uncertain if they have accurate knowledge.

Another ANOVA was conducted to explore the difference in knowledge composite scores among different levels of agreement with receiving adequate training on IDEA through coursework and professional development activities. Level of agreement was again recoded into three categories (agree, uncertain, and disagree) due to the few responses in the strongly disagree category. A statistical difference was found for knowledge between groups, $F_{2,104} = 3.93, p < .05$. Post-hoc comparisons using the Tukey HSD test indicated that the mean knowledge score for agreement with having adequate training ($M = 87.04, SD = 8.26$) was significantly different from the mean score of indicating uncertainty with having adequate training ($M = 82.96, SD = 4.91$). The disagreement group ($M = 83.52, SD = 5.72$) did not differ statistically from either of the other groups. The statistical difference indicates that teachers may accurately perceive their

knowledge of IDEA if they indicate they believe they have adequate training on IDEA or if they indicate they are uncertain if they have adequate training.

The fourth research question addressed whether or not a positive correlation exists between teachers' knowledge of IDEA and the amount of training they completed in the field of special education. The researcher explored the relationship between the two variables using the Pearson correlation coefficient. There was a significant positive correlation between knowledge and completing college courses in the area of special education, $r = .35$, $n = 104$, $p < .001$, with higher knowledge composite scores associated with the completion of a higher number of special education college courses and professional development activities within the past five years. Interestingly, a significant positive correlation was also found between attitudes toward including students with disabilities in the general education classroom and completing college courses in the area of special education, $r = .48$, $n = 108$, $p < .001$, with positive views toward including students with disabilities in the general education classroom associated with the completion of a higher number of courses related to special education.

The last research question addressed whether or not teachers' attitudes toward including students with disabilities in the general education classroom, amount of training they completed, and perception of their knowledge predict their actual knowledge of IDEA. In order to answer this question, the researcher conducted a hierarchical regression analysis using knowledge composite scores as a dependent variable (see Table 4). The analysis incorporated inclusion attitude composite scores and number of completed college courses and professional development activities in the area of special education as independent variables, after controlling for sex, education, and number of years teaching. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Perception of knowledge was removed from the analysis as an independent variable due to its high correlation with inclusion attitude scores ($r = .65$, $n = 111$, $p < .001$). Removal of the variable ensures no violation of multicollinearity.

Table 4
Hierarchical Regression Analysis of Teachers' Knowledge of IDEA (Standardized Coefficient)

Variable	Model 1	Model 2
Years Teaching	0.07 (0.07)	0.14 (0.15)
Sex Female = 0 Male = 1	-2.33 (-0.10)	-0.89 (-0.04)
Education level completed Bachelor's degree = 0 Some graduate work = 1	3.97 (0.17)	1.88 (0.08)

Teacher attitude		0.89* (0.21)
Completed college and professional development courses		0.52* (0.26)
Constant	81.05	72.90
Adjusted R ²	0.017	0.152
ΔR^2	0.046	0.148
F-Statistic	1.60	4.70**
ΔF	1.60	8.97**

* $p < .05$. ** $p < .01$

The hierarchical regression analysis produced two models. The first model included sex, number of years teaching, and education. The model failed to indicate a good model fit ($F_{3, 100} = 1.60$, $p = .19$), suggesting that none of the variables significantly predict knowledge of IDEA. The second model utilized inclusion attitude composite scores and number of college courses and professional development courses completed as independent variables. Model 2 demonstrated a good model fit ($F_{2, 98} = 4.70$, $p = .001$), explaining 15.2% (adjusted $R^2 = .152$) of the variance in knowledge composite scores. In this model, the number of courses completed ($\beta = .52$, $p < .05$) and teacher attitude composite scores ($\beta = .89$, $p < .05$) explained the largest amount of variation of knowledge with the number of completed courses making the greatest unique contribution to knowledge when controlling for the other variables (beta = .26, $p < .05$). These findings indicate that completing more college or professional development courses related to special education and holding a positive attitude toward the inclusion of students with disabilities in the general classroom predict accurate knowledge of IDEA.

Discussion

Teachers' Knowledge and Perceptions

Overall, teachers' performance on the survey suggests that they lack knowledge on the requirements of IDEA especially in the areas of parental participation and least restrictive environment; however, special education teachers did demonstrate significantly more accurate knowledge than general education teachers. This finding supports the findings of Brookshire and Klotz (2002) who found that teachers lacked knowledge on special education policies and procedures but that special education teachers scored higher on their knowledge than general education teachers. Conversely, this finding conflicts with the pilot study (Sanders, 2011), which found that although teacher candidates lacked accurate knowledge of IDEA, special education teacher candidates did not demonstrate more accurate knowledge than general education teacher candidates. Nevertheless, it is possible that once special education teacher

candidates gain employment, their knowledge of special education policies and procedures increases through district training and/or mentoring, thereby, improving their knowledge.

Of interest is the finding that teachers may accurately perceive their knowledge. While previous studies (Brookshire and Klotz, 2002; Sanders, 2011) suggest that general and special education teachers and teacher candidates lack an accurate perception of their knowledge, the present study suggests that teachers do accurately perceive their knowledge and the adequacy of their training on the requirements of IDEA. Teachers who indicated having adequate knowledge of IDEA and receiving adequate training on IDEA did score higher than teachers indicating disagreement or uncertainty with those statements. Nevertheless, since teachers performed poorly overall on the knowledge component questions, the accuracy of their perceptions may be somewhat misleading. For instance, teachers indicating agreement with having sufficient knowledge of IDEA only averaged 72% accuracy on the knowledge component questions. Accuracy of teacher perceptions is of concern because teachers may take incorrect actions in future situations, believing they are more knowledgeable. A teacher who is aware of his or her poor knowledge may be more likely to seek advice from a knowledgeable colleague or supervisor.

Training in Special Education

Results from the present study indicate that the number of special education college courses and professional development courses a teacher completes not only increases as accurate knowledge of IDEA increases but also predicts whether or not a teacher holds more accurate knowledge of IDEA. This finding highlights the importance of previous research that suggests teachers lack adequate preparation to instruct students with disabilities (Buell et al., 1999; Cooper et al., 2008; DeSimone & Parmar, 2006; Geiger, 2002; Singh, 2001; U. S. Department of Education, 2010a). The finding also supports recommendations from legislation, researchers, and government officials emphasizing the importance of teacher preparation and professional development as a means to improve educators' ability to successfully implement IDEA (U.S. Department of Education, 2002).

Not surprisingly, in the present study, special education teachers completed, on average, more courses pertaining to special education than general education teachers. Although expected, this finding is troubling considering that previous research found that general education teachers reported a lack of confidence with adapting materials and curriculum for students with disabilities (Buell et al., 1999) and reported that preservice and inservice programs failed to prepare them adequately for teaching in the inclusion setting (DeSimone and Parmer, 2006). In addition, many states' teacher certification requirements may lack adequate training for general education teachers to teach students with disabilities (Geiger, 2002; U. S. Department of Education, 2010a). For instance, Missouri requires a minimum of one course specifically addressing the education of students with disabilities for certification of general education elementary school teachers (Missouri Department of Elementary and Secondary Education, n.d.).

Attitudes toward the Inclusion of Students with Disabilities

In addition to completing courses in special education, positive views toward inclusion of students with disabilities in the general education classroom also predicted accurate knowledge of IDEA. The teachers in this study reported positive views regarding the inclusion of students with disabilities in the general education classroom, similar to findings expressed in the literature

(Avramidis & Norwich, 2002; Chmiliar, 2009; Sanders, 2011). Special education teachers did report significantly more positive attitudes toward inclusion of students with disabilities in the general education classroom than general education teachers. A finding reflected in previous research regarding the differences between general education and special education teachers' inclusionary practices (Buell et al., 1999). Since previous research indicates an association between teachers' attitudes toward inclusion and a willingness to implement successful classroom practices for the inclusion of students with disabilities (Chmiliar, 2009; Elliot, 2008; Eriks-Brophy & Whittingham, 2013), findings of this study suggest that the teachers in this sample may exhibit a willingness to implement practices benefiting inclusion when teaching.

The results of this study also support earlier findings that positive teacher attitudes toward including students with disabilities in the general education classroom appear related to higher levels of training in special education (Avramidis & Norwich, 2002; deBettencourt, 1999; Dickens-Smith, 1995; Van-Reusen, Shoho, & Barker, 2001). Interestingly, Dickens-Smith (1995) found that teachers revealed more favorable attitudes toward inclusion after an inservice training on inclusion than they did before the training, with general education teachers demonstrating stronger positive attitude change than special education teachers. Furthermore, not only do positive teacher attitudes toward inclusion appear related to training in special education, previous research also suggests it is related to implementing instructional strategies that support successful implementation of inclusion for students with disabilities in the classroom (deBettencourt, 1999; King & Youngs, 2003; Van-Reusen et al., 2001). King and Youngs (2003), for example, in a study of secondary schools that included the majority of students with disabilities in the general education classroom for instruction, found that most teachers reported believing inclusion benefited the learning of all students in the classroom. Teachers also reported making instructional accommodations for students with disabilities in their classes. Lastly, many of the teachers reported trying to maintain the curriculum and hold high expectations while providing accommodations. Since past research indicates an association between teachers' attitudes toward inclusion and implementation of inclusion for students with disabilities, the positive attitudes of teachers in the present study may indicate that they are willing to implement instructional strategies benefitting inclusion.

Implications

Based on the results of this study, the researcher suggests several practical implications for schools and policymakers. Overall, the teachers in this study lacked knowledge of special education policies and practices; however, completing courses in the area of special education did predict more accurate knowledge. This finding supports previous recommendations that teachers require quality preparation programs with classes addressing special education (Avramidis & Norwich, 2002; Brookshire and Klotz, 2002; U. S. Department of Education, 2002). Thus, policymakers and school officials should consider requiring teachers to complete inservice training in the area of special education policies and practices. In addition, policymakers should consider altering teacher certification requirements to include policies and practices relevant to special education so that teachers enter the workforce prepared to teach students with disabilities in their classrooms.

Current general and special education teachers require professional development and inservice training addressing instruction of student with disabilities. Training should address laws related

to special education, how to implement those laws, and best practices for educating students with disabilities. However, administrators should consider conducting a needs assessment prior to the professional development in order to address the needs of their teachers.

Limitations

Although the present research provided insight into the knowledge and perspectives of teachers, the conclusions of this research should be interpreted with several cautions. First, it is possible that respondents completed the online survey more than once since no barrier prevented them from completing it multiple times; thereby, altering results. In addition, since no survey tool existed to examine teachers' knowledge of special education policies and procedures as mandated by IDEA, the researcher created an original survey. Results should be interpreted with caution due to statistical limitations such as reliability measurements. Moreover, the generalizability of the findings of this research is limited to certified teachers in Missouri. Results should not be generalized to public school teachers in other states as they may hold different certification and training requirements. The researcher also cautions generalizing results due to sampling bias. Since teachers' self-selected participation in the present study based on whether or not they received a recruitment email, it is likely that the sample differs from the population of all teachers in Missouri. Teachers who chose to participate may hold more positive attitudes toward inclusion and more knowledge of special education policies and procedures than teachers who chose not to participate.

Future Research

The results of this study raise several areas for future research. Future research should examine best methods for instructing general and special education teachers and/or teacher candidates on special education policies and procedures. Research is also needed to explore general and special education teachers' knowledge of special education policies and procedures in real-life situations. Lastly, since research suggests a positive association between holding positive attitudes toward inclusion, completing courses in special education, having accurate knowledge of IDEA, and implementing instructional strategies benefiting inclusion, future research should further explore factors influencing positive attitudes, such as specific curriculum of courses and specific classroom experiences.

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About the Author

Pamela Sanders was born in St. Louis, Missouri. In 2002, she obtained a Bachelor of Arts degree in Psychology from Saint Louis University where she graduated Summa Cum Laude. In the winter of 2006, she graduated with a Masters of Education degree in Special Education from the University of North Florida in Jacksonville, Florida. She taught for two years for Duval County Public Schools in Jacksonville, Florida and currently teaches for Fox School District in Fenton, Missouri. In 2011, Mrs. Sanders published “Teacher Candidates’ Knowledge of Special Education Law” in the *Journal of the American Academy of Special Education Professionals*. Mrs. Sanders received the Doctor of Philosophy in Educational Studies in December 2013.

Appendix

Questionnaire

Part 1: Teacher perceptions about special education. Please check the box indicating your response.

Part 2: Please read the statements below. Based on your knowledge of IDEA and its

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1. I enjoy having students with disabilities in my classroom.	[]	[]	[]	[]	[]
2. I believe that I have the skills to effectively teach most students with disabilities in the inclusion setting.	[]	[]	[]	[]	[]
3. I believe that I have sufficient knowledge of special education policies and procedures as mandated by the Individuals with Disabilities Education Act (IDEA).	[]	[]	[]	[]	[]
4. I believe that I received adequate training on IDEA through coursework and professional development activities.	[]	[]	[]	[]	[]

regulations, check the response indicating whether or not you believe the statement is accurate.

	Yes, it is accurate.	It is probably accurate.	Uncertain	It is probably not accurate.	No, it is not accurate.
1. Public school personnel can remove a child with a disability who brings a weapon to school. They may either suspend the student for 10 or less school days or send the student to an alternative educational setting.	[]	[]	[]	[]	[]
2. If a parent does not respond to a school with consent for reevaluation, the school may reevaluate the child as	[]	[]	[]	[]	[]

long as they take reasonable steps to obtain permission.					
3. An Individual Education Program (IEP) should include a record of a student's past school performance.	[]	[]	[]	[]	[]
4. Federal law requires mainstreaming in placement decisions for students with disabilities.	[]	[]	[]	[]	[]
5. If a school and a parent disagree on whether a child should be evaluated for special education services, the parent may request a due process hearing but a school may not request a due process hearing.	[]	[]	[]	[]	[]
6. Schools are required to notify parents in writing after initiating special education services for their child.	[]	[]	[]	[]	[]
7. If a parent requests that a certain curriculum be used with his or her child and can produce data demonstrating its effectiveness, the school must implement the curriculum.	[]	[]	[]	[]	[]
8. If a teacher believes one of his or her students has a disability, he or she reports this to the evaluation team at the school. The team begins testing the student for a disability.	[]	[]	[]	[]	[]
9. An IEP should include a transition plan for students. Teachers must implement the plan as students' transition from one grade to the next.	[]	[]	[]	[]	[]
10. School districts must have available placement options	[]	[]	[]	[]	[]

ranging from the general classroom, special classes, special schools, home instruction, and instruction in hospitals and other institutions for all students with disabilities.					
11. If a school is not providing a student with the amount of speech therapy as required in the child's IEP, parents may request due process.	[]	[]	[]	[]	[]
12. An IEP must include suggestions for parental involvement which teachers are required to implement.	[]	[]	[]	[]	[]
13. If a student is not making progress on his or her IEP goals, teachers should continue to monitor the student's performance, report the student's progress to his or her parents periodically, and address the lack of progress toward the goal at the student's next annual IEP meeting.	[]	[]	[]	[]	[]
14. A general education teacher should be part of the evaluation process for a child being evaluated for a potential disability.	[]	[]	[]	[]	[]
15. Only teachers with special education certification are required to implement the accommodations listed in a student's IEP.	[]	[]	[]	[]	[]
16. The preferred placement option for a student with a disability is full inclusion with supplemental aids.	[]	[]	[]	[]	[]
17. A teacher can change a student's educational placement from the special education setting to the general education setting	[]	[]	[]	[]	[]

after getting administrative and parental permission.					
18. If a parent requests all records related to their child's education, a school must provide them within 45 days.	[]	[]	[]	[]	[]
19. A student's IEP goals should be designed to meet his or her needs and enable him or her to be involved in and make progress in the general education curriculum.	[]	[]	[]	[]	[]
20. When identifying a child with a learning disability, school districts are required to use a formula that measures the discrepancy between a student's score on an IQ test and an achievement test.	[]	[]	[]	[]	[]
21. A member of an IEP team is excused from attending the IEP meeting if the parent and school agree to the excusal, and the team member submits written input prior to the meeting.	[]	[]	[]	[]	[]
22. Due to scheduling difficulties, it is appropriate for service providers to schedule special education services during recess and other recreational activities.	[]	[]	[]	[]	[]
23. Schools are required to provide parents with a copy of procedural safeguards. The safeguards include parental rights, procedural rights for students with disabilities, dispute resolution mechanisms, and the voluntary mediation process.	[]	[]	[]	[]	[]

24. Parents are required members of the IEP team. The team must consider parental concerns for enhancing the education of their child at the IEP meeting.	[]	[]	[]	[]	[]
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Part 3: Please complete the following demographic information.

1. Please indicate your main teaching assignment(s).

- ☐ Early Childhood Integrated
- ☐ Elementary Integrated
- ☐ Special Education
- ☐ English/Language Arts
- ☐ Reading
- ☐ Social Studies
- ☐ History
- ☐ Math
- ☐ Fine Arts
- ☐ Science
- ☐ Physical Education/Health
- ☐ Foreign Language
- ☐ Other

2. Please indicate your areas of Missouri teacher certification.

- ☐ Early Childhood Integrated
- ☐ Elementary Integrated
- ☐ Special Education
- ☐ English/Language Arts
- ☐ Reading
- ☐ Social Studies
- ☐ History
- ☐ Math
- ☐ Fine Arts
- ☐ Science
- ☐ Physical Education/Health
- ☐ Foreign Language
- ☐ Other

3. Please indicate the grades you teach.

- ☐ Early Childhood
- ☐ Elementary
- ☐ Middle School
- ☐ Secondary

4. Please indicate the community type of the school where you teach.

- ☐ Rural
- ☐ Urban
- ☐ Suburban

5. How many years have you been teaching? ____

6. How many college courses pertaining to special education have you completed in the past 5 years?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7 or more

7. How many professional development activities regarding special education have you completed in the past 5 years?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7 or more

8. What is the highest level of formal education you have completed?

- ☐ Bachelor's Degree
- ☐ Some graduate work
- ☐ Master's Degree
- ☐ Specialist Degree
- ☐ Doctoral Degree

9. What is your gender?

- ☐ Male
- ☐ Female

10. Would you like to participate in a drawing for a \$50 Barnes and Noble gift card?

- ☐ Yes
- ☐ No

- 11.** Please indicate your email address to participate in the drawing for a \$50 gift card to Barnes and Noble. If your name is selected, an electronic gift card will be emailed to your account.
-

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