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Effects of the Picture Exchange Communication System (PECS) on Maladaptive Behavior in Children with Autism Spectrum Disorders (ASD): A Review of the Literature

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Abstract

This paper provides an overview of the literature investigating the functional relationship between the use of the Picture Exchange Communication System (PECS) and maladaptive behavior (i.e., aggression, tantrums) in individuals with autism spectrum disorders (ASD). Digital searches were conducted to identify single subject design studies published between 1994 and 2012. While nine studies were identified, only three explicitly addressed the collateral effects of PECS training on reduction of maladaptive behavior. Of the seven participants across these three studies, four demonstrated an inverse relationship between PECS exchange and reduction of maladaptive behavior. Results are promising in terms of functional communication. However, the authors suggest caution due to limited number of publications to date.

Effects of the Picture Exchange Communication System (PECS) on Maladaptive Behavior in Children with Autism Spectrum Disorders (ASD): A Review of the Literature

Autism Spectrum Disorders (ASD) have been characterized by impairments or delays in social interaction, communication, and restrictive or repetitive behaviors (American Psychiatric Association, 2004). More recently, the Diagnostic Statistical Manual, fifth edition (American Psychiatric Association, 2013) collapsed these three domains into social communication/interactions and restricted/repetitive behaviors. By virtue of diagnostic criteria, individuals with ASD possess challenges in the area of communication, which may be described as compromised in the ability to send, receive, or process symbols (American Speech-Language-hearing Association, 1993). Language is a symbolic system (Bloomfield, 1914). Having stated the aforementioned, one may consider *effective* communication as communication which is efficiently conveyed across individuals and environments, without need for repair (i.e., functional speech).

While the specific percentage of individuals with ASD who are effective communicators is uncertain, it is estimated that up to 50% of individuals with ASD are not functional communicators (National Research Council, 2001; Centers for Disease Control and Prevention, 2007). Mirenda (2003) described a functional communicator as one who can generalize communication across people and settings over time. Children with ASD, who may not demonstrated functional communication, may instead engage in maladaptive behavior (e.g., tantrums, self-injury or aggression) as a method of communication (van der Meer & Rispoli, 2010). When such behaviors are observed, clinicians may utilize Functional Communication

Training (FCT) (Carr & Durand, 1985; Tiger, Hanely, & Bruzek, 2008) in order to replace said behaviors with a more appropriate means of communication (i.e., verbal speech or Augmentative Alternative Communication).

When working with individuals with ASD who are not effective (i.e., functional) communicators, Augmentative Alternative Communication (AAC) may be implemented to either support existing communication patterns (i.e., function as an adjunct to verbal speech), or in lieu of verbal speech completely (American Speech-Language Hearing Association, 2007). The Picture Exchange Communication System (PECS) (Frost & Bondy, 1994) is an iconic AAC system developed to increase functional communication by way of requesting and initiating. The goal of PECS is to teach a functional relationship between communication and the environment (Frost & Bondy, 2002; Charlop, Malmberg & Berquist, 2008). More specifically, PECS utilizes a systematic approach to teach children how to exchange icons in order to effectively communicate. PECS is composed of six phases. The responses range from exchanging a picture to obtain a desired item during Phase 1, to answering simple questions and reciprocating comments at Phase 6. Although PECS is used widely clinically, there is a continued need to conduct and analyze research in an effort to objectively evaluate the efficacy of this intervention strategy.

Several literature reviews have been recently published regarding the use of PECS (i.e., Flippin, Reszka, & Watson, 2010; Subramanian, & Wendt, 2010; Preston & Carter, 2009; Hart & Banda, 2010; Ostryn, Wolfe, & Rusch, 2008; Lancioni, et al., 2007). These reviews have focused on PECS research that utilized various research design types (i.e., single subject, group and mixed), as well as different adaptations of the PECS protocol, and staff training and implementation of PECS use.

Flippin, Reszka, and Watson (2010) conducted a meta-analysis review of the current empirical evidence for effects of PECS on communication for children with ASD. Including both single subject and group designs, Flippin and colleagues (2010) reported gains in communication, by way of increased frequency of exchanges, initiations and requests. Preston & Carter (2009) conducted a review of efficacy of PECS intervention using both group and single subject designs. The researchers determined that the present body of literature investigating the effects of the use of PECS on development of verbal speech remain to be unclear (Preston & Carter, 2009). Hart and Banda (2010) conducted a review focusing on single subject research studies. They examined the use of PECS with children with developmental disabilities. They noted the limited implementation of PECS in inclusive environments. Ostryn, Wolfe, and Rusch (2008) conducted a literature review and analysis of use of PECS, operationalizing the notion of communicative competence in the domains of generalization, spontaneous communication, and maintenance. They noted a critical shortage in the literature, particularly as it pertains to individuals with ASD and functional communication. Lancioni and colleagues (2007) conducted a systematic review of the literature, evaluating outcomes of both PECS and Voice Output Communication aids (VOCAs). They asserted that PECS and VOCAs are both similarly effective communication systems for individuals with developmental disabilities who are nonverbal. They further asserted that a majority of the work reviewed was descriptive in nature, motivating the need for more experimental research. Collectively, these works have contributed to an increased understanding of outcomes of use of PECS with individuals with disabilities.

Previous literature reviews have been conducted using a variety of research designs (i.e., group, single subject and mixed designs). The current literature review focused solely on studies that employed single subject research designs. This method was employed in order to allow for a consistent examination of variables across each of the studies. While previous literature reviews have focused on the effects of PECS on communication, discussion of the collateral effect of PECS on challenging behavior reported in the individual studies has been (potentially inadvertently) overlooked. The connection between functional communication and the prevention of challenging behavior is crucial for individuals on the autism spectrum. Therefore this lack of empirical examination of the effects of PECS on the reduction of maladaptive behavior in the literature must be addressed. A small number of research articles to date have looked at this very important issue. For example, Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet (2002) reported decreases in problem behavior in three individuals with ASD who were trained using the PECS protocol. Frea, Arnold, & Vittimberga (2001) reported a reduction in maladaptive behavior in one participant as a function of PECS training. While studies such as these have been included in literature reviews, the impact of PECS on behavior change has not been highlighted as a main point of discussion. Literature reviews to date have not specifically analyzed the effect of PECS intervention (alone) on behavior change in individuals with ASD (Wendt, & Boesch, 2010).

The purpose of this literature review was to evaluate the scientific research base of PECS research with individuals with ASD using single subject research. The objective was not only to review published research in the context of increased communication and PECS, but specifically to examine the effects of PECS use on the challenging behavior of the individuals within these studies. This work expands the existing literature reviews in the following ways:

1. This work is a literature review of the use of PECS *exclusively* for individuals with ASD, including only single-subject design, and
2. This review measures the effects of PECS on *behavior* as well as communication.

Method

Studies identified for inclusion in this review underwent a three-step process. First, a search was completed using the search engines, including PsychInfo, ERIC, Pubmed, Academic Search Premier, Science Direct. Keywords included in the search were “Picture Exchange Communication System,” “PECS,” “Autism Spectrum Disorder(s),” “ASD,” “Speech,” “Behavior,” and “Communication,” with publication years between 1994 and 2012. This yielded 72 articles. The second step in this process was to exclude articles that did not use a single-subject research design. This further reduced the cohort of articles from 72 in step one to nine. The third step in this literature review was to review the official PECS website managed by Pyramid Consultants for any further pertinent research articles that should be included in the study. No further studies were identified with this review. The final number of single-subject articles analyzed in this literature review was nine. See Table 1.

Table 1. Single subject studies investigating the use of PECS.

Study	Number of Participants	Age(s)	PECS Phase(s)	Dependent Variable(s)	Results
* Frea, Arnold, & Vittemberga, (2001)	1	4;0	I-III	Picture exchange & aggression	Aggression significantly decreased when introduced to PECS exchange.
*Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, (2002)	3	3;8-12;0	I-IV	Independent PECS exchanges verbal speech, social-communicative behavior, aggression/undesired behavior	Speech and social communicative behaviors improved across all participants. Decrease in maladaptive behaviors across participants.
Ganz, & Simpson, (2004)	3	3;9-7;2	I-IV	Proficiency with each PECS phase, number of intelligible words, presence of non-contextual vocalizations	Mastery of PECS and observed increase in spoken words.
Markel, Neef, & Ferreri, (2006)	2	4-5	n/a	number of improvised requests based on trained stimuli	Number of independent improvised requests increased for functions, shapes, and colors.
Angermeier, Schlosser, Luiselli, Harrington & Carter, (2008)	4	6-10	I-III	Percentage of correct requests	Mastery up to Phase II.
* Ganz, Parker, & Benson, (2009)	3	3;2-6;0	I	Picture use, word use, maladaptive behavior	2/3 participants began using verbal speech. Increase in initiations observed across all 3 participants. No clear impact on maladaptive behavior.
Jurgens, Anderson & Moore, (2009)	1	3;7	I-IV	PECS mand, verbal mand, verbal initiation other than Mands, mean length of Utterance, functional play	Increase in verbal social-communicative behaviors with verbal mands. Increase in vocabulary and mean length of utterance, increase in duration of developmentally appropriate play.
Dogoe, Banda, & Lock, (2010)	3	3;8-5;1	I-III	Requesting desired items/ objects, generalization of PECS requesting up to Phase IIIB.	All 3 participants mastered PECS use up through Phase IIIB. Use of PECS was generalized across persons, settings, and stimuli.
Travis, & Geiger, (2010)	2	9;6-9;10	I, IV, VI	Number of requests in structured and unstructured Environments.	Increase in requests, increase in phrase length, increase in commenting (during Structured sessions only). Verbal approximation of clinician name and initiation of eye contact noted.

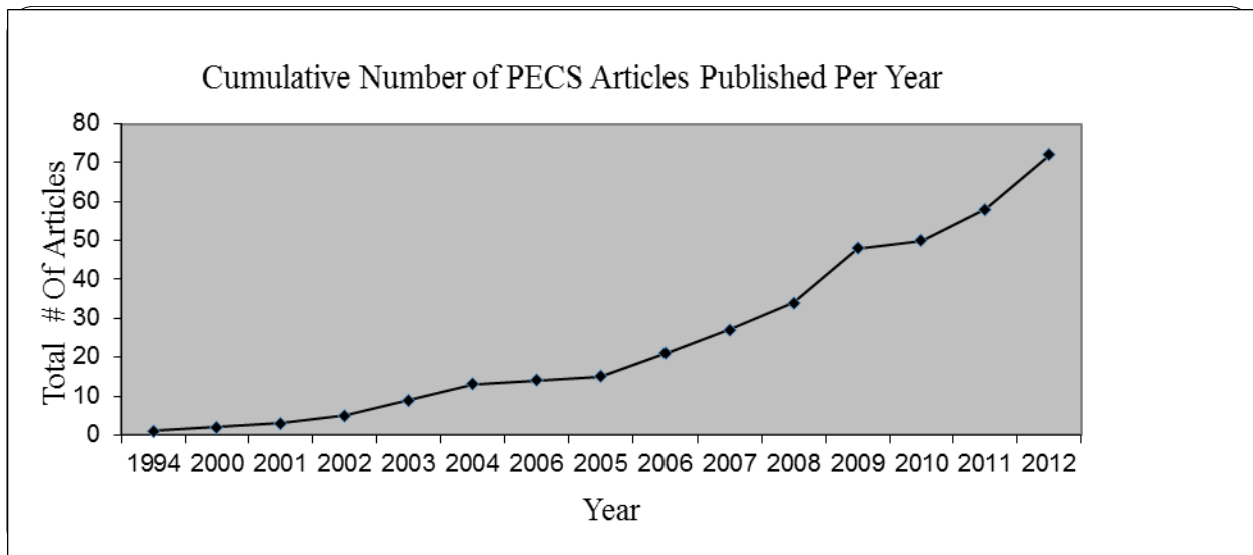
* Studies explicitly evaluating the correlation between maladaptive behavior and PECS use.

Upon review of the nine single-subject design articles, it was determined that only three explicitly addressed the issue of the functional relationship between communication and maladaptive behavior. (Frea, Arnold, & Vittemberga, 2001; Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002; Ganz, Parker, & Benson, 2009). This final set of (nine) studies are summarized in the results section, similar to the descriptive model used by Lancioni, O'Reilly, Cuvo, Singh, Sigafos, and Didden (2007).

Results

In recent years, there has been a substantial increase in peer-reviewed publications disseminating information regarding the use of PECS (see Figure 1).

Figure 1. Increase in number of PECS articles published per year.



However, as identified by our method, only nine were identified as single-subject design articles. Subsequent sections review the findings of these articles with respect to communication, as well as communication *and* maladaptive behavior.

Effectiveness of PECS for Increase in Communication

While six of the nine single subject articles did not explicitly address the issue of maladaptive behavior in children with ASD (Ganz, & Simpson, 2004; Markel, Neef, & Ferreri, 2006; Angermeier, Schlosser, Luiselli, Harrington, & Carter, 2008; Jurgens, Anderson, & Moore, 2009; Dogoe, Banda, & Lock, 2010; Travis, & Geiger, 2010), they *did* address the subject of increases in effective communication, as follows. Ganz and Simpson (2004) investigated the effectiveness of PECS with respect to increasing functional communication, increasing verbal speech and utterance complexity, and decreasing non-word vocalizations in three individuals with characteristics of autism (aged 3;2-6;0). Each participant had no prior experience with PECS, and was reported to have had limited speech. This study used a single subject (within subjects) design. Independent variables included the experimenter modeling the phrase, “I want _____,” and following the PECS training protocol as described by Frost and Bondy (1994). Dependent variables included participant proficiency within each phase of the training protocol (up through Phase IV), number of intelligible words initiated by each participant, and number of non-word vocalizations. All three participants were reported to have made gains on all three dependent variables. That is, they progressed through the PECS protocol to criteria (i.e., 80% accuracy), increased use of intelligible verbal speech (i.e., number of intelligible words), thereby increasing sentence complexity. However, no clear relationship was observed between PECS training and change in non-word vocalizations.

Marckel, Neef, and Ferreri (2006) conducted a single subject design study, as a multiple baseline across descriptors, with two children with ASD between the ages of four and five. The purpose of the study was to investigate the effects of PECS to facilitate problem solving and improvisation. The independent variable was method of stimulus delivery (i.e., “what do you want?”) Dependent variables included icons for descriptors (e.g., functions, colors, shapes). During training, participants were explicitly taught to use descriptors when requesting, such as “I want eat white square” for a sandwich (when the icon for “sandwich” was unavailable). Both participants made significant gains in improvisation in the absence of a particular item (i.e., “sandwich”).

Angermeier, Schlosser, Luiselli, Harrington and Carter (2008) investigated the impact of iconicity on PECS instruction across Phases I-II. There were four participants ranging in age from six to ten with a diagnosis of ASD, with little to no functional speech, and no prior instruction with graphic symbols. A modified alternating treatment design was implemented, embedded within multiple baseline design across participants. The independent measure was adherence to the PECS training protocol (Frost & Bondy, 1994). Dependent variables were percentage of correct requests per session, as well as number of sessions to criterion (80%). Training was conducted using PECS and Blissymbols, for requesting of highly preferred items (as per preference assessment for each participant). All students achieved mastery for both phases of PECS, suggesting that, for these participants, iconicity was not a factor in mastery of match to sample for purposes of requesting.

Jurgens, Anderson, and Moore (2009) investigated the acquisition of functional communication skills using PECS. In particular, they were concerned with generalization of PECS manding, increases in spoken language, and increases in duration of play. The authors implemented a single subject changing criterion design with their one participant, aged three years seven months. The independent variable was the PECS training protocol up through Phase IV, as delineated by Frost and Bondy (1994). The dependent variables were PECS manding, verbal manding, verbal initiation other than mands, mean length of utterance, and functional play. While increases were observed in the aforementioned dependent variables, generalization of these skills was inconclusive. The authors suggested that this result may have been observed as a function of lack of accessibility to the participant’s PECS book during noted opportunities for generalization.

Dogoe, Banda, and Lock (2010) investigated the effects of PECS training on requesting with three preschool aged children with ASD with limited verbal communication skills. More specifically, the authors sought to determine whether acquired skills would generalize across persons (e.g., different communicative partner), settings (e.g., school, community), and stimulus classes (e.g., nouns, verbs). The investigators implemented a multiple baseline across participants design. The independent variable was training using the PECS protocol. The two dependent variables were requesting desired items (as per outcomes of preference assessment), and generalization of requesting. Results indicated both acquisition of requesting skills, and generalization of said requesting, across all three participants.

Travis and Geiger (2010) implemented a multiple baseline across behaviors (i.e., requesting, commenting, and mean length of utterance) for two participants (both aged 9) with ASD. Their objective was to investigate effects of PECS on requesting, development of commenting behavior, and increasing verbal speech. Both participants had no prior exposure to PECS and were reported to have some verbal language. The independent variable was the PECS training (up through Phase VI) (Frost & Bondy, 1994). The dependent variables were frequency of requesting and commenting, as well as mean length of utterance. Results indicated the following: (1) both participants increased requesting using PECS, (2) increases in commenting was observed in both participants, and (3) mean length of utterance increased at the onset of training at Phase IV for both participants.

In summary, of the six aforementioned single-subject design articles, three reported an increase in verbalization, either by way of approximations or complete words (Ganz & Simpson, 2004, Jurgens, Anderson, & Moore, 2009; Travis & Geiger, 2010). Markel, Neef, and Ferreri (2006) uniquely demonstrated an increase in improvised request. Angermeier, Schlosser, Luiselli, Harrington, and Carter (2008) and Dogoe, Banda and Lock (2010) reported mastery of PECS use up to phases II and IIIB, respectively. Results of the remaining three articles, which *did* address the relationship between communication and maladaptive behavior (Frea, Arnold, & Vittemberga, 2001; Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002; Ganz, Parker, & Benson, 2009), are now described in detail.

Effectiveness of PECS for Increase in Communication *and* Decrease in Maladaptive Behavior

Frea, Arnold, and Vittemberga (2001) conducted a multiple baseline design across settings, investigating the use of picture exchange system to communicate basic requesting. They measured the total number of picture exchanges made across settings. One male student, aged four years, was included in their study. The authors found an inverse relationship between use of PECS and aggressive behavior. The investigation was conducted in a general education preschool classroom, during play time, which occurred daily. Particular areas during play time which were most likely to be used by the participant were sand play and puzzles.

Aggressive behavior was defined as biting, kicking, or hitting. A communicative response was defined as the participant handing the picture to someone *while* simultaneously demonstrating a joint attention bid. The participant was observed for 10-minutes, daily, during play time. Two 1-hour teaching sessions (for two consecutive days) were conducted immediately following baseline. During this training, the PECS protocol (Frost & Bondy, 1994) was followed for phases I-III. Intervention sessions immediately followed teaching sessions. These sessions were the same as baseline and treatment, with the addition of the verbal question, "What do you want?"

A multiple baseline across settings design was implemented. Results supported the authors' hypothesis, in that there was an observed decrease in maladaptive behavior upon implementation of the PECS. This study supported not only the effectiveness of use of the PECS protocol, but (more importantly for this review), the decrease in maladaptive behavior as a function of effective communication.

Charlop-Christy, Carpenter, Le, LeBlanc, and Kellet (2002) empirically assessed the usefulness of PECS. First, the authors assessed the amount of training necessary for mastery of PECS for three children with autism. Second, ancillary gains were assessed, such as pragmatic and behavioral skills. The (primary) dependent variables were spontaneous and imitative verbal speech. The collateral effects on social-communicative functioning and problem behavior were also measured.

Three male students (ages 3;8-12;0) with ASD participated in this study. All three participants were minimally verbal. There were three elements to this study; PECS training, free play, and academic sessions. During the PECS training sessions, all participants engaged in weekly sessions in multiple settings. At first, training occurred at a behavioral afterschool program. Subsequent sessions took place first in the participants' classrooms, and then in their homes. Free play sessions were conducted weekly, prior to, during, and following PECS training. During academic sessions (which occurred with the same frequency as free play sessions), no PECS training materials were used. Rather, task specific materials were present (i.e., flash cards, colored blocks), with traditional objectives appropriate for this population and age group (i.e., color identification and prepositions).

A multiple baseline across participants design was implemented. Dependent variables included speech, social-communicative behavior, and maladaptive behavior across free-play and academic settings. During each free-play or academic session, the experimenter provided five opportunities (each) for spontaneous speech and verbal imitation. To promote spontaneous speech, the experimenter presented the participants with a desired item. To promote verbal imitation, the experimenter presented the participant with the desired item (as in the spontaneous speech elicitation), followed by a modeled word or phrase. More specifically, free play sessions consisted of weekly, 10-minute sessions in which the experimenter would play and speak to the participant. Academic sessions occurred with the same frequency and duration, where the participants were expected to perform tasks included in the regular curriculum. During the actual PECS training, the participants were taught to use PECS twice per week, for 15-minute sessions. Training procedures followed those described by Frost and Bondy (1994).

All three participants mastered the use of PECS with an average training time of 170 minutes. All three participants demonstrated progress in both spontaneous and imitative speech. All participants demonstrated improvement in social-communicative behaviors (i.e., eye contact, joint attention, toy play). Two out of three participants engaged in maladaptive behavior (e.g., grabbing). For these two participants, significant decreases in these behaviors were observed to have changed from baseline to treatment across settings. This finding is significant for the purposes of this review, as it demonstrates the direct correlation between effective communication replacing nonfunctional, maladaptive behavior such as tantrumming.

Ganz, Parker, and Benson (2009) conducted an experiment investigating the impact of PECS on effective communication and maladaptive behaviors in boys with ASD (3;2-6;0). They not only investigated the use of picture exchanges, but also the use of verbal approximations paired with the exchange. Three main research questions were as follows. First, does explicit instruction promote an increase in picture exchange? Second, is there an increase in verbal approximations

(and do these approximations generalize)? Third, do maladaptive behaviors decrease with mastery of PECS use?

Participants were diagnosed with ASD, used infrequent spontaneous verbal speech, and had no prior experience with PECS. All phases of PECS training took place in a small classroom or office. Materials varied across participants according to individualized interests. A multiple baseline probe design was implemented with three dependent variables: 1) picture use, 2) word use, and 3) maladaptive behaviors. Following baseline, experimenters implemented 10-5 minute sessions, instructing participants on the PECS exchange for Phase I, as per the PECS Protocol (Frost & Bondy, 2002).

All participants demonstrated significant increases in picture use during PECS training. Two of the three participants demonstrated significant improvements in use of verbal speech during PECS training, as compared to baseline sessions. Progress regarding maladaptive behaviors, however, was variable. One participant (Ethan) demonstrated few maladaptive behaviors at baseline, but zero by the end of the study. The second participant (Adrian) demonstrated low but variable amounts of maladaptive behaviors throughout the study. The third participant (Jarek), was reported to demonstrate a variable but ascending trend in maladaptive behaviors. The authors explained that their findings may be attributed to the brief duration of PECS intervention, hence not allowing for a substantial duration of observation of a decrease in maladaptive behaviors. (i.e., the decline in behavior may have been more gradual, as opposed sharply declining). A further caveat of the study was that maladaptive behaviors were simply observed, as opposed to targeted, unlike PECS use. In the absence of a functional analysis, one cannot assume that the maladaptive behavior exhibited by the participants were a function of motivation by PECS requesting.

Discussion

As a whole, all nine single subject design articles demonstrated positive outcomes with respect to use of PECS for purposes of communication. Positive gains were reported with regard to verbal speech (three articles), improvisation of requesting using picture exchange (one article), and progress through the hierarchy up through phase IIIB (two articles). Results of this review indicate that only three of the nine articles published using single subject design explicitly addressed the functional relationship between effective communication and maladaptive behavior.

There were a total of seven participants across all three studies investigating the effects of PECS on maladaptive behavior. Of the seven participants across all three studies, four (participants) were observed to decrease instances of maladaptive behavior. It is notable that all seven participants made significant gains in use of PECS. These results can be viewed as positive, in that there appears to be an inverse relationship between use of nonfunctional behavior (i.e., maladaptive behavior) and functional behavior (i.e., use of PECS exchange) for those individuals with ASD who are minimally verbal.

The purpose of this investigation was to evaluate the empirical evidence regarding the change in behavior as a function of PECS use (i.e., use of PECS and maladaptive behaviors using single subject design methods). It appears that, when addressed and observed, there is a (positive)

collateral effect of use of PECS on maladaptive behavior. While case studies have been published on this topic (e.g., Peterson, Bondy, Vincent, & Finnegan, 1995), the lack of an extensive body of literature including well-controlled experimental designs was the impetus for this work. That stated, there appears to be preliminary support for an inverse relationship between the acquisition of PECS use and decrease in maladaptive behavior. However, if all seven out of seven participants across studies had demonstrated significant effects of this relationship, the authors might be able to make more firm conclusions. In addition, this review solidifies the need for further experimental research on the functional relationship between PECS use and maladaptive behavior.

Frea and colleagues (2001) observed an inverse relationship between maladaptive behavior (i.e., biting, hitting, and kicking) and use of PECS exchange. Charlop-Christy and colleagues (2002) supported their conclusions by extending this area of research. Charlop-Christy and colleagues (2002) included three participants in their study; two of whom engaged in maladaptive behaviors (i.e., tantrums, grabbing). For these two participants, there was an observed reduction in maladaptive behavior upon training use of PECS.

Ganz, Parker, and Benson (2009) reported variable performance with respect to reduction in maladaptive behavior. Of note, the authors reported that they did not assess the function of the behaviors observed in their three participants prior to the onset of the study. Had they more clearly isolated the function of these behaviors, Functional Communication Training (FCT) (Carr & Durand, 1985; Tiger, Hanely, & Bruzek, 2008) may have been utilized and monitored as an additional dependent variable. FCT is a teaching strategy which was an outgrowth of the field of applied behavior analysis. The addition of a replacement for a maladaptive behavior for more socially appropriate communicative exchanges is of concern to this paper. There are four primary functions of behaviors: 1) to escape an aversive situation, 2) to gain attention, 3) to obtain a tangible item or activity, and 4) to fulfill a sensory need (Cooper, Heron, & Heward, 2007). If a functional analysis was not conducted, one cannot conclude that the function of the behavior was to obtain a tangible item. If this is the case, then the behavior is not correlated to the use of PECS, potentially explaining why the authors did not observe a behavior change in their third participant.

It is evident from the lack of well controlled single subject design studies (and even more so by the lack of these studies investigating the relationship between communication and maladaptive behavior), that there is a dearth in the literature on the relationship between PECS and maladaptive behavior in individuals with ASD. Speech-language pathologists and special educators working with individuals with ASD will most probably encounter profiles of individuals who will engage in maladaptive behavior, while simultaneously having a limited means to effectively communicate. As such, it is imperative that emerging clinician-scientists add to the body of literature on this topic. In doing so, speech-language pathologists may feel more clinically at ease, knowing that they are engaging in Evidence-Based Practice.

Conclusion

Several considerations should be noted. First, the strength of this study is that it explicitly investigates the relationship between the use of PECS and observation of maladaptive behavior

in a specific clinical population (i.e., autism spectrum disorders). Furthermore, this work summarizes the research to date on PECS use and efficacy of the intervention with students with ASD. Second, the authors here only included studies using single subject research designs. The nature of this literature review was to determine the effect of PECS on maladaptive behavior in individual participants. As single subject research is meant to improve socially significant behavior of the individual participants, it seemed this research design was most applicable to the authors' research question. Third, given the criteria set for this analysis, there were a limited number of studies available for review. Fourth, of the three studies in line with the authors' research question, one did not explicitly assess the function of maladaptive behavior, yielding their findings questionable. However, the findings certainly do not refute this inverse relationship. Fifth, due to the limited number of single subject research articles available, a large-scale meta-analysis was not possible. Should this topic gain momentum in the literature, a more detailed analysis, measuring the breadth and depth of effect sizes, should be conducted to support this descriptive work. Sixth, increasing the breadth and depth of the research published in this area would provide clinicians with guidance on treatment planning for individuals with ASD who are minimally verbal and engage in maladaptive behavior. This is an area that warrants further research to determine the impact of PECS on the maladaptive behavior of individuals with ASD.

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Comparing Measure of Academic Progress (MAP) and Piers-Harris 2 Scores of Students with Emotional and Behavioral Disorders

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Abstract

In this quantitative, archival study, academic achievement and self-concept scores were compared for middle-school students with EBD based on whether the students had been placed into a self-contained learning environment (SCLE) or a mainstreamed least restrictive environment (MLRE). Academic achievement scores and self-concept scores for 2007 were compared between the two groups ($n = 70$ for each group), with 2005 scores used as a baseline. The findings of the study demonstrated that when students with EBDs are given an opportunity with highly skilled professional staff members trained in both mental health therapy and special education, improvements are possible. In addition, this study enhanced both the broken-glass and Social, Academic, and Cognitive (SAC) theories by demonstrating the potential of integrating academic skills with emotional and behavioral support. Additional research is needed to investigate more intensive and innovative strategies designed to help students with EBDs succeed academically and socially.

Comparing Measure of Academic Progress (MAP) and Piers-Harris 2 Scores of Students with Emotional and Behavioral Disorders

Students with an emotional and behavioral disorder (EBD) are at risk for negative outcomes in academic, social, and behavioral domains (Clark, 2007; Hagner et al., 2008). These behavioral patterns also have long-term effects. Many individuals with an EBD have difficulties adjusting to life, and these difficulties become adult mental health issues (Epstein, Atkins, Cullinan, Kutash, & Weaver, 2008). Most research in the area of EBD has involved measuring and analyzing students with EBD in learning environments not taught by qualified personnel (Prather-Jones, 2011). Issues that affect academic achievement and self-concept in the learning environment of students with EBD include learning problems, unfair educational placement, differences in diagnosis requirements, the presence of unqualified professionals, inadequate educational placement procedures, and behavioral limitations that are uncontrollable (Boreson, 2006; Collaborative for Academic, Social, and Emotional Learning 2007; Rutherford, Quinn, & Mathur, 2007). Students with an EBD present challenges in various learning environments. More than 52% of students with an EBD have dropped out of high school during the first 2 years (National Center for Special Education Research, 2007; National Longitudinal Transition, 2007). For this study, both the broken-glass and Social, Academic, and Cognitive (SAC) theories were used for the EBD students that were educated in the SCLE and the MLRE.

Broken Glass and Social, Academic and Cognitive Theories

The broken-glass theory was first developed by Chisolm for students with an EBD that were educated in the SCLE. The theoretical foundation of the broken-glass theory is a synthesis of ideas from several theorists, as well as of research from the Collaborative for Academic, Social, and Emotional Learning (2007) and the William Glasser Institute (2007). The broken- glass

theory focuses on allowing the teacher to solve problems concerning dysfunctional emotions, behaviors, and cognitions through a goal-oriented, systematic procedure that focuses on the present and takes away from academic instructional time (Chisolm, 2008). The broken-glass theory is a long term-plan/program and is based on reality therapy, which is a form of therapy that enables an individual to examine what he or she really wants, accept who he or she is, and accepts responsibility for his or her own actions (William Glasser Institute, 2007).

Chisolm's Social, Academic, and Cognitive (SAC) theory was developed as an extension of the broken-glass theory. Chisolm's Social, Academic, and Cognitive theory of Students with an Emotional and Behavioral Disorder addresses the short-term/ daily need of EBD students. This particular theory allows the teacher to develop and implement techniques to foster social, academic, and cognitive skills (Chisolm, 2013). SAC is a short-term strategy that is used to assist the student with an EBD in understanding how thoughts, emotions, and behaviors are connected and affect one another. Both of Chisolm's theories provide a learning environment with optimal academic, emotional, and behavioral support for the student with an EBD. The broken-glass theory focuses on the long-term academic, emotional and behavioral problems. The SAC provides short-term strategies/techniques in understanding and coping with specific actions, thoughts, emotions, and behaviors that are connected and affect one another; that interfere with reaching long-term goals of the broken-glass theory.

The academic, emotional, and behavioral components of Chisolm's theories are instructed by highly qualified special education teachers, who have additional training, certification or licensing in a particular mental health discipline. The academic, emotional, and behavioral components of Chisolm's theories are also theorized to work on three academic levels. The first academic level occurs when the academic, emotional and behavioral instruction is mainly led by the educator. The second academic level occurs when the academic, emotional and behavioral instruction is led by both the student and teacher. The final academic level occurs when the academic, emotional and behavioral instruction is mainly led by the student.

The essential teaching technique used by the teacher is called, "teaching and learning through the process". This process is simply, teaching and learning, correcting emotional and behavioral responses as events naturally take place for each individual child. As a group, the teacher introduces and models appropriate behaviors. The Introduction and modeling of appropriate behaviors is only completed a few times a week, this is done to introduce the concept as a group to the students. However, intense instruction is given daily and individually as the teacher regularly interacts with each individual student and notices problem behaviors, triggers, consequences, settings, events, or decisions, which are taking place that might or are causing negative or positive behavioral reactions. As a result, the teacher is teaching and learning through the process, with the student, through the natural process of the student, as behaviors take place, and replacing the negative behaviors with positive behaviors.

Significance of the Study

This study was unique in that both learning environments examined had exceptional academic, emotional, and behavioral support from highly qualified personnel. The school district in which the research occurred offered two types of learning environments (SCLE and MLRE) for middle school students with an EBD. The two special education teachers who taught the two groups

were highly qualified mental-health professionals certified in teaching students with an EBD. The special education teacher who taught the SCLE was a trained cognitive behavioral therapist, and the special education teacher who taught in the MLRE was a Licensed Master Social Worker. The special education teachers also had instructional aides who were highly qualified and trained in handling students with an EBD.

Purpose

The purpose of this study was to investigate differences in academic achievement and self-concept scores among students with an EBD based on the type of learning environment in which they were placed (SCLE vs. MLRE).

Setting

This study took place in two urban middle schools in South Carolina. The selection of the participants was based upon enrollment in the two self-contained programs for children with an EBD. Both middle schools serviced students with an EBD in Grades 6, 7, and 8. In the two schools, the same measures were used for academic achievement and self-concept, and both schools provided SCLE and MLRE learning environments for students with an EBD in 2005 and 2007.

Participants

The samples for this study consisted of archival records, rather than live participants. Archival records represented 140 students (70 per group) in Grades 6, 7, and 8 educated and associated with the EBD learning environment. Data were gathered from two middle schools located within an urban school district in South Carolina. Both middle schools were represented equally among the 140 participants.

The sample used for this study was a purposive, nonprobability sample, rather than a sample selected with a randomized selection process. Subjects in a nonprobability sample are selected on the basis of their accessibility or by the purposive personal judgment of the researcher (Vogt, 2007). A post hoc power analysis was conducted to determine the actual power of the statistical tests conducted for this study (Faul, Erdfelder, Buchner, & Lang, 2009). For a two-tailed, independent-samples *t* test, a medium effect size $d = 0.5$ was assumed, with an alpha significance level of .05 and a sample size of 140 (70 per group). The achieved power of the test was 83.6%.

In the selected school district, there were two schools with EBD programs. Students were eligible for the program if their place of residence was zoned for the middle school. The selected schools had similar demographics in terms of EBD classification and the number of students enrolled in the EBD program. In addition, the same assessments for both self-concept and academic achievement were used in both schools. Data were compared for the school year ending 2007, and 2005 data for the same students were used as baseline scores for comparison.

Materials/Instruments

The two testing instruments used for this study were the Piers-Harris 2 and the Measure of Academic Progress (MAP). The Piers-Harris 2 was a measure of self-concept, and the MAP was a measure of the academic achievement of the participants. Following is a description of each of the instruments used.

Piers-Harris 2.

The Piers-Harris Children's Self-Concept Scale is one of the most widely used measures of psychological health among children and adolescents because the scale quickly identifies youngsters who need further testing or treatment in the clinical or educational setting (Manning, 2007). The Piers-Harris 2 was designed to assess the perceptions of children or adolescents regarding how they feel about themselves and how they examine their consideration of another person's perspectives of themselves (Robinson, 2007).

The Piers-Harris 2 assesses self-concept in individuals aged 7 to 18 (Piers & Herzberg, 2002). The self-concept scale is composed of 60 items organized into six subscales: (a) physical appearance and attributes (11 items), (b) intellectual and school status (16 items), (c) happiness and satisfaction (10 items), (d) freedom from anxiety (14 items), (e) behavior adjustment (14 items), and (f) popularity (12 items). The total self-concept score are computed from 25 items related to positive self-concept, with a raw score in the range of 0 to 60 (Piers & Herzberg, 2002). Total self-concept ranges are: High (>60), Average (40 to 59), and Low (<39). The 25 items indicating positive self-concept were selected from all six subscales. Examples of positive self-concept responses are; "I am a happy person", "I am smart", and "I am a good person".

Test items on the Piers-Harris 2 are simple descriptive statements, written at a second-grade reading level and requiring yes-or-no responses (Piers & Herzberg, 2002). The yes-or-no responses include 25 positively and 35 negatively phrased items presented as first-person declarative statements (Puckett, 2008). A total score ranges from 0 to 60 and reflects overall self-concept. A low range (less than 39) indicates an individual with serious doubts about his or her own self-worth (Piers & Herzberg, 2002). An average range (40 to 50) indicates a balanced acknowledgement of both negative and positive aspects of self. A high range (60 or above) indicates a strong general self-appraisal. The *T* scores for the scale and all subscales were normed with a mean of 50 (*SD* = 10), with a normal range between 40 and 60 for the total score (Piers & Herzberg, 2002).

The basis for the reliability of the Piers-Harris 2 was a renormed test-retest for the norm groups of third, sixth, and tenth grade students. The test-retest was conducted with a nationally representative sample of 1,387 students aged 7 to 18, recruited from school districts throughout the United States. The reliability scores were .72 for third grade, .71 for sixth grade, and .72 for tenth grade (Piers & Herzberg, 2002). The internal consistency of the Piers-Harris 2 was .91 for the total score and .74 to .81 for the six subdomain scores (Piers & Herzberg, 2002).

Measure of Academic Progress (MAP).

The reliability of the MAP was based upon a test-retest and a type of parallel forms reliability. Traditionally, a span of 2 to 3 weeks has been used to separate the two test administrations. As a larger time spread of 6 to 8 weeks was used between tests for the current study, Pearson coefficients of reliability below .80 were not considered unreasonable (Northwest Evaluation Association, 2010). Pearson coefficients for test-retest reliability of the MAP ranged from .84 to .94, demonstrating the reliability of the MAP (Northwest Evaluation Association, 2010).

The MAP is a computer-based assessment system based on a Rausch Unit (RIT) scale that measures mathematics, reading, and language usage. A RIT scale is a curriculum scale based on the use of the difficulty values of individual items to estimate student achievement (Northwest Evaluation Association, 2010). The use of the RIT provides educators with better opportunities to address academic issues in a timely manner by relating the numbers on the RIT scale directly to the difficulty of items on the tests (Northwest Evaluation Association, 2010).

A RIT scale is a curriculum scale based on the use of individual item difficulty values to estimate student achievement (Northwest Evaluation Association, 2010). The RIT scale is also an equal interval scale, always showing consistent measurement (Cohen & Spenciner, 2007). For example, a student who improved from 165 to 170 shows the same amount of instructional growth as a student who improved from a 280 to 285. Because the RIT score is consistent, it accurately measures the student's growth over a period of time (Northwest Evaluation Association, 2010). RIT scores differ based upon the area of assessment.

The MAP was designed to adapt to the responses of the user as the user proceeded through the test. If a student answered a question correctly, the test presented a more challenging question. If the student missed the question, a simpler question followed (Northwest Evaluation Association, 2010). Test questions came from a growth research database built on accumulated test questions. To account for students who put forth little effort during the test, a monitoring system was built into the test to estimate the shortest potential completion time. If the student completed the test in less than the estimated time, the system would flag an error and not register the test results.

Research Questions

Research Question 1.

To what extent, if any, is there a difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD?

H1₀. There is no significant difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

H1_a. There is a significant difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

Research Question 2.

To what extent, if any, is there a difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD?

H2₀. There is no significant difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

H2_a. There is a significant difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

Results

To determine whether the total self-concept score and academic achievement score were normally distributed, P-P plots were generated. For academic achievement, distributions were strongly normal. For total self-concept, the residuals showed a minimal departure from normality, but having at least 30 participants in an independent samples *t* test makes the test robust against minor violations of normality (Pallant, 2010). Parametric statistics were therefore used to analyze both research questions. Levene's test showed that variances were equal for academic achievement scores but not for total self-concept scores. However, the results of the independent samples *t* tests for total self-concept were unchanged when equal variances were not assumed. An alpha level of .05 was set for all hypotheses tests.

Research Question Q1.

To what extent, if any, is there a difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD?

H1₀. There is no significant difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

H1_a. There is a significant difference in academic achievement, as measured with the MAP, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

Independent-samples *t* tests were performed to compute the differences in academic achievement scores based on the learning environment (MLRE vs. SCLE) for 2007. The results are reported in Table 1. Composite scores for academic achievement in 2007 were significantly different for the two groups, $t(138) = 2.65, p = .009$, with the MLRE group having a higher mean score. The null hypothesis H1₀ was rejected, and there was support for the alternative hypothesis H1_a. The composite mean score was also higher in 2007 for the MLRE group in mathematics, $t(138) = 1.68, p = .008$, and in language arts, $t(138) = 2.16, p = .03$. There were no significant differences in baseline scores for 2005 for any academic measures.

Table 1
Academic Test Scores, Between-Group Differences

Measure	Year	Mean difference	<i>t</i> (138)	<i>p</i>	95% CI of the difference
Mathematics	2005	3.34	1.30	.20	[-1.73, 8.42]
	2007	5.93	1.68	<.01	[1.55, 10.30]
Reading	2005	1.60	0.54	.59	[-4.21, 7.41]
	2007	3.37	1.40	.16	[-1.40, 8.14]
Language arts	2005	3.74	1.47	.14	[-1.30, 8.78]
	2007	4.91	2.16	.03	[0.41, 9.42]
Composite score	2005	8.69	1.39	.17	[-3.37, 21.04]
	2007	14.21	2.65	<.01	[3.61, 24.82]

Note. *n* = 140. CI = confidence interval.

Split-plot analyses of variance (ANOVA), also termed SPANOVAs, were performed to evaluate within-group longitudinal differences and Year x Class Type interactions for academic achievement scores. All within-group differences were significant, indicating improvement in all academic achievement scores between 2005 and 2007. Table 2 shows the within-group differences for academic achievement for the MLRE, and Table 3 shows the differences for the SCLE. The differences in composite academic scores for the Year x Class Type interaction were not significant, Wilks' Lambda = .98, $F(1, 138) = 3.46$, $p = .06$.

Table 2
Academic Test Scores, Within-Group Longitudinal Comparisons, Mainstream Least Restricted Environment

Measure	<i>M (SD)</i>			<i>t</i> (69)	<i>p</i>	95% CI of the difference
	2005	2007	Difference			
Mathematics	190.51 (16.03)	199.64 (14.07)	9.13 (8.42)	9.07	< .001	[7.12, 11.14]
Reading	186.66 (18.91)	194.40 (15.45)	7.74 (9.66)	6.70	< .001	[5.44, 10.05]

Language arts	191.50 (16.22)	199.40 (14.79)	7.90 (7.34)	9.00	< .001	[6.15, 9.65]
Composite score	568.67 (38.67)	593.44 (34.67)	24.77 (15.15)	13.68	< .001	[21.16, 28.38]

Note. $n = 70$. CI = confidence interval.

Table 3
Academic Test Scores, Within-Group Longitudinal Comparisons, Self-Contained Learning Environment

Measure	<i>M (SD)</i>		Difference	<i>t</i> (69)	<i>p</i>	95% CI of the difference
	2005	2007				
Mathematics	118.17 (14.30)	193.71 (12.04)	6.54 (11.07)	4.95	< .001	[3.90, 9.18]
Reading	185.06 (15.71)	191.03 (12.97)	5.97 (10.86)	4.60	< .001	[3.38, 8.56]
Language arts	187.76 (13.87)	194.49 (12.01)	6.73 (7.82)	7.20	< .001	[4.86, 8.59]
Composite score	559.99 (35.16)	579.23 (28.47)	19.24 (19.73)	8.16	< .001	[14.54, 23.95]

Note. $n = 70$. CI = confidence interval.

Research Question Q2.

To what extent, if any, is there a difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD?

H2₀. There is no significant difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

H2_a. There is a significant difference in self-concept, as measured with the Piers-Harris 2, between students with EBD educated in a SCLE and students with EBD educated in a MLRE, among middle school students with EBD.

Independent-samples *t* tests were performed to compute the differences in self-concept scores based on the learning environment (MLRE vs. SCLE) for 2007. The results are reported in

Table 4. Among middle school students with an EBD, there was no significant difference in overall mean self-concept scores between MLRE students and SCLE students, $t(138) = 0.57$, $p = .57$. The null hypothesis H_{20} was not rejected, and the alternative hypothesis H_{2a} was not supported. There were no significant differences in scores for any of the self-concept subscales for 2007. The only significant difference in baseline scores for 2005 was for freedom from anxiety, $t(138) = 2.01$, $p = .046$.

Table 4
Self-Concept Scores, Between-Group Differences

Measure	Year	Mean difference	$t(138)$	p	95% CI of the difference
Behavioral adjustment	2005	0.41	0.31	.76	[-2.24, 3.07]
	2007	1.33	0.85	.40	[-1.76, 4.42]
Intellectual and school status	2005	0.40	0.25	.81	[-2.81, 3.61]
	2007	1.21	0.75	.45	[-1.98, 4.41]
Physical appearance and attributes	2005	-0.34	-0.17	.87	[-4.34, 3.66]
	2007	1.23	0.60	.55	[-2.81, 5.27]
Freedom from anxiety	2005	2.94	2.01	<.05	[0.47, 5.84]
	2007	2.46	1.76	.08	[-0.30, 5.22]
Popularity	2005	-0.50	-0.27	.78	[-4.12, 3.12]
	2007	0.47	0.23	.82	[-3.54, 4.48]
Happiness and satisfaction	2005	-0.23	-0.15	.88	[-3.16, 2.70]
	2007	1.04	0.68	.50	[-1.98, 4.07]
Overall score	2005	-0.67	-0.44	.66	[-3.76, 2.39]
	2007	0.77	0.57	.57	[-1.90, 3.45]

Note. $n = 140$. CI = confidence interval.

SPANOVAs were performed to evaluate within-group longitudinal differences and Year x Class Type interactions for self-concept scores. All within-group differences were significant, $p < .01$, indicating improvement in all self-concept scores between 2005 and 2007. Table 5 shows the within-group differences for self-concept for the MLRE, and Table 6 shows the differences for

the SCLE. The differences in overall self-concept scores for the Year x Class Type interaction were not significant, Wilks' Lambda = .99, $F(1, 138) = 1.04$, $p = .31$.

Table 5
Self-Concept Test Scores, Within-Group Longitudinal Comparisons, Mainstream Least Restricted Environment

Measure	<i>M (SD)</i>			<i>t</i> (69)	<i>p</i>	95% CI of the difference
	2005	2007	Difference			
Behavioral adjustment	42.03 (8.53)	46.61 (9.58)	4.59 (7.79)	4.92	< .001	[2.73, 6.44]
Intellectual and school status	40.11 (10.07)	44.96 (9.32)	4.84 (7.50)	5.40	< .001	[3.05, 6.63]
Physical appearance and attributes	43.10 (12.94)	49.56 (13.03)	6.46 (10.47)	5.16	< .001	[3.96, 8.95]
Freedom from anxiety	47.13 (8.42)	50.83 (8.28)	3.70 (11.36)	2.73	.008	[0.99, 6.41]
Popularity	40.49 (11.59)	46.21 (12.68)	5.73 (10.57)	4.54	< .001	[3.21, 8.25]
Happiness and satisfaction	40.46 (9.00)	45.11 (9.65)	4.66 (7.27)	5.36	< .001	[2.92, 6.39]
Overall score	41.04 (9.78)	49.37 (8.77)	8.33 (9.16)	7.61	< .001	[6.14, 10.51]

Note. $n = 70$. CI = confidence interval.

Table 6
Self-Concept Test Scores, Within-Group Longitudinal Comparisons, Self-Contained Learning Environment

Measure	<i>M (SD)</i>			<i>t</i> (69)	<i>p</i>	95% CI of the difference
	2005	2007	Difference			

Behavioral adjustment	41.61 (7.34)	45.29 (8.93)	3.67 (8.17)	3.76	< .001	[1.72, 5.62]
Intellectual and school status	39.71 (9.12)	43.74 (9.78)	4.03 (8.80)	3.83	< .001	[1.93, 6.13]
Physical appearance and attributes	43.44 (10.91)	48.33 (11.05)	4.89 (10.30)	3.97	< .001	[2.43, 7.34]
Freedom from anxiety	44.19 (8.90)	48.37 (8.23)	4.19 (11.41)	3.07	.003	[1.46, 6.91]
Popularity	40.99 (10.05)	45.74 (11.24)	4.76 (9.79)	4.07	< .001	[2.42, 7.09]
Happiness and satisfaction	40.69 (8.53)	44.07 (8.41)	3.39 (8.20)	3.45	.001	[1.43, 5.34]
Overall score	41.73 (8.56)	48.60 (7.15)	6.87 (7.64)	7.53	< .001	[5.05, 8.69]

Note. $n = 70$. CI = confidence interval.

Discussions

This quantitative study was an investigation of academic achievement and self-concept scores for two groups of students with an EBD based on the type of learning environment in which they were placed (SCLE vs. MLRE). The academic, emotional, and behavioral supports in these environments had been designed to exceed by far the basic federal requirements for teaching students with EBDs (Prather-Jones, 2011; South Carolina Department of Education, 2007). In this section, the findings of the study are evaluated.

Academic achievement.

The findings of this study showed that when group main effects were examined, the composite academic score for 2007 was significantly higher for the MLRE group than for the SCLE group, $p = .009$. When examined in terms of the separate components (mathematics, reading, and language arts), scores for mathematics and language arts were significantly higher in 2007 for the MLRE group as well. No baseline between-group differences were significant. Within-group analyses showed that all academic scores improved between 2005 and 2007 for both groups, $p < .001$. These findings were in contrast to previous literature, according to which there is a lack of improvement in academic achievement for this population (Mattison, 2011).

The MLRE group generally consisted of students with less severe emotional and behavioral problems compared to the SCLE group (Kaufman et al., 2008). Thus, one interpretation of the findings is that students in the MLRE group may have focused more on academic issues than the other students did, and academic scores may have been higher as a result. In previous research,

findings regarding academic achievement and self-concept among students with an EBD have been mixed (Wiley, Siperstein, Forness, & Brigham, 2010). Students in both MLREs and SCLEs have demonstrated broad academic and social deficits (Gage et al., 2010). Overall, these individuals have unstable and inconsistent academic and social outcomes (Rutherford et al., 2007). A cross-sectional study of kindergarten through 12th grade students with an EBD (Nelson, 2004) showed that achievement deficits were higher and more pronounced among adolescents than among the younger children.

Studies of students with an EBD have consistently shown little to no improvement over time in academic functioning (Wiley et al., 2010). Students with an EBD did not improve in academic skills over the course of an academic year, regardless of the type of learning environment (Mattison, 2011). In some cases, the students fell farther behind in the academic, social, and behavioral domains (Trout et al., 2008). However, in this study, within-group longitudinal improvements were found for all academic scores.

Although prior research is consistent regarding a lack of improvement for students with an EBD, the nature and extent of the problem has varied among different studies (Lane et al., 2008). In terms of academic achievement, findings differ regarding whether deficits in different subject areas remain stable or worsen over time. Over a 7-year period, the percentage of students in this population reading below grade level increased, whereas the percentage performing below grade level in mathematics remained constant (Mattison, 2011). A cross-sectional study of students with an EBD in kindergarten through 12th grade (Nelson et al., 2004) demonstrated no significant growth in reading or written language over time, and deficits in mathematics increased. A meta-analysis of academic achievement among students with an EBD (Reid et al., 2004) showed no differences by age in any subject area, suggesting that academic deficits remained stable over time.

The wide variability in academic progress among students with severe deficits in academic achievement may be related to the contextual differences in the types of learning environments in which students with an EBD are educated (Carr-George et al., 2009; Wiley et al., 2010). In national longitudinal studies, environments for students with an EBD in particular have been found to be significantly under resourced (Wiley et al., 2010). Data from two nationally representative samples showed that students with an EBD spent less time in general education classrooms, were likely to have teachers who felt unprepared to work with them, and were unlikely to receive needed academic or mental health supports (Carr-George et al., 2010). In contrast to previous research, the environment examined in this study was marked by an unusually high level of professional expertise. These differences in quality may explain both the longitudinal improvements for both groups and the between-group differences, neither of which were found in other studies.

Self-concept.

There were no significant between-group differences in self-concept scores except for the baseline difference in freedom from anxiety, $p = .046$. However, self-concept did improve between 2005 and 2007 for all aspects studied, $p < .01$. This finding was in contrast to other studies (Parker, 2010; Rutherford et al., 2007) that showed no improvement of self-concept over time for students with EBD. The finding of within-group longitudinal differences has

contributed to the broken glass theory. The results showed that a special-needs program marked by an unusually high level of expertise was able to create improvement in the self-concept of adolescents with an EBD.

According to theories of self-concept, attributes of self-concept include control; acceptance; responsibility; and an understanding of self in terms of social characteristics or abilities, physical appearance, body image, and inner thinking (Bandura, 1997; Bandura et al., 2001; Hadley et al., 2008). In the current study, there was not a significant difference in self-concept scores between the two groups (SCLE vs. MLRE). Because many students with an EBD lack social competence and display erratic behaviors, some researchers (e.g., Parker, 2010) have assumed that members of this population perform better socially and have higher levels of self-concept in more restrictive learning environments. However, the findings of the current study confirm the notion, suggested by other researchers (Webber & Plotts, 2008), that many students with EBD do not engage in enough positive social interaction with peers to improve positive perceptions of the self.

Overall self-concept scores for both the MLRE and SCLE groups in this study were in the low-average range for the instrument used (Piers & Herzberg, 2012). Scores in the average range usually represent a balanced self-evaluation, with acknowledgement of both positive and negative aspects of the self (Piers & Herzberg, 2009). A low-average range indicates that on the balance, the self-evaluation of the participants was negative (Piers & Herzberg, 2009).

Students with an EBD typically exhibit lower levels of self-concept than the norm (Montague et al., 2007; Wiley et al., 2010). Students with an EBD would be predicted to have low levels of self-concept. These students typically perceive neutral social interactions as being hostile or negative (Robinson, 2007). A study of self-concept trajectories of students with an EBD (Wei et al., 2012) showed lower levels of social self-concept and self-image compared to students with other disabilities (Wei et al., 2012).

Contribution to Knowledge

The comparison of data from students with an EBD from two different settings in this study was a contribution to knowledge. Researchers have primarily compared students with an EBD to nondisabled peers (Rutherford et al., 2007; Vannest et al., 2009). Thus, standards for success are based upon the achievements of students without disabilities (Rutherford et al., 2007). Limited attention has been given to comparing students with an EBD with other students from this population in different learning environments to determine the best environment for success (Kaufman et al., 2008).

In comparisons of students with an EBD with other peers with disabilities, the educators in the learning environments were not prepared to handle the various emotional and behavioral needs of this population (Prather-Jones, 2011). In contrast, the academic, emotional, and behavioral support from highly qualified personnel for the students in this study was exceptional in the field of special education. The school district in which the research occurred offered two types of learning environments for middle school students with an EBD. The two special education teachers who taught the two groups were highly qualified mental-health professionals certified in

teaching students with an EBD. The special education teacher who taught the SCLE was a trained cognitive behavioral therapist, and the special education teacher who taught in the MLRE was a Licensed Master Social Worker. The special education teachers also had instructional aides who were highly qualified and trained in handling students with an EBD. Thus, both programs were staffed by highly qualified personnel equipped to handle the erratic and negative behaviors of this population. This high level of expertise may be the most appropriate interpretation of the differences between these findings and the findings of previous studies. In contrast to findings from previous research, all mean scores improved within a 2-year time span.

The findings of this study are a contribution to both the broken-glass and Social, Academic, and Cognitive theories. According to the theories, they provide a learning environment with optimal academic, emotional, and behavioral support for the student with an EBD; where the teacher can develop and implement techniques to foster cognitive-behavioral skills (Chisolm, 2008). These skills are needed to manage the learning environment and various emotional and behavioral issues more effectively so as to focus on the academic task at hand. By fostering these skills, highly expert professionals may have been responsible for ensuring that students improved both in academic achievement and in self-concept. Teachers were able to assist and work with the EBD students to develop cognitive-behavioral skills that focused on social, emotional, and behavioral strategies. These strategies may have assisted the students in being able to cope with stressful or negative situations by employing short-term strategies to stop and focus on their reactions to a situation. By stopping and focusing, the student can gain a better understanding of how thoughts, emotions, and behaviors are connected and affect one another. Students with an EBD may have been more able to manage their own actions in different learning environments, leading to more favorable academic outcomes.

The results of this study showed that after 2 years in positive learning environments, the students in the MLRE had scores that were significantly higher for academic achievement, compared to the students in the SCLE. Researchers and educators remain ambivalent regarding the inclusion of this population in general education classrooms, and opposition is firm in some cases (Hallahan et al., 2011; Rutherford et al., 2007). Some empirical research has shown that inclusive classrooms exacerbate the issues with different learning styles and various emotional and behavioral problems of these children (Prather-Jones, 2011; Rutherford et al., 2007). Writers who have been hesitant to support inclusive classrooms have argued that academic goals for this population should parallel the goals set for nondisabled peers (Hallahan et al., 2011) and that students with EBDs can learn appropriate social interaction and academic learning from peers in the inclusive classrooms (Prather-Jones, 2011). The findings in this study support the benefits of both inclusive and self-contained classrooms under the conditions of a highly expert staff and learning environment. However, maybe training for future special education teachers of students with EBD, would benefit from some type of mental health training.

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About the Author

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***Perceptions of Disability and Special Education Services: The Perspectives of
Korean-American Parents of Children with Disabilities***

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Abstract

Parents' perception of disabilities and special education services can impact the way they interact with professionals providing services for their children with disabilities. In addition, the cultural background of parents plays an important role in their perception of disabilities, as well as how they communicate with professionals. Thus, it is essential to examine how cultural contexts influence Korean-American parents' viewpoint of disability and their perception of special education services in order to improve practice when providing appropriate special education services. This paper provides a review of the literature about the perceptions of Korean-American parents of children with special needs in terms of disability and special education services. The difficulties these children encounter in receiving proper special education services will also be discussed. Suggestions for better understanding cultural issues and providing appropriate support for Korean-American children with disabilities will be offered. Lastly, implication for practitioners will be discussed.

***Perceptions of Disability and Special Education Services: The Perspectives of
Korean-American Parents of Children with Disabilities***

Perceptions, viewpoints, and attitudes toward disability (Choi & Lam, 2001; Erickson, Devlieger, & Sung, 1999; Hwang & Charnley, 2010), as well as processes for diagnosing and treating of disability (Cho & Gannotti, 2005) differ from culture to culture. Understanding the culture of the family such as the family's interpretation of disabilities plays an important role in building partnerships with parents of children with disabilities (Lamorey, 2003). Thus, it is imperative to examine how social and cultural contexts may affect Korean-American parents' viewpoint on disability, especially given the increase of the Korean-American population in the United States (U.S.).

The Korean-American population in the U.S. was 1.4 million in 2010 (Hoeffel, Rastogi, Kim, & Shahid, 2012). This population has risen from 1.1 million in 2000 representing a 27 percent increase. Korean is now the fourth most prevalent non-English language spoken by children in the U.S. public schools, preceded only by Spanish, Vietnamese, and Hmong (Hopstock & Stevenson, 2003). However, disaggregated data on the Korean-American student population with disabilities has not been recorded and is instead included among the larger Asian-American population (Erickson et al., 1999; U.S. Department of Education, 2009). Cho and Gannotti (2005) indicated that studies have begun to focus on the impact of having a child with a disability on Asian-American parents. Studying Korean-American parents' experiences of

disability, their attitudes toward their children with disabilities, and their perceptions of special education services can provide a better understanding of Korean-American parents' cultural attitudes regarding disabilities and special education (Cho & Gannotti, 2005; Erickson et al., 1999; Kim, Lee, & Morningstar, 2007; Park & Turnbull, 2001; Park, Turnbull, & Park, 2001). Through this, professionals may gain a better idea of how to develop and provide appropriate special education services in culturally sensitive ways for Korean-Americans with disabilities in the U.S. (Cho & Gannotti, 2005; Erickson et al., 1999; Kim et al., 2007; Park & Turnbull, 2001; Park et al., 2001).

Korean-American Parents' Perceptions of Their Child's Disability

In order to understand the perception of many Korean-American parents of children with disabilities, it is helpful to first look at the traditional Korean family structure. It is also useful to examine the influences of other factors operating within the U.S. that shape the Korean-American experience.

The Korean Context: Confucianism

Traditional Korean society features a family structure based on Confucianism (Shin & Koh, 2008), which directly affects the meaning of disability for Korean-American families (Erickson et al., 1999). According to Confucianism, the family is the fundamental unit of society. Pride and dishonor stem from family characteristics and the individual is seen as a reflection of his or her family; individual success brings great admiration for one's family, and, conversely, individual failure brings shame on one's family (Hwang & Charnley, 2010). Thus, within a Confucianism framework, disability is associated with family dishonor and shame (Hwang & Charnley, 2010).

The philosophy of Confucianism also emphasizes absolute respect and deference to authority and elders (Park & Turnbull, 2001). Younger generations usually respect and provide care for older generations; however, if a child has a disability, that disability often will prevent the child from caring for the aging parents and performing the rites that memorialize ancestors (You & McGraw, 2011). Therefore, "individuals with disabilities are stigmatized in Korea partly because they are viewed as people who threaten reciprocal family ties" (You & McGraw, 2011, p. 580). This respect for authority also influences the way Korean-American parents interact with educators and other professionals. Korean-American parents are likely to be reluctant to share their needs with professionals or to disagree with teachers (Cho & Gannotti, 2005; Lee, Turnbull, & Zan, 2009; Park & Turnbull, 2001; Park et al., 2001; Shin & Koh, 2008). Instead of engaging in dialogue with educators, parents tend to be the passive recipients of professionals' decisions (Lee et al., 2009).

Thus, cultural and linguistic differences must be considered when teachers interact with Korean American parents of children with disabilities (Cho & Gannotti, 2005). Teachers should take into consideration that parents' understanding of the nature of disabilities, their practices in raising children, and their willingness to use special education services will likely be affected by their cultural and social contexts (Cho & Gannotti, 2005).

Reactions after Notification of Their Child's Disability

An initial crisis often occurs when Korean-American parents are informed that their child has a disability. In Cho et al.'s (2000) study of sixteen Korean-American mothers who had children with disabilities, several reported feelings of anger, denial, shame, self-blame, and sorrow. For example, one participant said: "I was hopeless and lost the meaning of my life when I learned that my daughter has autism" (Cho et al., 2000, p. 241). More specifically, seven of sixteen Korean-American mothers, and even some family members, went as far as planning to commit suicide with their child with a disability. This was perceived as the one way to save the extended family members from shame or to escape the harsh realities and responsibilities, such as financial hardship, that oftentimes come with raising a child with disabilities (Cho et al., 2000).

The shame parents and families experience is exacerbated by the perception that disabilities are caused by poor maternal care. Traditionally, in Korea, newborn babies are considered to be a year old because the first year in the womb is thought of as a crucial time in the child's education. As a result, Korean culture places a strong emphasis on proper maternity care. This emphasis often causes parents to blame themselves if a child is born with a disability (Cho et al., 2000). According to Erickson et al. (1999), Korean-American women seem unanimous in their belief that pregnant mothers' exposure to toxic chemicals, drugs, alcohol, or a poor diet could result in giving birth to a child with a disability. Other explanations for conceiving a child with a disability include viewing the disability as punishment for sins of a past life or a curse (Erickson et al., 1999; Cho et al., 2000).

Religious Influences on Parents' Perceptions of Their Child's Disability

Cho et al. (2000) contended that many Korean-American parents' adoption of Christian religious beliefs sometimes helps them transform negative thoughts about their child's disability to positive cognitive and emotional conditions regarding their child's disability. In Cho et al.'s study, twelve of the sixteen Korean-American parent participants who had converted to Christianity viewed their child's disability as part of a divine plan. Cho et al. indicated that this religion helped release parents from self-blame, shifting their feelings from hopelessness to hope, even though their first purpose in joining a church was to receive strong support from the immigrant community. Cho et al. also found that religious parents have asserted that their children with disabilities have made significant contributions to their lives by strengthening their faith and helping them develop patience and express love. Thus, despite their immigrant status and the cultural influence of their home country, Korean-American parents who are religious have been able to alter their perception of their child's disability.

In addition, Korean churches attended by Korean-American parents provide support through offering disability services. For example, *Joy Center* is a Korean Christian non-profit organization for people with disabilities and *Mil Al* is a Korean mission organization for people with disabilities. It is featured in thirteen branches throughout the country in cities such as Boston, Chicago, Baltimore, New York, and Los Angeles (Kim et al., 2007). These organizations provide services such as free housing for adults with disabilities, free lunch, transportation, and recreational activities for Korean-American children with disabilities (Kim et al., 2007).

Experience of Public Attitudes toward Children with a Disability

One Korean-American mother experienced public reactions to her child's unusual behavior in both Korea and the U.S., but she felt that people in Korea were much less accepting of and less knowledgeable about individuals with disabilities (Cho et al., 2000, 2003). Kim and Horn (2008) researched public reactions to individuals with a disability in Korea and the U.S. They found that five of ten mothers of children with disabilities often encountered negative reactions from the community when they used public transportation such as subways and buses in Korea. To further support this assertion, one immigrant mother said that people in the U.S. had more knowledge about disability and, therefore, displayed more accepting attitudes toward individuals with a disability (Cho et al., 2000; 2003). Additionally, people in the U.S. are perceived to have a higher tolerance level for the public misbehavior of children with disabilities and their different appearance, although several of the mothers disagreed with this position (Cho et al., 2003). Kim and Horn (2008) also pointed out two explanations of why Korean people are less knowledgeable about disabilities than Americans. First, Korean society tends to be much more homogeneous than American society, as a result of which Koreans have difficulty understanding differences in general; "Korean people have had less exposure and thus are less likely to be sensitive to diversity in general and in particular to people with disabilities" (Kim & Horn, 2008, p. 305). Second, the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA) and the Americans with Disabilities Act of 1990 (ADA), which guarantee free public special education and other services in the least restrictive environment represent laws protecting the treatment of people with disabilities. This is in contrast with Korea, which has had a relatively short history of promoting special education in comparison with the U.S. (Kim & Horn, 2008). The increased parental stress and difficulty in raising children with disabilities may be the result of continued negative public attitudes toward individuals with disabilities, and a lack of social services (Cho et al., 2003).

Implications of Korean-American Parents' Perceptions of Disability for Schools

Some Korean-American parents are likely to hide their child's disability and consider suicide when they learn that their child has a disability (Cho et al., 2000). They believe that disability is associated with dishonor and shame and they want to save face (Hwang & Charnley, 2010). Therefore, it is crucial for service providers to be on the alert for suicidal ideation, especially after the diagnosis when parents have the lowest morale (Cho et al., 2003). Cho et al. (2000, 2003) also pointed out that professionals can help devastated mothers by connecting them to other parents in similar situations, support groups, and professionals who have the capacity to understand their cultural context so as to help illuminate and address suicidal thoughts and hopelessness.

Korean-American Parents' Interactions with Special Education Services in the U.S.

Most Korean-American parents whose children receive special education services in the U.S. are satisfied with the quality of their children's education (Cho et al., 2000; 2003; Cho & Gannotti, 2005; Park & Turnbull, 2001). For example, one parent in Park and Turnbull's (2001) research said, "It was the first Individualized Education Program (IEP) meeting that I had in the U.S and I was so moved by the fact that these eight people gathered only for my daughter" (p. 137). After attending their first IEP meeting, many parents expressed how impressed they were that people cared, talked freely, and made plans for their children (Park & Turnbull, 2001). In contrast, IEP meetings in Korea usually only include the special education teacher, general education teachers,

and the parents (Lee et al., 2009).

More than half of the ten mothers who participated in Cho and Gannotti's (2005) research had attended workshops on how to prepare for an IEP meeting or training (Cho & Gannotti, 2005). In addition, most had attended Korean-American family support groups and understood the rights and responsibilities associated with special education (Cho & Gannotti, 2005). When Korean-American parents had issues regarding their children, they were able to raise the issues in the IEP meetings and openly discuss them with the professionals and parent advocates until their concerns were resolved (Cho et al., 2000).

Communication with Professionals

The attitudes of the Korean-American parents toward collaborating with professionals were heavily based on the extent of the parents' knowledge of the system, their perceptions of their children's disabilities, and their level of English proficiency (Kim et al., 2007). Eight of ten parents (80%) in Park, Turnbull, and Park's (2001) study stated that their inability to speak fluent English prevented them from building smooth partnerships with professionals.

Regardless of their level of acculturation, most parents said that they tend to follow the professionals' directions and accept their opinions without objection or question (Kim et al., 2007; Park & Turnbull, 2001; Park et al., 2001). One of the parents reported, "Koreans are very compliant to professionals and we are taught to say 'Yes' to teachers, whereas being assertive is so important in the U.S." (Park et al., 2001, p. 163). As stated previously, the idea of hierarchy based on Confucianism influences the way the professionals and parents communicate; parents tend to be the recipient of professionals' decisions (Lee et al., 2009).

Although Korean-American parents of students with disabilities reported that overall IEP meetings were beneficial, some parents were dissatisfied with the interpreters due to the interpreter's lack of a special education background and insufficient time for interpretation (Cho et al., 2000; Cho & Gannotti, 2005; Park et al., 2001). Furthermore, four of ten Korean-American parents who participated in Kim, Lee, and Morningstar's (2007) study said that they faced difficulties in advocating for their children's preferences and needs in IEP meetings. These difficulties left them feeling conflicted; since they felt they had to follow the professionals' suggestions even when they did not feel those suggestions would be beneficial (Kim et al., 2007).

Even though some barriers to communication exist for all professionals, each of the mothers in Cho and Gannotti's (2005) study could recall at least one professional they regarded with great respect. These professionals commonly treated their child with respect and care, as they made positive comments, demonstrated their teaching capabilities, and set clear objectives and goals for the individual child, while valuing families' input about the children's education (Cho & Gannotti, 2005).

Special Education and Related Services

One hundred percent of the Korean-American mothers in the Cho et al. (2000) study ($n = 20$) agreed that the U.S. is the better place to raise their children with disabilities, since it provides many services that are not offered in Korea, such as free public special education and early

intervention. People who had lived in the two countries with their children with disabilities stated that the U.S. has better social services and greater public acceptance than Korea (Cho et al., 2000).

The support from special educators, school psychologists, and home-based service providers was extremely beneficial to the Korean-American parents since parents in Korea only receive assistance from the special education teachers (Cho et al., 2003). Also, the privilege of having benefits such as Medicaid and Social Security Income (SSI) made the parents feel extremely grateful because Medicaid helps alleviate their concerns about medical costs and SSI diminishes their financial hardships (Park & Turnbull, 2001). Cho and Gannotti (2005) pointed out that parents of young children with disabilities in Korea must bear the financial burden of early intervention and related services. The availability of similar free services for Korean-American parents in similar circumstances in the U.S. alleviated their stress and financial difficulty (Cho & Gannotti, 2005).

Impediments to receiving proper special education services include the excessive paperwork required by various service agencies, the lack of time and flexibility to build partnerships with professionals, the frequent change of service providers, and professionals' heavy caseloads (Park et al., 2001). According to Park et al. (2001), one mother even stopped using the subsidy money due to her limited English proficiency and the excessive paperwork. In addition, another mother said that her child's school scheduled such short parent conferences that she never had sufficient time to discuss her concerns with her child's teachers (Park et al., 2001).

Recommendation and Implications for Practitioners

Given the increase of the Korean-American population in the U.S. and the studies that help illustrate the Korean-American parents' experiences of raising their children with disabilities, it is necessary to offer recommendations for practitioners. The limited, but growing, body of research on the Korean-American parents' interactions with the special education service represents the starting point.

Recommendation for Educators and Professionals

The Korean-American parents stated that they were extremely grateful for professional services and support when provided in a translated form by well-informed individuals (Cho et al., 2000). Negative views of their children with disabilities among professionals hindered them from acquiring better service (Kim et al., 2007). The Korean-American parents described having a *special heart* as the quality most needed in professionals. They thought that those whose work is to help people with disabilities should prioritize compassion over salary and other considerations. In fact, eight of ten Korean-American parents participating in Kim et al.'s (2007) said that people who do not have a special heart constitute an obstacle to their child's progress. For example, one father criticized those who are not committed to their work by saying that "they just do nothing but babysitting students with disabilities and pretend to do something when parents visit in the classroom" (Kim et al., 2007, p. 258).

Language barriers impede Korean-American parents' participation in school meetings and meetings with professionals (Cho & Gannotti, 2005; Kim et al., 2007; Park et al., 2001). Kim et

al. (2007) suggested that the written form of communication might be beneficial to Korean-American parents. In addition, providing written materials in advance would help the parents to participate in school meetings and conferences (Park & Turnbull, 2001). Park et al. (2001) also argued for providing more time for Korean-American parents to communicate. For example, teachers and professionals could schedule extra time for them to read documents and consider options before parents are required to make important decisions (Park et al., 2001). Lee, Turnbull, and Zan (2009) also argued that parents should be encouraged, in a way that is supportive, to voice their concerns and desires, and that teachers should be culturally sensitive in their communication with parents. Park and Turnbull (2001) recommended using a simple symbol system, such as a short video clip of the child, and putting important information on paper when communicating with the parents. This facilitates communication between the professionals and the parents with limited English proficiency because it does not embarrass parents but keeps them notified (Park & Turnbull, 2001).

Another critical strategy for improving parent-professional relationships is to ensure that teachers enhance their cultural competence (Kim et al., 2007). Korean values and traditions in the Korean-American family seem to endure regardless of the length of time spent in the U.S. or education level (Cho & Gannotti, 2005; Kim et al., 2007; Park & Turnbull, 2001; Park et al., 2001). For example, Korean-American parents are more likely to use modest expressions to complain rather than more direct language (Park et al., 2001). Thus, in addition to the language barrier, the differences in communication style (such as using indirect messages) should be considered when communicating with Korean-American parents.

Additionally, a more comfortable atmosphere for the parents would help them express their opinions, gain clarification, persuade professionals, and make suggestions (Cho & Gannotti, 2005). As stated before, Confucianism affects parents' attitude toward teachers, including feelings of respect and acts of deference (Cho & Gannotti, 2005; Lee et al., 2009; Park & Turnbull, 2001; Park et al., 2001; Shin & Koh, 2008), and many parents are reluctant to share their opinion with professionals (Lee et al., 2009). Thus, Lee et al. (2009) proposed that professionals verify parents' concerns about their children's education and create an environment in which parents feel comfortable in expressing their opinions.

The emphasis on interdependence, the importance of group success, and the willingness to help others is natural to Korean people (Cho & Gannotti, 2005) because they have been raised in a collective society (Lee et al., 2009). Thus, it is beneficial to connect Korean-American people who have similar experiences for information exchange and emotional support (Cho et al., 2000; Cho & Gannotti, 2005; Park et al., 2001). These support systems can also help diminish the impact of shame that may traditionally be felt by these parents.

The Need for Trained Interpreters

Information should be presented in the family's native language to expedite comprehension, and it should be accessible in a variety of formats (Kim et al., 2007) in advance. Parents have raised concerns regarding the use of interpreters in IEP meetings because the interpreters may lack important knowledge about special education (Cho et al., 2000; Cho & Gannotti, 2005; Park et al., 2001). One mother in Cho and Gannotti's (2005) study expressed dissatisfaction with her interpreter by saying, "I was extremely disappointed to learn that she knew nothing about autism

- even the terms! She spoke about deafness for autism” (p. 7).

Also, interpreters should remain neutral and prevent themselves from trying to persuade the parents to take the professionals’ advice (Park et al., 2001); they also should have sufficient time and fluency to translate English and Korean (Cho & Gannotti, 2005). One mother in the Park et al. (2001) study mentioned that the interpreter was trying to convince her to follow the professionals’ statement rather than staying neutral while interpreting. Another mother in the same study stated that “it took too long for the conversation to be interpreted back and forth between Korean and English and I was not able to finish even half of the agenda because another parent was waiting” (p. 162).

The Korean-American parents often ask the school district to provide a “qualified” interpreter; this means “(1) being fluent in both English and Korean; (2) allowing sufficient time for the meeting; (3) having knowledge of childhood disability, medical and rehabilitation terms, and available services; and (4) acting professionally, remaining objective, not interjecting with either party while translating” (Cho & Gannotti, 2005, p. 7). Recall that the use of interpreter for is guaranteed by law (IDEIA, 2004). Section 300.322(e) of IDEIA (2004) states: “The public policy agency must take whatever action is necessary to ensure that the parent understands the proceedings of the IEP team meeting, including arranging for an interpreter for parents with deafness of whose native language is other than English.”

When an interpreter is not available, it is imperative that the professional try to communicate with the parents by being attentive, speaking slowly, repeating and rephrasing important points, and being patient (Cho & Gannotti, 2005). If professionals accommodate the needs of families, parents will be able to comprehend issues raised in the meeting, ask for clarification, and contribute suggestions (Cho & Gannotti, 2005).

Limitations of Studies

It is difficult to find research studies about Korean-American parents of children with disabilities and their perception of disability and special education services. A search engine using EBSCO, ERIC and PsycINFO, revealed only eight studies about Korean-American parents’ perceptions having children with disabilities. Furthermore, most parents featured in these studies have a child with mental retardation, autism, developmental disability, or physical disability; thus, the parents’ perception of disabilities and special education services in terms of other disabilities were not examined in this research.

Due to the small sample of participants (Cho et al., 2000, 2003; Cho & Gannotti, 2005; Park & Turnbull, 2001; Kim et al., 2007; Kim & Horn, 2008) in the research, the findings of each study are limited in terms of generalization to other Korean-American parents who have children with disabilities. The number of participants in each study varied from eight to twenty; however, it would be difficult to say the studies’ findings reflect all Korean-American parents’ perspectives; some parents had different perceptions about disability based on their Christianity (Cho et al., 2000), and a few disagreed that the U.S. public holds relatively positive attitudes toward disabilities (Cho et al., 2003).

Seven studies featured interview methodology to conduct their research on Korean-American parents' perceptions of their children's disability and special education services. The interviews all started with open-ended questions (Cho et al., 2003). However, the possibility exists that the questions did not address all the parents' perceptions of disability and special education; the questions could reflect biases based on the researchers' attitude toward disability and special education services. Three research studies used telephone interviews; however, even though the telephone interview is efficient when long distances are involved, they have limitations because this method disregards non-verbal communication (Park & Turnbull, 2001; Kim et al., 2007; Kim & Horn, 2008).

Another barrier is the lack of participation of fathers and other family members (Park & Turnbull, 2001; Park et al., 2001; Kim & Horn, 2008). All the studies featured interviews with Korean-American mothers even if the research title related to the Korean-American parent. Fathers and other family members could have different perspectives of disability and special education services in the U.S.

Conclusion

By and large, the U.S. has developed a clearer vision for supporting people with disabilities when seen through the eyes of the parent participants in this literature review. This has been associated with Korean-American parents' more favorable attitudes regarding the impact of their child's disability on the family and its social context (Cho et al., 2003). Special education services tailored to the needs of each child (Cho et al., 2000, 2003; Cho & Gannotti, 2005; Park & Turnbull, 2001) satisfy the Korean-American parents who participated in the studies reviewed in this paper. People in the U.S. have more knowledge about disabilities and a more positive attitude toward people with disabilities than people in Korea (Cho et al., 2000, 2003). All participants in the 8 studies agreed that the U.S. provides better special education services even though some participants encountered difficulty in receiving proper services because of their limited English proficiency or interpreter issues. Professionals and practitioners must continue to support Korean-American parents overcome any language barrier (Cho & Gannotti, 2005; Park & Turnbull, 2001; Park et al., 2001) and neutralize cultural issues such as parents' respectful attitude toward professionals (Cho & Gannotti, 2005; Park & Turnbull, 2001; Park, Turnbull, & Park, 2001; Shin & Koh, 2008). Due to Confucianism, which emphasizes absolute respect and deference to authority and elders (Park & Turnbull, 2001) as well as family honor (Hwang & Charnley, 2010), Korean-American parents will try to recognize teachers' statements (Cho & Gannotti, 2005; Lee et al., 2009; Park & Turnbull, 2001; Park et al., 2001; Shin & Koh, 2008) and even feel shame about their child's disability (Cho et al., 2000).

Professionals should understand parents' attitude toward teachers and provide an atmosphere in which parents have sufficient time to communicate, encourage parents' participation using the parents' preferred communication style, and offer appropriately trained interpreters for conferences and IEP meetings. To provide successful service delivery to Korean-American families that have children with disabilities, it is also important to understand and accept the hardships that the families experience (Cho & Gannotti, 2005). There is a range of suggestions available for teachers and related service personnel when considering the cultural and linguistic backgrounds of their students. The suggestions pertain to: IEP development (e.g., García &

Malkin, 1993; Zhang & Bennett, 2003); instructional planning (e.g., Cloud, 2002); and person-centered planning (e.g., Callicott, 2003), all of which can be adapted to meet the needs of an individual Korean-American family.

Research has begun to focus on Korean-American parents who have children with disabilities even though this small number of parents does not represent all Korean-American parents with exceptional children. In addition, the Korean-American parents in the studies have different educational backgrounds, English proficiency, and economic levels (Cho & Gannotti, 2005; Kim et al., 2007; Park & Turnbull, 2001; Park et al., 2001). Future research should: (a) focus on Korean-American students with disabilities and their families, (b) feature Korean-American participations in intervention research, and (c) contain sufficient descriptions of any cultural and linguistic variables to ensure ecological validity and external validity within the studies. Given the increasing population of Korean-American in the U.S., the amount of students and families interacting with special education professionals will only increase, making these studies all the more important.

In summary, understanding how Korean-American parents' perception of disability and special education services differs from, or is similar to, other culturally and linguistically diverse parents will help professionals better understand Korean-American parents who have children with disabilities. It will also benefit professionals who seek to accommodate parents' unique needs promoting a productive, positive family and school collaboration. The richer the information on Korean-Americans with disabilities, the more Korean-Americans with disabilities will receive appropriate special education services that meet their unique needs.

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Instructional Constraints Faced by Learners with Muscular Dystrophy: A Case of Joytown Special Primary School, Thika, Kenya

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Abstract

The purpose of this study was to investigate the instructional constraints facing learners with muscular dystrophy in Joy Town special primary school, Thika, Kenya. Descriptive design was used for this study. The target population were all the 20 learners suffering from muscular dystrophy from S.A Joy Town Special Primary School. The total target population was 84. Random sampling was used on learners suffering from muscular dystrophy. Purposive sampling was used on the head teacher, parents, teachers, teacher aides, housemothers and medical personnel. The researcher used an interview and an observation guide to collect data for comprehensive results. Piloting of the instruments was done at Dagoretti special school to establish validity and reliability of instruments. Content related validity was used as a measure to determine validity. The researcher used the Human Capital Theory. Descriptive statistics were used to analyze data. Results revealed that there were major instructional constraints faced by learners suffering from muscular dystrophy that included; slowness in completing learning tasks, mobility problems, problems in manipulating teaching learning materials, inability to hold a pen, lack of specialized facilities among others.

Instructional Constraints Faced by Learners with Muscular Dystrophy: A Case of Joytown Special Primary School, Thika, Kenya

The term muscular dystrophy is defined as a group of genetically determined disorders, which have in common a progressive degenerative process in skeletal muscle and no structural abnormality in the central nervous system Dubowitz (1989). These dystrophies have been subdivided into various fairly distinct syndromes, on the basis of the distribution and severity of muscle weakness and pattern of inheritance.

Duchenne Muscular Dystrophy (DMD) is one of the nine types of muscular dystrophy. The researcher focused on DMD because it is the most common, severe and affects school going children. It affects boys almost exclusively because the mutated gene is on the X chromosome and because males have only one (Tortora, 2002).

The study of progressive degenerative of muscle began in the mid-19th century especially in France and Germany whereby in 1830 Charles Bell gave the first description of a patient with muscular dystrophy, McComas (1977) while Meryon (1852), gave the first clear account of progressive muscular paralysis in young boys and demonstrated that it was due to granular degeneration of muscles without changes in the anterior horns of the spinal cord or in the motor roots, (Walton, 1988). In the late 1985, researchers reported that it was possible to identify carriers of the Duchenne gene with 98% accuracy. Similarly, significant progress was also being made in an effort to identify the exact location of the gene (Kolata, 1985; Amato, 1986). Xp²¹ was identified as the exact location of the Duchenne gene, (Dubowitz, 1989). Dystrophin gene was discovered in 1987 and by 1990, first attempts were made to treat Duchenne muscular dystrophy patients with gene therapy (Tortora, 2002).

Globally, the disease has no known cure; therefore, most effort in research as well as in practical medicine is concentrated upon its prevention. Associations have been formed in developed countries like America, Britain, Ireland and Australia among others to combat neuromuscular disorders. For example, the Muscular Dystrophy Association which was formed in 1950 in the United States of America by parents whose children were victims of muscular dystrophy. The association established 85 outpatient clinics that provide diagnostic and follow-up services for afflicted persons (Weiner, 1973). Doctors and teachers are specially trained to handle learners with muscular dystrophy. Doctors have specialized diagnostic equipment (Bauer, 1970). Teachers are trained on the kinds of adaptations required for learners with muscular dystrophy (MD) to enhance their learning. A model of adaptations is provided to the educator to select relevant adaptations to their needs. Systematic selections are made for learners suffering from MD (Wolff, 1996). Specialized equipment used on these learners are dictated by the progressive nature of the disease, for example, some children have specially trained dogs to carry things for them like books or toys, while some are given drugs to delay muscle wastage, (Alisa, 2004).

According to Bleck (1975), specialized equipment are used like the hover hydraulic lifts which are valuable aids in bathing and toileting. Other specialized equipment include auto-vans, electric wheel chairs among others. Some learners are fitted with pacemakers when cardiac conduction defect occurs (Ferri, 2005). According to Dubowitz (1989), these learners are immobilized in calipers and swivel walkers after loss of ambulation. This enables them to continue with their learning instead of dropping out from school. Learners with muscular dystrophy may attend main stream schools, integrated schools, special schools or residential schools with full assessment for appropriate placement (Stopford, 1987).

According to the Parent Project on Muscular Dystrophy Annual Conference (2006) report, South Africa has researched on the disease and has established an association known as the Muscular Foundation of South Africa. It is a non-profit organization that depends on goodwill of donors. Donations assist with research, education, support groups and administration. The overall incidence is one in 1200.

Evidently, in Kenya, no empirical research studies have been conducted on the disease despite having learners with muscular dystrophy in some of the special schools for individuals with physical disabilities. This was confirmed by a consultant neurologist/ neurophysiologist Paul Kioy who is the current chairman, medical physiology department at Chiromo Campus

University of Nairobi (personal communication, 2007). Scarcity of information on muscular dystrophy in the Kenyan context is regrettable because these learners diverse needs may not be taken into consideration thereby denying them equal opportunities in their education as clearly stipulated in the Universal Declaration of Human Rights (1948), Salamanca World Conference on Special Needs (1994) among other international conventions.

Ominde Report (1964) advocated for teacher training to include a component of special education to enable the teachers to meet the needs of learners with special needs. Kenya is cognizant of the need to provide training on special needs. This is evidenced by several institutions that have been set up that offers special education training. These include; Kenya Institute of Special Education (KISE), Kenyatta University, among others. The question is whether and to what extent the training given in these institutions is customized to the level or to the specific type of physical disability of learners.

Joy Town Special Primary School was established by the Salvation Army in 1962. It was established because the post-polio and cerebral palsy children were finding it difficult to gain admission to regular schools due to society's negative attitudes, (Ndurumo, 1993). This special school admits all categories of learners with physical disabilities. With time muscles of learners with muscular dystrophy progressively waste and their diverse needs may not be taken into consideration with the various groupings. There is no special school for learners with muscular dystrophy. In America, a school for all categories of learners with muscular dystrophy has been established at California. They have all the adaptations and equipment for these learners as dictated by the progressive nature of the disease, (Bleck & Nagel, 1982). According to the head teacher of Joy Town Special Primary School, the current number of learners suffering from muscular dystrophy is twenty (20) and many of them die at an early age due to respiratory and cardiac problems. The background information available points to the deficient efforts and information to mainstream the needs of learners with MD in special schools in Kenya. In this context, the quality of instruction or the instructional environment is a factor of interest. The study sought to find out the instructional constraints faced by these learners at Joy Town Special Primary School.

The proposed study was based on the Human Capital Theory that has its foundations on the 18th Century works of Adam Smith that was later on advanced greatly by American economists like Theodore W. Shultz, Alfred Marshall and Edward F. Denison in the 20th Century. Education is therefore the most essential mechanism for Human Capital Theory. It holds that investments are made on people in the form of education and training because such investments improve the individual and ultimately the society. People enhance their capabilities as producers and consumers by investing in themselves and that schooling is the largest investment in Human Capital. Noor (1981) proposes that investment in school age children benefit society over a long period.

The relevance of this theory's underpinning to the proposed study is that by providing special education among children with disability, the government has been striving to ensure that all school age children receive education which is a basic human right according to the Universal Declaration of Human Rights (1948). This is a form of investment on human capital in that those who are educated would possess better skills and hence lead better and useful lives. It also

implies that failing to give adequate attention to the quality of education, by not availing the necessary equipment and human resources, many children with disability in special schools may fail to obtain meaningful schooling. This means that these children will have poor human capital development. They will, therefore, reap minimum benefits of education in terms of cognitive development and independence.

Purpose and Objective of the Study

The study sought to investigate the instructional constraints facing learners with Duchenne muscular dystrophy at Salvation Army (SA) Joytown Special Primary School. The specific objectives of the study were to find out:

- Academic difficulties faced by learners suffering from Duchenne Muscular Dystrophy at Salvation Army Joy Town Special Primary School.
- Academic difficulties faced by teachers at Salvation Army Joytown Special Primary School as they offer instructions to learners with Duchenne muscular dystrophy
- The available resources and support services for learners suffering from Duchenne muscular dystrophy and establish their effectiveness.
- Strategies used at Salvation Army Joy Town Special Primary School to alleviate the academic difficulties faced by learners suffering from Duchenne muscular dystrophy.
- Suggestions that can be made to minimize the academics difficulties facing learners with Duchenne muscular dystrophy.

Research Questions

1. What are the academics difficulties faced by learners suffering from Duchenne Muscular dystrophy at Salvation Army Town Special Primary School?
2. What are the academic difficulties faced by teachers at Salvation Army Joy Town Primary School as they offer instructions to learners with Duchenne muscular dystrophy?
3. What are the available resources and support services for learners suffering from Duchenne muscular dystrophy and their effectiveness?
4. What are the strategies used at Salvation Army Joy Town Special Primary School to alleviate the academic difficulties faced by learners suffering from Duchenne muscular dystrophy?
5. What suggestions can be made to minimize the academics difficulties facing learners with Duchenne muscular dystrophy?

Method

The study adopted a descriptive design and grounded theory was used as the qualitative research method to analyze social processes and human interactions. Grounded theory is guided by theoretical sampling an active process in which discoveries made during data gathering, observation and literature review direct the researcher to her next area of inquiry or potential data source, (Glaser, 1967).

Target Population

The target population was 43 comprising of twenty (20) learners suffering from muscular dystrophy, 20 teachers, one (1) head teacher and two (2) teacher aides. The study population was twenty three (23) comprising of ten (10) learners, ten (10) teachers, two (2) teacher aides and one (1) head-teacher.

Table 1
Study Sample Frame for the Target Population

	Total number of Learners in joy Town special school			Learners with DMD	Target population	Sample size
CLASSES	MALE	FEMALE	TOTAL	MALE		
STD 1	19	14	33	3	20 teachers 1 head-teacher 20 learners 2 teachers' aides	10 teachers
STD 2	18	14	32	4		1 head-teacher
STD 3	18	13	31	1		10 learners
STD 4	20	13	33	5		2 teacher aides
STD 5	19	14	33	2		
STD 6	19	13	32	1		
STD 7	19	13	32	3		
STD 8	19	13	32	1		
	151	107	258	20	43	23
						53.4

Sampling

Salvation Army Joy Town Special Primary School for learners with physical handicap was purposively selected for this study because it was among the first special schools established by the Salvation Army in 1962 and hence had a long tradition in dealing with various categories of learners with physical disabilities. The school also had a national outlook because it admits learners from different parts of the country and had the subjects required for the study. The study used purposive sampling to select teachers, teacher aides, head teacher and learners. Ten teachers were purposively selected on the basis of previous experience with learners suffering from Duchenne muscular dystrophy (DMD). Teachers with more experiences were picked, four (4) from lower primary and six (6) from upper primary. The two (2) teacher aides were picked because they serve learners with DMD in the classes. The head teacher was purposively selected because he is the head of the institution and in charge of school administration and was expected to provide information regarding the instructional constraints facing learners with DMD. He was had a degree and had been working in the school for six (6) years. Seven (7) teachers had a Diploma in Special Education from Kenya Institute of Special Education (KISE) and had been working in the school for more than five years. Three (3) teachers had degree in Special Education from Kenyatta University and had also been teaching in the school for more than ten years. The teacher aides had a long experience in that school because they had served as house mothers for 15 years then they were promoted to be teacher aides in the classrooms. The ten learners picked for this study were all in a wheelchair. Four learners were picked from standard

four, 2 in standard 5, 1 in standard 6 and 2 in standard 7 and 1 in standard 8. All the samples picked for this study are indicated in Table 1 above.

Sample Size

Sample size was 23 comprising of 10 learners, 10 teachers, 1 head teacher and 2 teacher aides.

Research Instruments

For this study, researchers used self-made research instruments which included; interview guides and an observation guide. According to Orodho (2005) an interview guide with a set of questions makes it possible to obtain the data required to meet the specific objectives of the study. In this study, semi structured interviews were used to collect data from respondents. Gall, Bong and Gall (1996) assert that semi structured interviews involve asking a series of questions and then probing more deeply using open form questions to obtain additional information that is quite vital in a study. Mugenda and Mugenda (1999) states that the interview instruments yield high response and personal and sensitive information can be extracted. In this study, interviews were used on head teacher, teachers, learners and teacher aides. An observation guide is a tool that provides data through direct observation. According to Peils (1995), an observation guide helps in gathering data concerning the status of the school facilities, equipment and examining the general situation of the environment. The researchers used observation guide to collect data about Joytown Special primary school focusing on curriculum, classrooms, adaptive aids, teaching strategies, ramps, pathways, step lifts, hand rails, ground surfaces and time given to complete learning tasks.

Pilot Study

A pilot study was conducted at Dagorretti special primary school for learners with physical handicaps in Nairobi. Ten learners suffering from DMD. Others who participated because they have some contact with learners suffering from DMD included: 1 head teacher, 10 teachers, and 1 teacher aide. These subjects did not participate in the main study. After piloting the instruments were evaluated to eliminate ambiguity, misunderstandings and inadequate items. Piloting also enabled the researchers to detect any flaws in the administration of the research instruments.

Results

Academic difficulties faced by learners suffering from Duchenne muscular dystrophy (DMD) at SA Joytown special primary school for learners with physical handicap.

The most reported academic difficulties faced by learners suffering from Duchenne Muscular Dystrophy (DMD) was constant illness (21.9), (18.8%) of the learners responses showed that time given for them to complete learning tasks was not enough, (15.6% of the learners were poor in reading, writing, had poor memory, poor spoken language and were poor in mathematics, (15.6%) of learners were slow in compelling learning tasks, (15.6%) reported as being not able to manipulate reading and writing materials while (12.5%) of learners responses cited fatigue.

Academic difficulties faced by teachers at SA Joytown special primary school as they offer instructions to learners with DMD.

Reported response on academic difficulties faced by teachers as they offered instructions to learners with DMD was absenteeism by learners (25%) due to frequent ill health, (20.8%) were reported to be slow in completing learning tasks, to manipulate reading materials (20.8%), some learners (20.8%) were reported to have poor memory, poor spoken language, reading, spelling and mathematics while teachers reported that (12.5%) of learners were unhappy and uninterested in class work.

Available resources and human support services given at SA Joytown special primary school for learners with DMD and their effectiveness.

The largest proportion of learners with DMD respondents 25.9% cited the availability of wheelchairs, 22.2% and 18.5% respectively reported the availability of adopted pencils and adapted desks, 14.8% of learners with DMD reported the availability of adapted toilet seats, while 11.1% and 7.4% of learners respectively reported availability of rails to assist in walking and pathways.

Teacher responses on the availability of specialized equipment.

The largest proportion of teachers respondents 28% cited the availability of wheelchairs, pathways and rails to assist in walking were reported to be available by 20% and 16% of the teachers' responses respectively, availability of adapted toilet seats were reported by 12% of the teachers' while a similar proportion of 12% reported availability of adapted pencils and adapted desks at 12%.

Learner responses on the availability of human support and their effectiveness.

Most learners 35% reported the most support services they get from their teachers was to ask other learners to copy notes for them, 25% of learners reported that teachers asked them to go to the dorm to rest, while 25% reported that teachers played the role of empathizing and encouraging the learners to accept their situation, and 15% of learners reported that they were provided with adapted pencils when they were in the lower primary when muscles were still strong.

Teacher responses on the availability of human resource support services and their effectiveness.

The majority of responses 25% cited the availability of trained teachers, 15% reported availability of one physiotherapist and one occupational therapist in the school, 15% of teachers reported availability of one nurse in the school, 15% of teachers reported availability of grounds men, while 15% of teachers reported the availability of teacher aides.

Strategies used at SA Joytown special primary to alleviate academic difficulties faced by learners with DMD.

31.8% of teachers reported the use of other learners in the class to assist learners in with DMD in writing notes for them, 27.3% of teachers reported as playing the role of empathizing and encouraging the learners with DMD to accept their condition, 18.2% of teachers reported the use of regular methods in their teaching, 13.6% of teachers reported on availability of adapted

pencils, adapted desks and wheelchairs which were used to minimize academic difficulties, 9.1% of teachers revealed that they were asking learners with DMD to go for a bed rest when they had problems.

Suggestions that can be used to minimize the academic difficulties among learners with DMD.

From the findings of this study, majority of learners with DMD 22% asked that they be allowed to undertake exams orally, 18.5% of learners asked that their teachers be patient with them as they required a flexible curriculum and more time, 18.5% suggested provision of comfortable wheelchairs, 18.5% suggested that they be provided with adapted pens, and 11.1% suggested that a male be employed to bathe them.

Teachers' suggestions on minimizing the academic difficulties of learners with DMD.

12.5% of teachers' proposed that learners with DMD be provided with and adaptive curriculum and adaptive aids, 12.55 of teachers suggested that remedial time to be created for these learners, 12.5% of teachers suggested that counseling be provided to learners with DMD. 12.5% of the teachers responses indicated that a special diet be provided to these learners, 12.5% of teachers suggested that proper rehabilitation and medical attention be provided, 6.25 of teachers suggested that mobility aids be provided to learners with DMD and 6.25% of the teachers suggested that aid workers be provided for these learners.

Discussion

General Recommendations

The following recommendations have been made:

- To Kenya Institute of Education (KIE)-More adaptations should be made on the curriculum to suit the needs of learners with MD.
- Ministry of Education (MOE)-The government should deploy more teachers to special schools so as to enhance the teacher pupil ratio.
- The learners with MD should be given close supervision and encouragement in-order to stay on the program for as long as they can.
- The government should have a policy to meet the cost of educating learners with severe disability.
- The government should provide specialized facilities for learners suffering from MD to enhance their mobility and independence.
- The training offered in the specialized institutions should be customized to the level of the specific physical disabilities.
- Teachers should make use of specialized teaching strategies like the IEP to cater for the diverse needs of learners suffering from MD.
- The government should make provisions for prenatal diagnosis for early intervention for learners with MD.
- Creation of awareness on MD should be given to all the stakeholders in education so that the diverse needs of these learners may be taken into consideration.
- Formation of an association in Kenya can also play a major role in educating the society on the neuromuscular disorders.
- Teachers should be given refresher courses on how to handle learners with MD.
- The medical personnel handling learners with MD should be specially trained.

- The government should provide a speech therapist to assist learners with communication difficulties.

Conclusion

Results have shown that MD learners in JoyTown School in Thika faced many challenges. The handlers of these learners including teachers did not seem to have adequate information about the ailment and how to manage it. The school was also faced with constraints in specialized resources and equipment. In some instances the equipment were improvised but this did not help much in alleviating the conditions of the learners. The study observed that there was much that needed to be done to make the lives of these learners bearable in order to achieve success in the curriculum instructions given.

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The Perspectives of K-12 Stakeholders Involved in Early Implementation of Response to Intervention (RTI)

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Abstract

Response to intervention (RTI) is an approach that has been implemented in more than 90% of the states in the U.S. The purpose of the study is to advance understanding of what efforts need to be made in order to increase the likelihood that special education professionals will accept RTI. Data used in this study include individual interviews with two principals, three special education teachers (two of whom were school district RTI coaches), one social worker, and one Title I teacher across four K-12 schools. Data were collected and analyzed around four sets of what qualitative methodologists call “grand tour” questions (Bernard, 2001): (1) respondents’ perceptions about data-based decision making, (2) use of evidence-based interventions at each tier, (3) strengths and challenges to achieving effective coordination, and (4) ongoing supports and professional development needs. The participants’ perspectives offer critical information to advance both research and practices related to RTI.

The Perspectives of K-12 Stakeholders Involved in Early Implementation of Response to Intervention (RTI)

Response to intervention (RTI) is an approach which involves “a combination of high quality, culturally and linguistically responsive instruction; assessment; and evidence-based intervention” to offer better education to all students (National Center on Response to Intervention, NCRTI, 2013). The development of RTI is aligned with federal legislation, such as the No Child Left Behind Act (NCLB, 2002) and the Individuals with Disabilities Education Act (IDEA, 2004). Both laws highlight the importance of highly-qualified teachers and scientifically-based research to improve students’ academic achievement on standardized tests and to meet the different needs of individuals. IDEA 2004 makes it clear that schools are no longer required to use the IQ-discrepancy model to identify whether a student has a learning disability. The law also establishes that “in determining whether a child has a specific learning disability, a local education agency may use a process that determines if a child responds to scientific, research-based intervention as a part of the evaluation procedures used to determine if the child is a child with a disability” (IDEA 2004, P.L. 108–446, Section 614(b) (6)). RTI is permitted under language encompassed in NCLB and IDEA. The goals of RTI are not only to use scientifically-based research to improve students’ academic achievement on standardized tests, but also to prevent early deficits in foundation skills from becoming intransigent or resistant to intervention and performance measures. This study was designed to explore what efforts need to be made in order to increase the likelihood that practitioners will accept RTI implementation.

Overview of RTI

The term “response to intervention (RTI)” was conceptualized by scholars who were concerned about the increasing number of students diagnosed as having learning disabilities and the use of the IQ-achievement discrepancy model as evidence for learning disabilities (Fuchs, Mock, Morgan, & Young, 2003; Reschly & Ysseldyke, 2002; Stage, Abbott, Jenkins, & Berninger, 2003; Walser, 2007). The RTI model involves a series of assessment screenings, progress monitoring, and multi-level prevention processes to provide increasing levels of intense intervention to students who experience academic and/or behavioral difficulties (NCRTI, 2013). With early identification and early intervention, one purpose of RTI is to prevent students from falling behind in the curriculum before they are identified as being eligible for receiving additional services in education.

Although RTI can be implemented in various ways, it is typically represented by a three-tiered triangular model (Fuchs & Fuchs, 2006). Leading scholars in RTI (e.g., Fuchs & Fuchs, 2006; Mellard, Byrd, Johnson, Tollefson, & Boesche, 2004; Vaughn & Fuchs, 2003) have described how each tier works. The primary goal of RTI is to ensure that all students receive high-quality instruction with differentiation and evidence-based practices at Tier 1. It is expected that tier 1 instruction can meet 80 to 85 percent of students’ learning needs in general education classes. Students who do not respond to Tier 1 high-quality instruction adequately will be provided with more intensive and explicit instruction within small groups at Tier 2 (Fuchs & Fuchs, 2006). Tier 2 can be conducted within or outside of the general education classroom by trained general education teachers or intervention specialists, such as special education teachers, Title I teachers, or reading specialists. Those who still do not respond to Tier 2 intensive and explicit instruction adequately will be provided with the most intensive and individualized interventions at Tier 3 (Fuchs & Fuchs, 2006).

The logistics of tiered intervention is that the more intensive interventions are supplements to the initial interventions, and thus they do not replace the initial interventions. To accomplish this goal, school administrators play an important role in scheduling so that students will not miss their entire Tier 1 instruction while receiving Tier 2 or 3 support, and struggling students can receive timely interventions that match their particular needs.

The RTI approach has several strengths. First, regardless of students’ eligibility for special education and related services, students can receive instructional support once universal screening tests indicate that they may be struggling in particular areas (Coleman, Buysse, & Neitzel, 2006). Second, RTI allows teachers “to use their professional judgment within the context of a federal top-down reform effort” (Greenfield, Rinaldi, Proctor, & Cardarelli, 2010, p. 47). Third, traditional IQ-achievement discrepancy model does not consider students’ culturally and linguistically diverse backgrounds, and thus RTI can help reduce inappropriate referrals to special education when students’ socio-cultural backgrounds are considered in the RTI framework (Klingner, & Edwards, 2006).

Although RTI has its strengths, debates about whether RTI can be used as a means to identify students with special needs and how RTI can be combined in the current school system are widely discussed in the education research literature (Fuchs, Fuchs, & Compton, 2012; Kavale,

2005). For example, Kavale (2005) argues that many fundamental issues related to RTI remain unresolved, and thus more rigorous, structured psychometric criteria may still remain important for identifying students with learning disabilities and for providing them with empirically validated interventions. Another criticism of RTI has resulted from poor fidelity of intervention implementation. Scholars point out that some school staff begin to spend more time analyzing data to identify the areas of students' weaknesses, instead of considering how students' strengths can mediate instruction, which would mean RTI focuses on deficit-based assumptions (Ferri, 2012).

Such criticism raises a concern that future teachers should still be well prepared to teach fundamental understanding of subject areas (e.g., reading and mathematics) rather than just a to learn about series of procedures involving RTI. To understand how teachers and school administrators are currently using RTI, what their experiences and challenges are in the process of implementing RTI, as well as what novices might need to know to engage in RTI more effectively, it is urgent and necessary to collect more data from the field. Particularly, investigating the above-mentioned issues from the stakeholders in different schools but within the same school district may reveal how complex and challenging RTI is to be implemented.

Methods

Data Collection

A suburban school district was purposefully selected for this study for two reasons. First, this school district partners in one of the largest public university teacher preparation programs in the United States. The number of the students enrolled in this university's College of Education was above 4,000 in the fall semester of 2013. Second, this school district also partners in several local colleges and universities. Because this school district involves pre-service teachers and prospective school administrators in one of the largest teacher preparation programs and in several universities and colleges, selecting participants who have sufficient knowledge and experience to address the interview questions plays an important role in informing teacher preparation programs about RTI.

After receiving an approval letter from the Institutional Review Board (IRB) and a support letter from the school district office, the researcher announced this research project in the school district's RTI leadership meetings. Each of the participants was interviewed in person for approximately 30 to 45 minutes. The interviews were conducted at each participant's school, with no one in the room except the researcher and the interviewee.

To enhance the quality of this study, indicators, such as participant selection procedures, the quality of the interview questions, and the participants' confidentiality in interview studies were taken into consideration (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005).

Setting

In this school district, there are eight schools (four K-4 schools, two Grade 5-6 schools, one middle school, and one high school). The total student enrollment was 3,469 students in 2011. The majority of the students were white students. In the district's Adequate Yearly Progress (AYP) report for 2010-2011, all of the schools in this district made AYP and the high school graduation rate was 81.56%. The school district began its RTI leadership training in September,

2009, with a leadership team that involved directors of educational services, university professors, district RTI coaches, principals, counselors, subject area teachers, psychologists, special education teachers, and Title I teachers. The leadership team met once a month. The school district website indicates that online AIMsweb data collection training sessions have been offered to K-8 school administrators and teachers since 2011. The district did not begin the implementation of RTI across all K-12 schools until 2012.

Participants

Seven people across four schools volunteered and consented to participate in this study. The participants include two principals, three special education teachers (two of whom were school district RTI coaches), one school social worker, and one Title I teacher. These seven individuals represent about 44% of the population of potential volunteers. The seven participants were from four schools (K-12) in this focus school district. Two of them were from an elementary school (K-Grade 4), one was from an intermediate school (Grades 5-6), three were from a middle school (Grades 7-8), and one was from a high school (Grades 9-12). The participants had received RTI training during professional development for at least one year in their school district. Six of the participants had more than 25 years of teaching experience. The participants' demographic information is summarized in Appendix A.

Instrument

The interview protocol (see Appendix B) involves seventeen questions. These questions were developed based on the key components of RTI discussed in the related literature and covered questions about the major components of RTI and teacher education (Fuchs & Fuchs, 2006; Vaughn & Fuchs, 2003). To enhance the validity of the instrument, these questions were then reviewed by an RTI coordinator in this school district, who is knowledgeable about RTI and the state policy about RTI. She agreed on the appropriateness of these questions. Minimal adjustments were made to make the interview questions clearer. Additional data sources for triangulation were based on the documents posted on this school district RTI website, including one document named *RTI 101 for Parents*, two RTI district leadership team minutes, one screening assessment calendar, and four RTI district newsletters.

Data Analysis

The data analysis of this study is organized around four sets of what qualitative methodologists call "grand tour" questions (Bernard, 2001): (1) respondents' perceptions about data-based decision making, (2) use of evidence-based interventions at each tier, (3) strengths and challenges to achieving effective coordination, and (4) ongoing supports and professional development needs. Because different participants might use different words or terms to describe the same concept, the Response to Intervention Key Terms and Acronyms published by IDEA Partnership (2007) was used for developing themes of coding that were consistent and not overlapping. For example, based on the definition of "tertiary intervention" in this document, "Tier 3 intervention" and "the most intensive intervention" should all refer to the same concept. A draft codebook was developed to begin the open coding process.

An independent rater who had completed training in qualitative research method courses was hired for inter-rater reliability. A protocol was developed for training the rater. With limited time and budget, the rater randomly selected 60% of the data for this examination. The rater was

trained by using the codebook on a pre-identified set of responses. When the inter-rater reliability exceeded 80%, the rater continued to examine the rest of the data. When the inter-rater reliability fell below 80%, a problem-solving process (e.g., discussions and literature reviews), was undertaken to come to agreement, minimal adjustments to the codebook were made, and a second round of inter-rater reliability assessment on the question was undertaken. To reach consensus across the coders, both coders discussed differences and revised codes until agreement is reached. In the end, agreement (consensus) was 100%.

Although the qualitative paradigm is fundamentally an analysis of subjective experiences about a phenomenon (Seidman, 2006), to ensure that the participants provided fair information, the evidence collected in the school district database (e.g., *RTI 101 for Parents*, meeting minutes, and RTI newsletters) was used for helping the researcher examine the reliability of the data. For example, when participants addressed that their school district had made efforts to involve parents in RTI, the researcher examined the school district archives to see if there were any documents that supported the participants' responses. Similarly, when participants mentioned in the interviews about RTI training that the school district had provided, the researcher read the existing documents and examined how they supported (or did not support) the participants' responses. If the documents did not support the participants' responses, more comparisons among different participants' responses were examined. Additionally, to avoid overlooking individual contexts and overgeneralizing data due to coding, direct quotes from the participants are included.

Results

This section reports the seven RTI stakeholders' perceptions toward the implementation of RTI. Data is organized based on the four grand tour questions: (1) respondents' perceptions about data-based decision making, (2) use of evidence-based interventions at each tier, (3) strengths and challenges to achieving effective coordination, and (4) ongoing supports and professional development needs. Aligning with the research question, this study will address: what efforts need to be made in order to increase the likelihood that practitioners will accept RTI implementation. Table 1 shows the four "grand tour" questions and the categorization of the participants' response.

Table 1

The "Ground Tour" Questions and Response Categorizations

"Ground Tour" Questions	Responses Categorizations
1. Respondents' perceptions about data-based decision making	• Specific and targeted interventions • Flexibility on receiving intervention • Scheduling • Validity and reliability of assessment • Cutoff scores • Student motivation
2. Use of evidence-based interventions at each tier	• The function of tiered interventions • Reduction in referral numbers
3. Strengths and challenges to achieving effective coordination	• Reflective practices • Teachers' workload • General education teachers' involvement

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| 4. Ongoing supports and professional development needs | <ul style="list-style-type: none">• Administration support• Collaborative community and teacher attitude• Practitioners' suggestions for university-level teacher education programs |
|--|--|
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1. Respondents' perceptions about data-based decision making.

Specific and targeted interventions. Participants A (special education teacher and also RTI coach), B (social worker), C (special education teacher), E (special education teacher, RTI coach), and F (Title I teacher) expressed that using data can help teachers develop more specific and targeted interventions. Participant C stated that teachers can “look at the data and numbers to know that kids do need help instead of just knowing that kids are struggling but not having something concrete that you can point to.” Similarly, Participant E described, “I see that the main strength is being able to reach more kids... all kids. Having been data-driven, it is no more guess work. If kids need our help, we can see that in our data.” The use of data is also seen as one possible way to demonstrate the accountability of student performance and school progress. Participant F believed, “Through screener tests, we can see what we did is effective; more kids are moving back to that green area.” The responses from the participants indicated that the advantages of using data include informing instruction, providing more concrete information about students' needs, and encouraging teachers to adjust teaching based on students' performance.

Flexibility on receiving intervention. The conclusion drawn here was that using data to inform instructional decisions makes educational services more flexible to struggling students. For example, Participant A (Special education teacher and also RTI school district coach) also reported, “Even in the resource room, students are not in with me for a whole day. They are in with me for a portion of the day based on their needs. It is very flexible, and students will be coming and going.” The participants' responses are evidence that RTI can provide interventions for struggling students without labeling them as disabled or placing them in a fixed group. Meanwhile, these students can still have access to the core curriculum.

Scheduling. Although utilizing data for interventions is commendable, there are still challenges in data-based decision making. Most participants reported that scheduling data collection requires great effort. Participant A (Special education teacher and also RTI school district coach) asked, “When does it occur? Who does it? How often do we need it to be done?” In looking over the scheduling process, Participant F (Title I teacher) explained:

The challenge is to incorporate the system that already exists. Scheduling is always hard. Who is going to do the assessments? How can we collect the data on the kids so we can have a really good understanding of what they need? How can we restructure it so we can provide all the different things that they will need?

In addition to scheduling for universal screening tests, one participant stated that constantly monitoring progress is strenuous work for teachers who have many students in their classes. Participant B (social worker) said, “Teachers have such full days. It is hard for a teacher to monitor students' progress when she or he has twenty to twenty-two kids in each class.” Furthermore, Participant C (special education teacher) inquired, “When do you take the Tier 2

kids out to gain more support? Who does the intervention?" The participants seemed concerned about the availability of time and personnel for implementing interventions due to underdeveloped scheduling.

The curriculum structures in the school system seem to make interventions difficult to implement as well. For instance, Participant D (principal) noted, "If we could get all kids together when we have same subjects arranged at the same time, it would give teachers more time to work with kids who need help." Noticing this similar challenge, one school started to work on the adjustment of their existing curriculum structure. Participant C (special education teacher) stated, "Next semester, we are hoping to have literacy blocks by grade level so that three teachers in three different classes in the same grade level will share kids, and move the kids around based on their needs." Due to the fact that it is difficult to hire extra staff with a limited budget, some participants suggested that school administrators need to adjust their curriculum structures to make the best use of school personnel resources for conducting early interventions.

Validity and reliability of assessment. Some teachers were not sure whether the data collected in their schools was reliable. For instance, Participant E (Special education teacher and also RTI school district coach) reported:

We question about the screeners. Some teachers think that the screeners are accurate, but some think that they do not give you good information. The other obstacle is whether our teachers are getting the data with fidelity...some of them are teaching toward the tests and that is going to be a challenge.

Participant E's observation implies that accountability indeed places pressure on many teachers. To reach the goal of accountability, teachers may adopt an educational practice called "teaching to the test," in which the curriculum is mainly focused on preparing students for a standardized test, not for preventing early deficits in foundation skills. Furthermore, the fidelity of data collection is another factor that influences whether or not teachers will accept RTI. Participant A noted, "As we know, data can be skewed. You can lie with statistics. You need to look at the data for your building in a real way." According to Participant A's responses, teachers need to know how data is collected, how to read the data, and how to use it to inform their instruction in order to accept RTI.

Cutoff scores. Participant B found that the decision of establishing a cutoff score for tiered interventions is an arguable issue. She stated, "The challenge is that there is a cutting score for identifying kids at Tier 2...I would like to see more kids being able to get that help than just those who are below 25%." Participant B's response raises some critical issues in data-based decision making, such as who decides the cutoff score for tiered interventions and how these scores are decided.

Student motivation. While teachers believe it is meaningful to spend extra time on helping struggling students, students may not look at this extra help positively. Participant G (principal) reported,

We have developed literacy workshops for our students with reading challenges. The drawback is that they will lose their one or two elective classes. Sometimes doing this is difficult. Students sometimes do not like taking these literacy classes or they feel uncomfortable to be there. We need to provide appropriate incentives.

Participant G's perspectives highlight that motivating students to participate in interventions is one of the challenges that many teachers face. Students may see the extra help as a burden, and thus they are not willing to miss their elective classes in order to participate in intervention programs.

2. Use of evidence-based interventions at each tier.

The function of tiered interventions. 100% of the participants perceived the strengths of RTI as providing evidence-based interventions to help more students reach the core curriculum in general education. They all also agreed on the instructional focus of each tiered intervention in their schools. For example, Tier 1 reading interventions should cover the five key components of reading outlined by the National Reading Panel: phonemic awareness, phonics, fluency, vocabulary, and comprehension in a whole class. Tier 2 reading interventions focus on specific reading skills with more intensive intervention delivered in small groups. Tier 3 reading interventions provide the most intensive instruction, which also target students' specific needs and are delivered in small groups (including one-on-one instruction). Although each tier of evidence-based intervention has its intervention focuses and activities, all three special educators who participated in this study unanimously agreed that it is more likely to help struggling students catch up with peers in the general education (where tier 1 intervention is involved) when all tiered interventions are connected to each other and the curriculum is aligned.

Reduction in referral numbers. Participants A (special education teacher, RTI coach), C (special education teacher), D (principal), E (special education teacher, RTI coach), and G (principal) believed that if the primary level intervention beginning with high-quality instruction and evidence-based interventions is done effectively, the RTI approach can prevent students from falling behind and ultimately can reduce the number of referrals to the secondary level intervention or the tertiary level intervention. Participant A said:

Tier 1 is general education and that should be preventative; all students should be receiving a very solid piece of core education...if we are doing an excellent job in the core curriculum, we should have fewer students in the yellow or in the red.

Participant A's responses indicated that high-quality preventative instruction in general classrooms, which has a potential to benefit all students, is a critical feature of primary level interventions. Participant A also reported that under the framework of RTI, the traditional referral of struggling students to resource rooms without providing any pre-referral interventions is no longer recommended. When asked if tiered interventions would delay providing special education or related services to struggling students, none of the participants agreed with this statement. Participant C reported that with early interventions, RTI can push more students back to the "green area" (or the primary level of RTI). Participant C stated, "For some kids who are just a little behind...if we can get Tier 2 that would be really great to catch these kids and push

them back to Tier 1.” Participant C’s response indicated that Tier 2 interventions play a role in bridging general and special education services and also has a preventative function.

3. Strengths and challenges to achieving effective coordination.

Reflective practices. Participant D pointed out, “The cooperation is going to give you an opportunity to share skills, to improve your instruction abilities, including presenting information to the classroom.” In other words, collaboration encourages teachers to self-reflect, which may help them become more effective teachers. Participant G also reported, “Teachers need to reflect on their instruction and think about why some interventions are successful in other classes but may not be in their classes.”

Teachers’ workload. Participant B (social worker) stated, “Our teachers in this building are really taking a lot more responsibilities, but having someone to support them is so important. I would like to see more intervention specialists to help with interventions.” Participant D (principal) also reported a similar challenge. She stated, “The challenges include scheduling and funding. We need to have bodies to teach these kids. These extra interventions need to be done by other support because general education teachers cannot do two things at once.”

General education teachers’ involvement. Although RTI needs proactive collaboration between general and special education teachers, the school district RTI documents showed that most school personnel who were involved in this newly established RTI leadership team were school administrators, special education teachers, Title I teachers, social workers, and reading specialists. The lack of general education teachers’ engagement might reduce fidelity when implementing intervention within an RTI framework. Participants A (special education teacher, RTI coach), C (special education teacher), and E (special education teacher, RTI coach) spoke with the same accord, agreeing that special education teachers should not be the only people who can implement interventions in schools. The participants of this study believed that general education teachers need to be trained in order to increase the fidelity of intervention implementation. Participant C reported, “Currently, Tier 2 is mostly taught by general education teachers, but they have not received any training in terms of interventions.” Due to the lack of training provided to general education teachers, Participant A observed that many general education teachers worked with struggling students in small groups with exactly the same materials and the same activities as in general classrooms, instead of using more direct or explicit methods of instruction. The issue of intervention quality raises an urgent need to increase the number of intervention specialists or to provide professional development for general education teachers in schools where RTI is implemented.

In addition, participant E argued that when teachers regard interventions as a separate responsibility, the chain of tier support becomes difficult to connect. She stated:

Science teachers do not think that they can do reading interventions; math teachers do not think that they can do reading interventions; social study teachers do not think that they can do math interventions. So, everyone is kind of pointing their fingers at others.

Participant E's response indicated collaboration across subject areas and disciplines is the key to making RTI work. She further reported:

It is really the key that you need cooperation and coordination with everybody, with teachers, with the principal, with the interventionists, and with Title I teachers. Everybody has to be on the same page, and know exactly what the students need, what they are getting, and monitor their progress. These have to happen for RTI to be successful.

Similarly, Participant C (special education teacher) reported that "currently our general education teachers are provided with Reading Street training, but it is just a general overview of it, not specific for any interventions." She suggested that there is a need to help general education teachers learn how to implement interventions for struggling students in their classes.

4. Ongoing supports and professional development needs

Administration support. If appropriate support cannot be continuously provided, it will undermine teachers' confidence in implementing RTI. Participant E reported:

Teachers think that in education we have so many things like a pendulum swinging, and then we switch back. Teachers need to feel that they are supported; they need to feel all of their work is supported by the administration, by the district, and by the parents for them to accept it. I believe that RTI is not a pendulum swinging, but it is here to stay.

From Participant E's response, it seems that because there were educational policies that did not last long in the past, many school teachers are still wondering if they should implement RTI wholeheartedly. Furthermore, many participants suggested that having sufficient funding for buying intervention resources (e.g., reading software and technology) and having extra staff to support interventions would be helpful. Participant A (Special education teacher and also RTI school district coach) expressed that having extra personnel support is needed. However, she was aware that it is difficult for her school to hire extra staff due to budget cuts. She hopes that the school or the school district should at least provide current staff with professional development opportunities about RTI and help the staff utilize the resources already available in the school and the school district.

100% of the participants of this study agreed that having intervention training can increase teachers' fidelity of intervention implementation. However, this relies on a well-organized time schedule arranged by school administrators in order to promote school-wide RTI implementation. As Participant F said, "I think that it will be great to have professional development for the administrators about how to incorporate some of these program changes with scheduling...What does this look like? How have other schools figured it out with a flexible schedule?" In other words, professional development in RTI should be provided to school administrators who are scheduling interventions and to teachers who stand in the forefront of implementing interventions. School administrators need to know how to arrange courses efficiently in order to incorporate RTI interventions into their existing educational systems.

Collaborative community and teacher attitude. Participant D suggested that schools should develop an effective communication system, a collaborative community where teachers can learn within and across subject areas, and a well-organized manual to guide teachers through RTI implementation. Participant A also reported, “We are looking at a collaborative situation where with an excellent system of communication, where our students’ needs are being addressed based on skills, where there is adequate staffing, and most importantly scheduling is in place.” With the development of collaborative community, Participant B (social worker) hopes that teachers will develop a better understanding of RTI and change their attitudes and instructional behaviors. She stated,

Things impacting whether a teacher buys into RTI are judgmental. I think that people who have difficulties with change would have a harder time buying into RTI...if teachers are open, realizing that what they learned in school ten, fifteen, twenty years ago would not be necessary, and things do change and people do get smarter about things, they can accept it.

Practitioners’ suggestions for university-level teacher education programs. 100% of the participants recommended that fundamental knowledge of RTI, such as school-wide screening, progress monitoring, tiered interventions, and fidelity of data collection, should be explicitly and comprehensively taught to pre-service teachers. Participant E (Special education teacher and also RTI school district coach) offered suggestions to teacher educators:

They [pre-service teachers] need to know the whole concept of RTI, the data-driven piece of RTI; they need to understand how to analyze different pieces of data; they need to know the interventions out there available for students; they need to know what fidelity means; they need to know screeners; how to get different screeners, at least have knowledge about them. They need to know how to work collaboratively in a team, such as collecting information, solving problems, having an open mind to changing things, etc.

Participant E suggested that solid RTI teacher coursework should include both theoretical considerations and practical examples of RTI. Participant A (Special education teacher and also RTI school district coach) also asserted, “...this should be fundamental coursework so that all teachers understand the importance of RTI.” In other words, university teacher education programs should provide pre-service teachers in all subject areas with intervention training and a fundamental understanding of RTI, which includes directing them to useful information and resources on RTI.

In addition to coursework in RTI, Participants D (principal) and G (principal) both emphasized that high-quality instruction is especially important in RTI training, such as classroom management and engaging activities. By high-quality instruction, Participant D stated, “Teaching them to be explicit teachers; be explicit in instruction... be able to work both independently and collaboratively. For RTI, it is all about good quality of instruction. Be able to read data and to revise instruction. Have an understanding of the framework of RTI...a good relationship with students, classroom management, class instruction, content knowledge...getting students engaged are all essential.” Participant G also noted, “This is all about teachers’ instruction. They

need to know about their students, how to develop their curricula in a variety of ways that are relevant to students' lives... and then assess whether students get it or not." In short, teacher preparation programs at the university level need to make sure that they cultivate pre-service teachers' essential knowledge related to RTI before they enter the field. Such knowledge should include quality teaching, data-based decision making, teacher collaboration, and flexibility in instructional approaches that are relevant to students' cultural background.

Participant E further suggested that pre-service teachers might benefit from seeing different models of RTI. While seeing different models, they need to ask critically how the entire school gets organized to support RTI and how different resources get used.

School District Archives

Additional data sources from the school district website archives indicated that since September 2010, the school leadership team has been meeting together once a month to review their district leadership team norms and to identify school roles in terms of RTI implementation. The professional development training seemed to be helpful to enhance the school personnel's understanding of data collection, such as the AIMSweb data collection procedures (see <http://www.aimsweb.com/>). However, through the interviews, it became apparent that the lack of general education teachers' involvement in the RTI leadership teams raised concerns for special education teachers about the fidelity of intervention implementation at the primary intervention level.

The data shown on school district website indicates that Grades K-1 in this school district were the first targeted groups of students for the universal screening in 2010-2011, using the AIMSweb assessment. Additionally, this school district was making efforts to involve parents in RTI. In the document *RTI 101 for Parent*, the school district staff explained to parents what RTI is and what the RTI prevention framework looks like. They also provided concrete examples about how each prevention tier implemented in their school district could have a potential to benefit all students, such as early identification and intervention.

Discussion and Conclusion

To address the research question: what efforts need to be made in order to increase the likelihood that practitioners will accept RTI implementation, the four "grand tour" questions are discussed below.

1. Respondents' perceptions about data-based decision making.

Although none of the participants mentioned issues about using more rigorous psychometric testing as discussed in the literature (e.g., Kavale, 2005), they did express their concerns about the fidelity of intervention implementation, including the validity and reliability of assessment tools as well as general education teachers' capacity in implementing interventions. Furthermore, scheduling of data collection and the arrangement of school personnel for implementing RTI remain the major challenges of data-based decision making. These issues need to be carefully addressed in school-wide and district-wide RTI training programs in order to help practitioners understand the practicality of RTI.

Moreover, the results of the first ground questions indicate that students' motivation of participating in tiered intervention programs was not discussed by any participants in the elementary schools, but only in the high school. This might be due to the fact that teenagers are more sensitive to being sorted out for intervention programs or to losing their time for school activities. Thus, school administrators and teachers in high schools should particularly take students' emotions and self-esteem into consideration when offering interventions.

2. Use of evidence-based interventions at each tier.

The RTI process is a proactive approach that provides early identification and evidence-based interventions for all students (Fuchs & Fuchs, 2006; Mellard, Byrd, Johnson, Tollefson, & Boesche, 2004; Vaughn & Fuchs, 2003). In this study, all participants perceived the value of using evidence-based interventions to prevent students from falling behind. However, there seems to be a gap between research and practices in terms of providing evidence-based interventions based on students' performance data. While scholars are concerned that teachers may begin to look for students' weaknesses and turn the RTI approach into a "deficit-based model" (Ferri, 2012), the participants in the present study seemed to appreciate knowing students' specific needs through the data obtained on each student in order to tailor their interventions for these students. To fill the gap and to ensure that students benefit from evidence-based interventions, further investigation of the voices of students, parents, and educators who are involved in the data-based decision making process is needed.

In addition, one participant in this study described that struggling students are not in a resource room all day, but access the resource room for a portion of the day based on their needs. This seems to imply that it is likely the same students regularly receive intervention, but for varying amounts of time. Therefore, it is important that schools should annually report their referral numbers of students who receive tiered interventions and for how long these students have been placed in each tier throughout the year. This may help practitioners understand the effectiveness of RTI.

3. Strengths and challenges to achieving effective coordination.

The strengths of effective coordination are many, such as teachers' reflective practices pointed out by Participants D and G. It is worth mentioning that teachers may make instructional adjustments based on their perceptions about quality teaching and the new knowledge that they have learned through coordination. However, whether teachers' self-reflection and their practices would actually result in students' progress remains an empirical question. In order to persuade practitioners to accept RTI, future studies may include evidence about students' progress both academically and behaviorally related to the changes of teachers' perceptions and practices.

Moreover, it is important to investigate why most members in this school district RTI leadership team (and probably in other school districts as well) mainly consist of school administrators, special education teachers, and other specialist, but no general education teachers. To encourage more general education teachers to get involved in RTI, school districts should provide a report on both general and special teachers' workload under the RTI framework, which should go beyond the description of school personnel roles in RTI that has been suggested by scholars.

Furthermore, parental involvement is critical to make RTI work effectively. However, there was no data available regarding parents' perspectives toward their school district's efforts on RTI. It is also not clear whether the document for parents was written in a way that parents would be able to understand or in a way that could assuage parents' concerns about how their children would benefit from the new educational services. Therefore, to achieve effective coordination with parents, including parents' voices is needed.

4. Ongoing supports and professional development needs

The participants in different roles (i.e., school administrators vs. teachers) perceived the priority of supports related to RTI implementation differently. When most teachers in the present study (85%) stated that they need school administration supports in terms of scheduling and training, the two principals (Participants D and G) expressed that school administrators need school-district supports, such as funding for providing teacher training and purchasing intervention materials. In other words, according to this study, to make RTI work more effectively, both school-district and school supports (and maybe even state-wide supports) are needed. Another empirical question emerging here is that whether and how these supports will actually improve the implementation of RTI and students' progress in order to scale up the intervention framework of RTI.

Based on the participants' responses, the results of the present study reveal that implementing RTI is not an easy task to both school administrators and teachers. The participants' responses help educators understand why resistance against RTI may exist in educational change. With the development of RTI, the current education reform does not recommend that teachers refer students to the resource room before they have done appropriate interventions in general classrooms. Thus, the more effective that training efforts are made, the higher acceptance of RTI that practitioners may have.

Finally, learning from these practitioners offers an opportunity for teacher educators to align university-based teacher education programs with school practices. However, aligning teacher education programs with what has been shown in research to improve student learning outcomes and behavior, such as the improvement of family-school partnerships (Edwards, 2004) and teacher quality (Darling-Hammond, 2000), should not be overlooked.

Limitations of the Study and Suggestions for Future Studies

There are several limitations in the study. First, the individuals interviewed only represented a subset of stakeholders who were directly impacted in their ability to carry out their professional responsibilities related to RTI by professional preparation in RTI procedures. While these stakeholders' voices are important, the voices of general education teachers, students, and parents are equally important. Thus, the scope of participants should be enlarged to accommodate different perspectives related to RTI. Second, the qualitative interview data of the present study were limited to participants' self-reports and thus may not allow for drawing conclusions about what their actual behaviors were in schools as practitioners or the improvement of their students' learning outcomes. To deepen educators' understanding about how RTI is implemented in schools, collecting multiple data resources such as classroom observations through prolonged engagement in a site or across sites is recommended. Finally,

although investigating a group of participants across different K-12 schools in the same school district reveals how complex and challenging it is to implement RTI even within the same school district, the results may not allow for drawing conclusions about all the knowledge that the population of practitioners in each school district need to know. To encompass the full range of the use of RTI, participants from different school sites will bring more comprehensive knowledge, experiences, and challenges that novices in implementing RTI might need to know to be prepared in their training.

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Appendix A
Participant Demographics

	School	Grade	Title	Years of Teaching	Years of RTI Training
A	Elementary School	K-Grade 4	Special education teacher and also RTI school district coach	31 years	2 years
B	Elementary School	K-Grade 4	Social worker	32 years	2 years
C	Intermediate School	Grades 5-6	Special education teacher	4 years	2 years
D	Middle School	Grades 7-8	Principal	30 years	1 year
E	Middle School	Grades 7-8	Special education teacher and also RTI school district coach	25 years	2 years
F	Middle School	Grades 7-8	Title I teacher	29 years	2 years
G	High School	Grades 9-12	Associate principal	30 years	1 years

Appendix B

Interview Protocol and Interview Questions

OPENING: Thank you for agreeing to speak with me today. I really appreciate you taking the time to help us better understand RTI. I am going to record this interview, so I am able to capture all the comments. Remember that neither your name, nor the name of the school or principal will be used in any presentation or publication of this data. Only I will have access to the audio recording. And, I will use a false name or assign a number to you on the transcript, so you cannot be personally identified.

Okay, let's get started!

Interview Questions:

There are totally 17 questions regarding RTI.

1. What do you see as the potential strengths of RTI?
2. What do you see as the potential challenges to RTI?
3. Can you describe what RTI would look like in your building when it is fully developed?

RTI programs share a set of common features. The next several questions ask about these features.

One of these features is data-based decision making, or using data to inform decisions that we make about how a student is progressing. Data is collected at several levels in RTI, including Universal Screening measures for all students, Progress Monitoring for some students who do not meet benchmarks, and charting data to determine whether a child is responding to the intervention.

4. Can you describe how data will be collected in your building related to RTI?
5. What do you see as the potential strengths of data-based decision making in RTI for your building?
6. What do you anticipate as the potential challenges of data-based decision making related to RTI in your building?

Another common feature of RTI is the use of evidenced-based interventions at each of several Tiers of support, such as Tier I, Tier II, and Tier III interventions.

7. What do you see as the potential strengths of having several tiers of support in your building?
8. What do you see as the potential challenges of having several tiers of support in your building?
9. Can you describe what you anticipate will be Tier I interventions related to literacy in your building?
10. Can you describe what you anticipate will be examples of Tier II interventions related to literacy in your building?

11. Can you describe what you anticipate will be examples of Tier III interventions related to literacy in your building?

RTI requires the coordination of RTI teams, coaches, teachers, support personnel, and administrators.

12. What do you see as the possible strengths related to collaboration and coordination in the implementation of RTI in your building?
13. What do you see as the possible challenges related to collaboration and coordination in the implementation of RTI in your building?

RTI requires ongoing professional development over time.

14. What types of professional development do you see as necessary for implementation in your building? Why?
15. What types of resources, both materials and personnel, are necessary to implement RTI in your opinion? Do you feel your building will have sufficient material and personnel resources? Why or why not?
16. Some researchers believe that the faculty have to “buy in” to a program for it to be successful. What things impact whether a teacher buys in to RTI?
17. What should teacher preparation programs include in their programs to prepare future teachers for working in buildings that are implementing RTI?

Thank you so much for speaking with me. This will surely help us gain an understanding of the implementation of RTI.

The Role of Peer Guided Play for Children with Autism Spectrum Disorder

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Abstract

Childhood play has a well-established role in the development of social and cognitive skills that may have important implications for intervention with children with autism spectrum disorder (ASD). Yet, social and language skills of children with ASD are developmentally different from those of typically developing children, although these differences should not exclude children from being considered able to play. When implementing play interventions, it is important to remember why all children need to play and how their play affects their exploration of the world around them. This case study emphasizes the importance of peer-mediated play for children with ASD in early childhood settings by examining the actions of a pair of children engaging in play activities. Play interactions were mediated through guided participation and modeling by the peer. One child has been described by parents and teacher as being identified on the moderate to severe end of the autism spectrum.

The Role of Peer Guided Play for Children with Autism Spectrum Disorder

Autism spectrum disorder (ASD) is characterized by impairments in social interactions, impairments in verbal and nonverbal communication skills, and restricted and repetitive patterns of behavior (American Psychiatric Association, 2013). ASD is a “complex developmental disability that affects a person’s ability to interact with others” (Autism Society, 2007). Other common signs of ASD include unusual learning needs, as well as atypical attention and sensory processing patterns. The increased incidence of ASD among children has greatly increased the demands placed on early intervention and educational systems due to the complexity of ASD. Examples of such complexities include the unique ways children with ASD process and respond to information, the variability of how ASD affects each child, and the often extreme and unusual communication and socialization challenges of children with ASD. Statistics show that ASD is impacting an increasing number of children, affecting an estimated 1 in 88 children in the United States (www.cdc.gov), which translates to 32.3% of children identified with ASD being served in the general education classroom 80% of the day (OSEP, 2012). Thus, this complex disorder is impacting more and more families throughout the US with very little information about the extent of its impact on the emotional, intellectual, and social lives of family members and overall family health.

While individuals with ASD have many strengths, some behaviors that appear can impair their ability to form meaningful relationships. Childhood play is an essential and powerful mechanism of socialization that fosters development of instrumental and affective relationship skills. Through play children develop important social skills such as turn taking, problem solving, collaboration skills, and communication skills as well as perspective taking and empathy. For children, with and without disabilities, occasions to interact in play represent critical learning opportunities as well as opportunities to connect with one another. Play is a vehicle through which the development of lifelong relationships between individuals is created.

Thus play has a powerful potential for establishing and maintaining friendships and personal identities. These relationships provide rich opportunities for learning cooperation, increasing and developing interpersonal skills, acquiring the ability to support others through difficulties and beginning to understand the consequences of certain actions. Children as young as two to three years of age appear to use guidelines (Cole, 1986), which have been termed rules. Guidelines include taking turns, sharing toys, determining who leads the activity, and deciding how the game ends. When children play often they do things that are not typical for their age or abilities while interacting with their environment and peers. Arranging the play environment for children with ASD includes structuring the physical environment, choosing appropriate toys, peer grouping, and adult assistance (Mason, Kamps, Turcotte, Cox, Feldmiller, & Miller, 2014). In general, children identified with disabilities will have more interactions with peers when toys are limited and well-chosen, when children with disabilities are grouped with peers who demonstrate appropriate social skills, when there is minimal adult-child interaction, play and joint attention is the target behaviors and the play area is relatively small (Wong, 2013).

Childhood play has a well-established role in the development of social and cognitive skills in children that may have important implications for how children with autism spectrum disorder (ASD) and their peers learn to relate and persist in their relationships over time. Although play studies provide general support for a relationship between language and play, the exact nature of the relationship is not clear (Lewis, 2003). Play provides both context and readiness for the development of social, cognitive, and communication skills (Johnson, Christie & Wardle, 2005). When a child engages in play activities with another child, they become involved in activities that may expand their range of emotions and improve both social and communication skills (Wolfberg, 2009). By considering play as a possible intervention to improve social and communication skills in children with ASD, it may be possible to recognize the great value this tool has on their lives. A report by the Committee on Educational Interventions for Children with Autism, the National Research Council (2001) emphasized play as one of five priorities for skill development in children with ASD. In fact, children with ASD develop important social skills through the exploration of different forms of play, such as pretend play utilizing objects (Lifter, Ellis, Cannon, & Anderson, 2005). These social skills facilitate meaningful participation in family and community activities. In this paper I assert the importance of teaching children to mediate social interactions, particularly play in inclusive settings. This article is organized into four sections which include 1) background of play, 2) discussion of methods, 3) importance of study results, and 4) pedagogies. A discussion includes implications for research and practice as well as developmental, cultural, and behavioral pedagogies.

The purpose of this paper is to emphasize the importance of peer-mediated play for children with Autism Spectrum Disorder (ASD) in early childhood settings by examining the actions of a dyad of children engaging in play activities. When implementing play interventions or activities with a child with ASD, it is important to remember why they need to play and how their play affects their exploration of the world around them. By looking at play as a possible intervention to improve social skills in children with ASD, it may be possible to recognize the great value this tool has on their lives. This study investigated the effects of a peer modeling and guided participation in play to increase social interactions for children with ASD in order to advance thoughts of inclusion of all children with disabilities into preschool and early childhood settings.

Background of play

Theories of play were first developed during the eighteenth and nineteenth centuries. Throughout the years, educators, psychologist and theorists have been fascinated by the way children play. By the late 1800's, elementary schools were universal creating a definite place for children to play games (Sutton-Smith, 1981). Although school playgrounds were primitive, they did not restrict the children to playing in small areas, nonetheless school playgrounds have always followed a hierarchy of rules. Play is free, voluntary and spontaneous insofar as the authority of each of the players. From early schoolyards to contemporary playgrounds, each contains the same rules that exclude certain groups of children from many games. Structured play has clearly defined goals and rules, which are decided upon by a community of children; other play is unstructured, without rules. These rules are also many times determined by influences beyond the community of children. Some forms of play are rehearsals or practice for later life events, such as "play fighting," pretend social encounters (such as tea parties with dolls), or flirting (Sutton-Smith, 1997).

Contemporary play has become much more complex than play displayed by previous generations of children. Children's play has become saturated with commercialized and manufactured modes of play, more complex toys and video games. Through play, children explore and learn about their world as well as developing imagination, creativity, social skills, and problem solving skills. In 1932, Mildred Parten categorized the stages of children's play that continue to provide a standard definition for describing a child's developmental progress in social play. The stages of play recognized by Parten and many current scholars include: unoccupied play, solitary play, onlooker play behavior, parallel play, associative play and cooperative play (Fergus, 2009; Parten, 1932). According to Parten, as children became older, improving their communication skills, and as opportunities for peer interaction become more common, the nonsocial (solitary and parallel) types of play become less common, and the social (associative and cooperative) types of play become more common. Although Parten's stages are still widely used and recognized, some (e.g. Rubin, Smilansky, Erickson) disagree regarding whether or not these stages of development are actually followed by all children. For example, are toddlers really unable to play cooperatively or is solitary play in older children less common or a sign of developmental delay?

Developmental theorists attribute children's play to their growth and learning and play should be included in early childhood curriculum (Bowman, 1993). The relationship between social and play behaviors as asserted by theorists (i.e., Parten, 1932; Piaget, 1962) is strengthened through a cognitive-developmental perspective, which claims play is a pro-social activity that fosters the individual's learning and interpretation of the surrounding world (Lifter & Bloom, 1998). The social aspect of play begins when the child starts to notice the play of others (Jordan, 2003). According to Vygotsky (year), play, particularly pretend play, is a primary social and cultural activity through which children acquire symbolic capacities, interpersonal skills and social knowledge. Extending his theories, Rogoff (1990) suggests that children maximize their developmental potential, within their zone of proximal development (ZPD) with the support and challenge of experienced social partners through guided participation in culturally valued activity (Yang, et al., 2003). Children continue to pursue activities that are fun and enjoyable, learning about their world.

The close relationship of social and play behavior as suggested by theorists (i.e., Parten, 1932; Piaget, 1962) is supported by the cognitive-developmental perspective, which states that play is a prosocial activity that fosters one's learning about and interpretation of the world (Johnson et al., 2005). Body posture, gestures, eye contact, hand movements and other nonverbal components of language often interfere with a child's ability to understand all communication used by others (Koegel & Koegel, 1995). Play is an activity that can be utilized to improve communication skills with peers through initiation and practice (Mason et al., 2014; Parten, 1932). Yet, the social and language skills of children with ASD may be delayed or atypical which could result in barriers to the important kinds of learning that evolve out of play. Play provides both context and readiness for the development of social, cognitive, and communication skills (Johnson, Christie & Wardle, 2005). In a report by the Committee on Educational Interventions for Children with Autism, the National Research Council (2001) emphasized play as one of five priorities for skill development in children with ASD. In fact, children with ASD develop important social skills precisely through the exploration of different forms of play, such as pretend play utilizing objects (Lifter, Ellis, Cannon, & Anderson, 2005). These social skills facilitate meaningful participation in family and community activities (Gleave, 2009).

Anne Donnellan (1984) discussed the concept of the "least dangerous assumption." This notion assumes that all students, even students with significant disabilities, are competent and able to learn, because to do otherwise would result in harm in areas such as educational opportunities, inferior instruction, segregated classrooms, and fewer choices as adults. In other words, if a student does not do well in a particular classroom, the quality of the instruction or curriculum should be questioned before the student's ability to learn or not learn. Furthermore, when teachers begin to question the prevailing paradigm, they will become open to changing not only their beliefs, but also their actions. Consequently, changing our paradigm about student ability based on labels and diagnoses is key to promoting achievement, learning, inclusion, and quality of life for all students in our classrooms.

In this study, the peers demonstrated the notion of "least dangerous assumption" (Donnellan, 1984, p. 143) when interacting with the boys diagnosed with autism. For instance, instead of presuming the boys did not understand, could not learn or did not have something to say because their communication abilities were different did not factor into the equation for the peers. Especially in the case of Mia and Logan (two of the children in this study), when Logan did not respond as Mia expected, she would try to initiate an interaction again or change her play tactic. Mia never thought Logan was unable to engage in play.

Albert Bandura's Social Learning Theory (1977) expresses the fundamental idea that humans notice others and seek their attention and approval. This theory supports the idea that all children learn from the modeling of peers and adults in classroom. Their interest in others and their attentions strongly motivates children and provides them with models for behaviors and attitudes (Bandura, 1977). Children in learning-through-play based programs have higher rates of interaction. They have more opportunities to observe, interact, and seek the attention of their peers. Children seek the attention and approval of teachers and teacher can be valuable role models for all children. Teachers and peers as role models can be therapeutic influences on children who have not had opportunities to practice social/ emotional skills in a larger, consistent community. Schools can be safe places for children in need to observe socially acceptable

models for behaviors and attitudes and to practice them regularly through the fun and motivating medium of play.

Johnson, Christie, and Wardle (2005) contend that play is a “medium that is self-enabling” and that “play can help children – and grown-ups too – deal with stress” (p. 149). Behaviorally and on the level of brain functioning, play entails both affect and cognition. Singer and Singer (2006) assert that children’s play is central to their sense of themselves and their relationship to others. If schools are the first experience beyond home and family, then teachers wield considerable power for both education and intervention. The authors examine the concept of “resilience” and its role in guiding children with challenges – of all kinds – to develop coping skills and the motivation to succeed. The goal of play within the curriculum is to integrate children’s skills and understandings to provide meaning and support their development into competent social beings. Johnson et al. (2005) explain that “with help from trusted adults, child [at risk] may become at promise as their affective system becomes more integrated and controlled. This leads to the following: improved autonomy of active agency, independence, and a sense of purpose and direction, improved emotionality, or the ability to control impulses and delay gratification in striving after goals with greater persistence, and improved subjunctive thought, or the ability to explore the possible and the fantastic” (p. 150-151).

Importance of mediating social activities

The play that children with ASD engage in is less likely to elicit the interest of peers (Jordan, 2003). A study completed by Lifter, et al. (1993) stated children with autism do not appear to be intrinsically motivated to engage in cooperative or interpersonal play in order to learn about objects and/or events. In addition, children with ASD choose things to play with that are not usually “toys” that children would usually choose as a play item. For example, a child with ASD may enjoy playing with a piece of tape or string. These objects [toys for children with ASD] can provide a preferred sensory stimulation (Holmes & Willoughby, 2005).

Play is a phenomenon that has intrigued educators, psychologists, researchers and others who have attempted to define it, understand it, explain it and connect it to particular types of activities for decades. Although the debate continues, most researchers accept that play can be defined by the manifestation of play attributes through play activities (e.g. making connections with others, intrinsic enjoyment, unstructured set of rules, sharing, and taking turns) rather than looking for the presence or absence of one definitive trait. Johnson, Christie, and Wardle (2005) define play in a number of ways. They argue play is a means of helping children learn; an element of being freely chosen by the child; a personally directed in a process of trial and error in which the child learns new activities; and an activity wherein a child is intrinsically motivated. Play exposes a child’s problem-solving skills as he or she demonstrates how the child thinks, plans and organizes (Bass & Mulick, 2007). It is a vehicle in which children can be exposed to a world of new and novel activities, while he or she controls the rules surrounding their play. Young children initially depend upon their parents, then siblings, and eventually, peers, to interact with toys and their environment. For most children with ASD play behaviors do not progress appropriately without direct instruction. For families of children with ASD, the difficulty in interactions between typically developing and ASD identified siblings may result in frustration or other negative feelings for children and parents.

Methods

Participants

There were six children involved in this study, creating three separate play dyads each consisting of a child with ASD label and a peer who has not been identified with any disability or disorder. Due to varied results among the dyads in this study, I choose to include only one of the three dyads for this discussion. During the recruitment phase, I purposefully identified the participants for this study. More specifically, I looked for children who have been labeled with ASD, as well as a peer described as typically developing. Logan, a six-year old boy who has been identified with ASD was one of the targeted participants in this intervention. Logan's parents and teacher described him as being very limited with his verbal skills, which is a concern for both. His parents believed if his language ability improved, his social skills would also improve; however, by the end of the study Logan and Mia proved play was possible without the same communication abilities. After I engaged Logan in a communication exchange, I found he repeated one-word phrases and made a variety of noises as his form of his expression. His communication skills also included a variety of gestures he used to indicate his needs and desires (e.g. pointing while hopping up and down, repeating "thi,thi,thi, rocking his body back and forth toward an object he wanted). Although Logan had a reported capacity to participate in functional play, no spontaneous symbolic play skills were present. He was recruited from the private day school for children with ASD, which he attends.

Mia, a five-year old girl, was designated as Logan's peer. She currently attends kindergarten at a public school within the same district as Logan's school. She was chosen by her teacher due to her demonstrated above average social and communication skills for children the same chronological age. Mia was described by her mother as "outgoing, socialable, spunky, full of energy, and always willing to help. She is very nice and mannerly" (personal conversation May 7, 2010).

Setting

Play sessions were conducted at a private day school for children with ASD during and after school hours. Sessions were held in the same classroom each day. The classroom contained two U-shaped tables with chairs, computer, cabinets with curriculum supplies, two large white boards, one chalkboard, shelves with bins of toys and large area rug. Since this room was a pre-kindergarten (pre-k) classroom, the walls had many bright posters related to ABCs and numbers 1 through 10. Children's artwork also decorated the classroom making the room welcoming and fun for the children. Even though this study was conducted in a pre-k classroom, I brought the toys and supplies into the school each day in order for these items to be novel to each child. Before the play sessions began each day, I removed any toys or play activity items the children with ASD would have used during the day during instructional time. I placed the toys around the room in an arrangement to promote positive interaction with each set of activities. This procedure was followed to keep the toys novel to the study play sessions.

Equipment

The same age-appropriate toys were set-up around the room throughout the entire study. These toys include: Lego blocks, a set of cars, a roadway, train track and train cars, baby dolls and accessories, toy kitchen, dishes and pretend food, markers and paper, puzzles, and mats and a

parachute tunnel. In the same corner each session, a flip camera was set-up on a tripod. The computer and CD player were kept off and unavailable to the children during all play sessions.

Design

A case study design was utilized. Observations of target participants' social dimensions of play (eye contact, imitation, spontaneous interaction) were measured under controlled baseline (A) and intervention. Each play dyad met twice weekly for 20 minute sessions over a period of three months (26 sessions). All sessions were conducted in 20 minute increments with the children playing with toys within the designated play space. The baseline data included three separate observation sessions, each consisting of 20 minutes of free play; spontaneous interactions prompted by targeted participant and eye contact between children were measured.

Baseline

While establishing baseline no instruction or feedback from the researcher was given, except to prompt the children to stay in the classroom and/or to interrupt and redirect them when severe disruptions occurred (e.g., aggression, destruction of materials). If a child approached and asked for help with a toy, physical help was given without verbal comments (e.g. opening a container). A general positive statement was provided at the end of each session. For example, "I am glad you could play today; thanks." The children were given the following instruction prior to each baseline session, "you may play with anything you want, but you must stay in the room." The two children (dyad) entered the room at the same time and had immediate access to play activities and toys. Each session was videotaped and, additionally I completed detailed field notes while observing the sessions.

Measures

Play was measured by the amount of interaction between the children based upon eye contact, proximity, and/or child with autism responding to peer's attempt to engage them in play. For example, when Mia approached Logan with a Lego block, he took the block and stayed within close proximity to Mia, subsequently play interaction was recorded. Other play interactions that were recorded included such activities as Logan giving Mia a car while playing with the track, or Mia enticing Logan to join her in the crawl tunnels. Mia's attempts were not counted as engagement, unless the child (Logan) responded. Each 20-minute sample was divided into 120 intervals of 10 seconds each and coded for actions initiated by Logan.

Intervention

After baseline data were collected, instructional sessions were completed with the peers [children]. These consisted of ten minutes of social skills training followed by ten minutes playgroup during which feedback was given to the children. During instruction the peers sat at the table with me while I introduced the session, briefly reviewed the skills previously taught, described the skill to be taught that day, and modeled practice examples for the children. The children then practiced these skills with each other for the remainder of the ten minutes while the teacher gave verbal prompts and reinforced appropriate interactions and participation. During training sessions peers received instruction regarding ways to engage another child to play with them, when the other child's play skills did not match their own. Play skills were divided into the following three segments:

1. Skill 1: greetings, using names, and conversations included (a) saying hello, (b) asking friends to play and answer (c) asking questions about the toys (d) saying good-bye when the group was over [for eye contact]
2. Skill 2: imitation and following instructions included two behaviors: (a) imitation (e.g., touch head, arms up) and (b) following simple instructions (e.g., “push the car”) [for interaction]
3. Skill 3: sharing and turn taking included (a) sharing, in which children were asked to let the other children play with the toys they had, and (b) taking turns [for eye contact and interaction] (Gonzalez-Lopez & Kamps, 1997)

Posters with visual prompts were used to teach the children each skill (see figure 1). These posters were used as prompts for the peers when attempting to play partners. Poster (visible reminders) hung on easels on the perimeter of the play area. Posters represented information provided to the peers during informational sessions.



Figure 1.
Example of poster prompts - visual prompts used after training session

The training sessions continued for a total of ten hours over a two-week period. During these sessions, the peers participated in role-play practicing the three sets of skills previously discussed. The same visual prompts used during training sessions were also used during intervention play sessions.

The instructional sessions used the same toys and supplies included in the baseline sessions. Each session focused on a different set of toys, for example kitchen with dishes and pretend

food, racecar track and cars, and legos. This allowed for the children to practice asking each other to implement specific activities with a particular set of toys.

The intervention phase began after two weeks of instructional sessions. Play sessions began with a specific instruction given to the peer to implement. Specific instructions included a particular feature of play meant to engage the other child. Peers were reminded of the visual prompts set-up around the room. The first five minutes were dedicated to free play in order for the children to explore the play area. Peers were allowed to participate in free play without attempting to engage the other child in play. Non-instructional prompts were utilized for guidance when the peer seemed to be struggling to engage the other child in play.

Fifteen intervention sessions were conducted. At the beginning of each play session during the intervention phase, Mia was reminded of visual cues and ways to engage her play partner in activities. Logan was not given any directions. Sessions five through twenty followed the same procedure as baseline: specifically, twenty minute sessions, video-taped by myself with no guidance provided to either child by researcher. In addition the same equipment and classroom were used. These fifteen sessions were utilized to study how the play dyads engaged in play without adult guidance.

Results

The results of this study describe the initial impressions of children playing with peers who may be different than they are in terms of communication skills, physical attributes, and social skills. Mia and Logan's first play session began timidly with Mia drawing on the chalkboard and Logan sitting at the table on the opposite side of the room. Logan did not appear to be interested in Mia even when she began to singing to herself. Logan began to circle the room, stopping briefly at each set of toys arranged around the room. Mia continued to draw and sing, however she frequently glanced at Logan as he moved around the room. Neither child approached the other or attempted to engage the other child in any type of activity, even when Mia grew tired of drawing and moved on to another activity. Throughout the twenty-minute play session, Logan approached Mia ten times, however these interactions did not result in any shared activity or engagement between them. At the end of this session, Mia informed me she was looking forward to "playing with Logan again." I found this statement curious and encouraging; curious because they did not engage in any social interactions but encouraging because it appeared she wanted to become one of Logan's play partners or friends.

Consider this vignette about Mia and Logan's play. During one play session, Mia played with a new toy truck. Mia showed Logan how to make the truck 'drive' by itself. Logan liked the way the truck could be pulled back and drive forward automatically by itself. Mia taught him how to push the truck back and forth, however he remained more interested in watching her make the truck go. He also liked the noise the truck made when it was pushed away from him. Mia liked the truck too, but she quickly grew tired of the truck and wanted to play with something else. Subsequently, she found some picture cards she liked to play with, and left Logan with the car. When she left him, he sat down in the corner and just looked at the truck. He seemed to be studying the truck hoping it would start to go, although Mia had already taught him once what he needed to do to make the truck work.

Logan really wanted to play with the toy truck like he did with Mia, but, Mia was playing with the picture cards. Logan went over to Mia and looked at her. She continued playing with the picture cards and didn't pay attention to him. Logan touched her shoulder and tried to sound like the truck, "vroom." Mia looked at him and laughed but quickly went back to her picture cards. Logan used his hand to pretend the toy truck went "vroom" and drove up Mia's arm. Mia stopped playing cards and said, "do you want to play with me and the truck again Logan?" He laughed and said "vroom, vroom." They went over to the toy truck and played for a few minutes together with it. When Logan began to show ability to work the truck without Mia's assistance, she left him again and went back to playing cards.

Mia's modeling and guidance encouraged Logan to go beyond his present ability and explore new interactions. Piaget (1950) stated, "It is through game playing, that is, through the give and take of negotiating plans, settling disagreements, making and enforcing rules, and keeping and making promises that children come to understand the social rules which make cooperation with others possible." Throughout Mia and Logan's play sessions, plans, rules and an understanding of each other's social needs were negotiated in the course of learning to play together. For example when the play sessions began Mia would play with the car and track, while Logan would bounce from area to area without sustained interaction with any item. He did not demonstrate desire to play with Mia and/or play items. Mia established a routine to the play sessions in which she would follow Logan for a period of time, then formed rules and procedures for the activity.

During the collection of baseline data, Logan spontaneously approached, initiated Mia, and/or had eye contact with her ten to thirteen times in a twenty-minute period. These interactions were brief and as noted before, did not result in any shared social activity between them. Baseline data were collected on the first four play sessions. After the collection of the baseline data, the peers, including Mia, participated in training sessions to learn how to engage a child who was different than they were in play. The first training session, we discussed ways in which people are different. The peers had a variety of topics including but not limited to: "color of skin, color of eyes, boy/girl, how they talk, how old they are, if they like to run, what they like to eat" (personal conversation with peer participants). The peers described a few characteristics exhibited by their play partner, however, they mostly talked about their classroom peers' differences. The peers did not describe these differences in terms of disabilities or deficits but rather by physical attributes and habits. The peer who said "how they talk," continued to describe the accent another friend had but did not mention their play partner's nonverbal attribute. None of the peers mentioned that their play partners did not talk or appeared unable to participate in conversations. When questioned about this, they all said their play partner did not want to talk to them. Mia said she would try to talk to Logan the next time they played.

The intervention approach was based on Rogoff's (2003) guided participation. In *The Cultural Nature of Human Development*, Rogoff (2003) discusses the opportunities children around the world have for learning a variety of developmental tasks through the process of play. The engagement between children of different ages provides venues for peer modeling (Rogoff, 2003). Although the grouping of children by different ages varies around the world within various cultures, the definitions of play include some common characteristics. Children with ASD typically do not apply concepts to new situations but need explicit instruction for each new

skill. This may be in direct contrast to mimicking behaviors as a form of development. Logan demonstrated this when he was unable to play with the racetrack and cars without Mia's guidance and assistance. Logan needed Mia to directly teach him each of the steps needed to put the track together and make the car move on its own.

Data in figure 2 reveal the number of spontaneous interactions and eye contact initiated by Logan toward Mia. Data were graphed from video observations. In baseline conditions, Logan initiated social interaction with Mia an average of twelve times in a twenty-minute period. However, after the peer training sessions the number of spontaneous interactions and eye contact between Mia and Logan steadily increased over the remaining play sessions. Logan began to demonstrate independent social interaction skills with Mia. The last play session between Mia and Logan resulted in 143 interactions within the twenty-minute time period of continuous play together, one session resulted in 152 spontaneous interactions initiated by Logan within a twenty minute period.

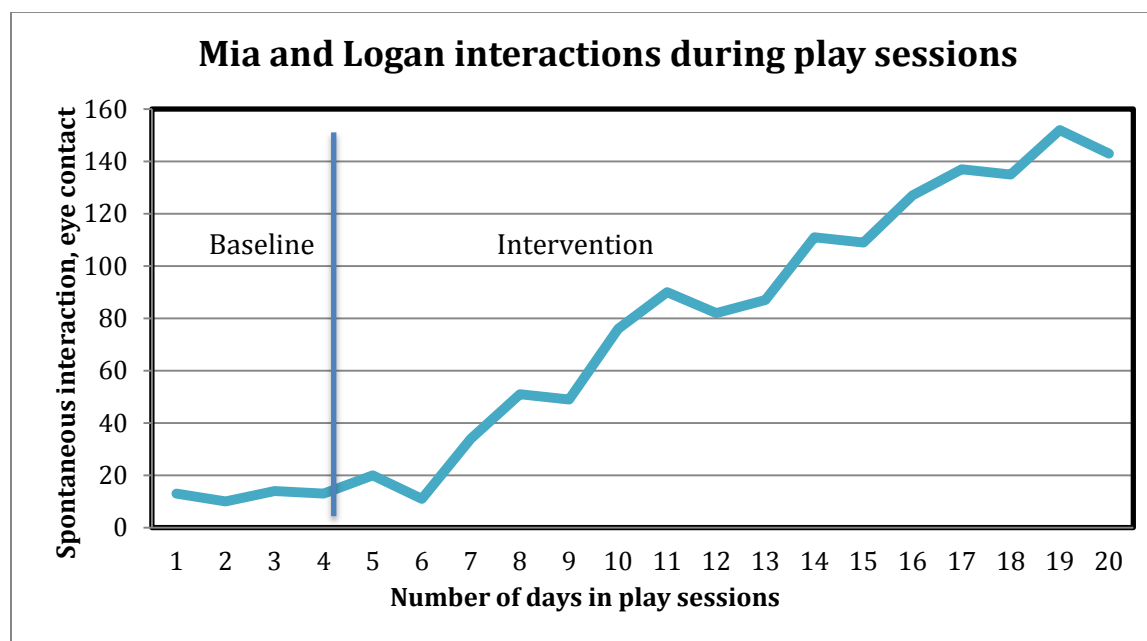


Figure 2. Spontaneous interactions and eye contact initiated by Logan.

Discussion

Play is not only “fun,” it is a child’s “work” (Gussin Paley, 2004; Piaget, 1962) and their way of learning about the world around them. Since play is a critical component for early childhood development it is important for educators to understand the deficiencies often times displayed by children identified with ASD and investigate strategies to enhance social and communication skills. A particular activity is a goal-directed or purposeful interaction of a subject with an object through the use of tools. Strategies in which facets of intellectual, social, physical, and emotional aspects are orchestrated into activities facilitate meaningful participation for children with and without disabilities. Lifter, Ellis, Cannon, and Anderson (2005) discuss the importance of facilitating the exploration of different forms of play for children with ASD. Activity theory recognizes the

internalization and externalization of cognitive processes involved in the use of tools, division of labor and rules as well as the transformation or development that results from the interaction (Engestrom, 1999; Engestrom & Miettinen, 1999). Internal activities cannot be understood if they are analyzed separately from external activities, because they transform each other. For children with ASD, the need to build independent social and communication skills requires a specific set of skills and tools. Tools are created and transformed during the development of the activity itself and carry with them a particular culture - the historical remnants from that development. Mia appears equipped with a set of social skills to assist her in making appropriate play choices, ability to access more areas of the playroom, demonstrate performance of toys, and complete meaningful interactions with Logan. However, Logan's restricted social and communication skills require additional assistance through modeling and guidance in order to improve his play skills. A recommendation for social interventions is to keep the interactions with peers fun and entertaining. For individuals with ASD, it is imperative to incorporate generalization into learning play skills. An understanding of play as voluntary, enjoyable, and pleasurable to children assists researchers with guidelines to promote educational play in children (Saracho & Spodek, 1998). Despite the fact that play may take on many forms, defining the value of play continues to include assisting children in exploring and understanding various roles and interaction patterns in their social world (Pellegrini, 2009; Rubin & Coplan, 1998; Saracho & Spodek, 1998; Scarlett et al., 2005).

Body posture, gestures, eye contact, hand movements and other nonverbal components of language often interfere with a child's ability to understand all communication used by others (Koegel & Koegel, 1995). Play is an activity that can be utilized to improve communication skills with peers through initiation and practice (Parten, 1932). Peer interactions within play activities offer the opportunity to gain important social communication skills. When children begin to play cooperatively with others, their social and emotional maturity develops. As cooperative play increases, play becomes more structured and children begin to communicate more often working for toward a common goal. Teaching a child language in natural contexts is more meaningful to retention and generalization. For example, when a child wants to join a group of children who are playing ball, teaching the child to say "can I play?" is important to their growth. Likewise, we need to consider how to make these communication changes from day to day. Play is a tool that serves not only as a vehicle for learning new skills but also a way of expanding and broadening many skills.

Implications for Research and Practice

Despite its limitations, the current study has important implications for further research and social interventions for inclusive classrooms. It would be useful to repeat this study in an inclusive preschool classroom in which more than one dyad of children is observed. For this reason, I would also recommend extending this study to include consecutive days in which play sessions are held.

The simultaneous development in language and cognition are often described as paralleling development with play behaviors because of the advances in complexity (Barton & Wolery, 2008). Early intervention cannot be stressed enough especially when the interventions involve play activities. The earlier the intervention commences the more time the child with ASD has to

learn how to play and interact with other children. According to researchers Malone, Stoneman and Langone (1994) even though an association among cognitive and communicative development variables related to play have been observed, only a handful of studies have been completed in this area regarding children with delays in play skills, cognition and communication.

Developmental pedagogies

The American Academy of Pediatrics believes play is essential for the development and well-being of a child's cognitive, physical, social and emotional structures (Ginsburg, 2007). According to Lindon (2002) children may increase physical development including fine and gross motor skills, when given appropriate space and resources to play. In preschool, many children improve fine and gross motor skills like balance, laterality (awareness of left and right sides of their body), spatial orientation and muscle coordination of large muscle groups (Elkind, 2007). When the child masters these skills, it allows for enhanced play-based activities and social competencies.

Since the implementation of No Child Left Behind Act of 2001, a national trend focusing on academic fundamentals has resulted in the decrease of other creative academic subjects, such as art, music and social sciences, as well as recess and physical education. This trend may have serious implications for the social and emotional development of children because of the diminishing focus on organized play, free play and physical activity (Ginsburg, 2007). The Alliance for Childhood put out a report in the spring of 2009 titled "Crisis in the Kindergarten: Why Children Need to Play in School," which concludes that kindergartens have changed dramatically in the last two decades. The report showed that play materials such as blocks, sand and water tables, and props for dramatic play "have largely disappeared" from more than 250 full-day kindergarten classrooms studied. Most children had half an hour or less a day for playtime, and some got no playtime at all (Miller and Almon, 2009). Joan Almon, the group's executive director explains through play children are able to develop language, express their creativity, expand social skills, problem solve – "take on every aspect of life" (Miller and Almon, 2009). Critics of NCLB blame the increased pressures to focus on academics even with the youngest students without regards to social and communication skills. Research studies have revealed in children with autism pretend play skills are important predictors to later social abilities. Curricular programs that include pretend play as a functional skill may be important within the cognitive domain for children with autism (Barten & Wolery, 2008). Teaching children to play is important for all the developmental skills play reinforces within a child. It is important to differentiate that while a peer may benefit from generally supervised play, children with ASD would have increased benefits from guided play where they are taught and guided how to interact within the play environment.

Although Logan has difficulty with the concept of abstract thinking required for pretend play and social interactions, Mia was able to foster an emerging friendship with Logan. While playing with the toy truck, Mia modeled the steps needed to make the truck work giving Logan the necessary steps to independently proceed with this play activity. Thus, Mia scaffolded the play for Logan which permitted him to accomplish more independently (i.e. pretend play) than he could have accomplished without Mia's scaffold. However within their relationship there was reciprocity in learning how to interact and react to each other as well as toys. For example,

Logan often would hop around the room when he became overly excited. As the play sessions carried on, Mia began to imitate Logan's hopping motion smiling and laughing while she followed Logan around the room. After a couple of times, he began to smile and point at Mia before hopping, looking at her to follow. This became a ritual as they switched toys and activities. In addition, the first interaction with the truck was positively reinforcing for both children, creating a mutually enjoyable experience. Furthermore, Mia's role as a peer model helped support Logan's learning. The success of future play interactions between Logan and Mia or other peers is dependent upon the development of reciprocal interactions which are influenced by Mia's reaction to Logan. This means the sophistication of Mia's role in this relationship is particularly important in guiding Logan's social interactions within their friendship.

Cultural pedagogies

Play can be a powerful instrument that brings children together as social beings (Johnson, et al., 2005). During a child's preschool years a variety of cognitive, emotional, social and physical changes occur. A child's social development is impacted largely by cognitive and emotional growth. These changes allow a child the ability to acquire new skills necessary for continued maturity to adulthood (Johnson, et al., 2005; Loop, 2009). Play is a way for children to make sense of their social experiences (Quill, 2000). Many opportunities for imitation and play occur within the preschool curriculum including opening circle, small group, gym, outdoor play and free choice. These opportunities create numerous occasions for a child with ASD to interact with their typically developing peers when being guided by the teacher. When Mia and Logan participate in circle time, Logan sits on the edge of the circle busying himself with a toy outside of and a part from the circle activities. He needs the teacher and peers to model appropriate behaviors and guide him through each activity. Nadel and Peze (1993) stated, "play is the glue that holds together peer interactions in early childhood" (NRC, 2001, p. 75). In the United States, play groups, organized sports activities and scheduled play dates are some examples utilized to increase a child's social developmental growth (Loop, 2009). These activities may traditionally be known in the western cultural, conversely in many parts of the world children are expected to show independence by the age 5 to 7 years and "stop playing childish games and start skill training" (Rogoff, 2003, p169). However, researchers agree children explore diversity, difference and the impact of issues such as skin color, language, knowledge of popular culture and perceptions of difference through social experiences and play (Mundine & Giugni, 2006). These issues may contribute to the greater discussion and challenges surrounding inclusion, social justice and equity in schools and the children's surrounding community.

Play can be found in a multitude of settings, is flexible, offers a foundation for developing leisure skills, increases social and communicative interaction with peers, and increases learning in natural and inclusive settings (Barten & Wolberg, 2008; Casby, 2003; Ginsburg, 2007). As a child with ASD progresses throughout the school day, they encounter settings with diverse materials, which could lead to opportunities for social interactions with peers. At the same time as children increase their awareness and understanding of self and the world around them many essential skills are developed in the areas of physical, language, social and cognitive development.

Behavioral pedagogies

The theoretical assumptions of behaviorism are primarily concerned with observable and measurable aspects of human behavior. A behaviorist explains any behavior that can be directly observed and directed by a stimuli is defined as a behavior (Cooper, et al., 2007). Many approaches to teaching social skills include breaking down the skill into the components and then to teach each individual task in a sequence of skills. However, what seems to be a basic skill can turn out to be an incredibly difficult task for both the teacher and the child with ASD. For example, in the vignette, Logan wanted Mia to play truck again. He approached her and made a “vroom, vroom” sound, his way of verbalizing his desire to initiate play. Although this was a huge step toward social competence for Logan, the skill of requesting a friend to play required a more complex set of interactions for Mia. She wanted Logan to use words and actions to tell her his needs and desires. Mia wanted Logan to wait until she was done with the picture cards, but his desire was for her to leave the picture cards immediately. He did not seem understand or care about Mia play desire. Logan continued to make the “vroom” noise and show her the truck motion, until Mia relented. She seemed to want Logan to run the truck by himself. Mia appeared to be bored with the simple action of ‘making the truck go’ and wanted Logan to expand the truck play beyond the simple mechanics of this act. These higher-level skills require an enormous set of social skills often taught utilizing intensive early behavioral interventions.

For example, if a young child with ASD is completely uninterested in social interactions with others, the teacher will utilize a set of tools to guide the child through the fundamental social skills building upon each skill that is mastered. Logan and Mia have been building a social relationship together constructing a set of tools each of them can use with other children. Effective pedagogical strategies are important for educators and students. The impact of these early social skills experiences is crucial for all children. For example, research has shown children who develop social skills and early relationships with peers are likely to have better mental health, better employment records, more likely to live independently and have greater self-esteem (Bass & Mulick, 2007; Mastrangelo, 2009; Strayhorn & Strain, 1986). Learning does not occur in compartments, cognitive, social and language learning occurs at the same time. Skilled educators know that children with and without limitations require a variety of strategies for the best possible outcomes.

Parameters of the Study

The participants in this study were young children who had limited amounts of interaction. In addition, dyad play sessions were only held in a ‘pull-out’ situation meeting only twenty times, two to three times a week. There were no group play sessions conducted during the span of this study. Consequently, I am aware of the selection of participants, setting, and limited interaction and the impact of these on the results. By coincidence, all targeted participants with the autism label were boys. However given the male-to-female ratio of autism reported in the current literature, there are more boys than girls who meet the predetermined criteria of autism. Nevertheless, it is not implausible the results are influenced by a gender factor. Another factor potentially affected by a gender factor is the boy-girl dyad, as opposed to including same gender dyads.

Conclusion

The results of this study highlight several implications for facilitating inclusive preschool education for all children. Interventions and/or play curriculum to increase social interaction and engagement in developmental stages may be most effective when considering aspects of the ‘least dangerous assumption’ are considered (Donnellan, 1984). The least dangerous assumption is that Logan belongs and that those who control curriculum; teaching and classroom organization need to change ideas in order to ensure that Logan is genuinely valued and involved in the education and community in which he belongs. When individuals assume that he does not belong with his peers, then there is a dangerous assumption encompassing all minorities, in regards to education and living in a just, caring society. Furthermore, future research should involve peer mediated play to be completed in an inclusive preschool using the natural environment of small groups of children mixing gender ratios and abilities.

In spite of this recommendation, teachers and administrators must consider the fact that making decisions for or about other individuals can be “dangerous”. When decisions must be made about another student, consideration must be given relative to which child is most affected by these decisions. If it is decided that Logan could be included in his home-school in an age-appropriate classroom designed to teach *every* student, then safeguards must be put in place to ensure all actions focus on what Logan wants and not on what others say his *needs* are. In addition to these considerations, low expectations result in segregated educational programs that do not focus on challenging our students, and narrow visions for change in the future.

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Improving Science Scores of Middle School Students with Learning Disabilities through Engineering Problem Solving Activities

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Abstract

This study evaluated the differential effects of three different science teaching methods, namely engineering teaching kit (ETK), explicit instruction (EI), and a combination of the two methods (ETK+EI), in two sixth-grade science classrooms. Twelve students with learning disabilities (LD) and/or attention deficit hyperactivity disorder (ADHD) participated in this study. The dependent variables included students' performance on daily quizzes covering the material taught in that day's lesson and students' performance on a pretest and two posttests covering the steps of the engineering problem solving process. Using a multiple probe across science units design, we demonstrated that both the ETK and EI interventions alone increased the participants' quiz scores, with the combined method (ETK+EI) producing slightly better results in most participants. Students' understanding of the engineering problem solving process also improved after being exposed to the ETK method. Limitations, suggestions for future research, and practical applications are discussed.

Improving Science Scores of Middle School Students through Engineering Problem Solving Activities and Explicit Instruction

The principles of science allow a deeper understanding of the physical world surrounding us. The application of this knowledge to solve real world problems forms the basis of engineering. For students to be successful in the 21st century, they must be able to make connections between science, technology, engineering, and math (STEM) principals. It is, therefore, important for teachers to create a learning environment that exposes students to scientific concepts and problem-solving skills through K-12 science curriculums to adequately build students' science knowledge and skills. Current education policies and practices, such as No Child Left Behind (NCLB, 2002), have placed emphasis on higher level instruction that is reinforced through an increase in teacher accountability and is measured with high-stakes standardized end-of-year assessments in content areas including science. These test results are often analyzed to determine the percentage of students performing below basic level, at basic, proficient, or at advanced level. According to the 2005 Nation's Report Cards in science assessments (Grigg, Lauko, & Brockway, 2006), less than 30% of all fourth, eighth, and twelfth grade students achieved at or above proficiency level, a trend that has persisted since 1996. This lack of growth in science achievement for all students indicates a dire need for more effective science instruction in K-12 schools.

With increasingly diverse science classrooms, teachers are further charged with differentiating their instruction to meet the needs of all students. For example, students with a learning disability (LD) or an attention deficit hyperactivity disorder (ADHD) face unique challenges due to their difficulty with information processing, retention, and other learning deficits. Steele (2007) outlines some of the specific challenges students with LD or ADHD face. Specifically, these students often have difficulty in visual processing, deficits in auditory processing, a lack of motor processing skills, and memory deficits. These challenges can affect a student's ability to analyze tables, graphs, or diagrams, to follow step-by-step directions or to understand materials presented solely in lecture formats, to perform specific laboratory tasks, and to memorize key facts that link with higher-level analytic questions (Steele, 2007). Additionally, receptive and expressive language deficits can further hinder students' ability to communicate clearly using newly attained vocabulary from science lessons. The problems associated with the inability to focus on the teacher or the given assignment can also lead to incomplete written work or laboratory experiments (Steele, 2007). Due to these issues, teachers often find it difficult to effectively provide scientific pedagogy to students with LD or ADHD.

In response to the aforementioned challenges students with LD or ADHD face, teachers need the skills and expertise required to teach a diverse classroom (Biddle, 2006; Grumbine & Alden, 2006). Steele (2007; 2008) outlines possible solutions that teachers can implement in the science classroom to make students more successful. First, teachers can make the material more specific to the students' interest. This allows students to connect what they are learning to previous experiences while gaining their interests. Second, varying teaching methods and activities will facilitate students' access to the material and concepts through different mediums including visual and auditory presentations, hands-on activities, and technology simulations. Third, teachers should model different learning strategies including (a) organizing information into graphic organizers, (b) utilizing the "key questions" often presented at the start of a unit in science textbooks to help make predictions, (c) creating mnemonic devices to help remember the order of events or key facts, and (d) reviewing relevant vocabulary words before beginning each lesson (Steele). Although these suggestions seem promising, empirical research on how to best teach science to students with LD or ADHD is currently limited.

Science Instruction

Most research addressing science instruction in K-12 classrooms has compared the efficacy of three different methods that combine some aspects of Steele's (2007) suggestions for teaching science including (a) the "textbook" approach, (b) explicit instruction, and (c) hands-on, inquiry based instruction. The textbook approach, also called the traditional approach, relies heavily on teacher lectures, students' note taking, and concepts and activities outlined in the classroom textbook. In this approach, the teacher guides instruction while the students passively participate (McCarthy, 2005). Explicit instruction, also referred to as direct instruction, differs from the traditional approach by requiring the educator to teach in small steps, guide students through initial practice with the skills, and provide students with several different levels of practice (McCleery & Tindal, 1999). This approach is also teacher directed, but it allows for more active student involvement. The hands-on, inquiry learning differs from both the textbook approach and explicit instruction in that the teacher facilitates instruction by providing opportunities for the

students to ask questions, explore the material through student-designed experiments, and draw conclusions based on their results (McCarthy, 2005).

Four recent studies examined and compared the efficacy of various forms of these aforementioned methods for teaching science. McCleery and Tindal (1999) compared the effects of explicit, rule-based instruction with the hands-on approach on students' ability to explain and apply the scientific problem-solving process. Fifty-seven sixth grade students, including 14 students with LD, received a combination of these two teaching conditions in three different groups. Group 1 received instruction that incorporated specific rules for performing various tasks into the explicit instruction and combined this with hands-on activities. Group 2 received a similar combination of techniques without the explicit instruction of science concepts. Group 3 received hands-on activities without any explanation of the concepts covered. The results indicated that the students who received a combination of explicit, rule-based instruction with the hands-on approach performed better on the final assessment. Similarly, McCarthy (2005) compared the effects of the textbook approach with hands-on, inquiry learning on science achievement for 18 middle school students with serious emotional disturbances. Group 1 received the textbook approach and Group 2 received instruction using hands-on activities. The results of this study indicated that Group 2 scored better on the hands-on assessment and short answer assessment than Group 1. Both groups performed similarly on the multiple-choice assessment. The author suggests that these results most likely derived from the fact that the students who received the hands-on instruction were more engaged utilizing diverse mediums during the class time than the students who passively participated in the textbook instruction.

Finally, Klahr and Nigam (2004) and Dean and Kuhn (2006) used similar methods to compare the efficacy of the explicit, direct instruction to hands-on, discovery learning. Both studies included 40 to 45 fourth grade students randomly divided into three groups. Group 1 received science instruction in the form of discovery learning, Group 2 received direct instruction, and Group 3 received a combination of discovery learning and direct instruction. Klahr and Nigam empirically demonstrated that direct instruction was more effective than discovery learning based on students' science performance. However, in examining the results over a 6-month time period, Dean and Kuhn found that the group who received only discovery learning instruction performed the highest on assessments at the conclusion of the study. The extent to which different science instructional approaches can lead to greater maintenance and generalization warrants further investigation.

Although each of these studies focused on different combinations of the three major teaching paradigms, they all concluded that implementing explicit instruction combined with hands-on activities yielded the most positive results. However, these studies indicated a need for further research to verify which method, combination of methods, and parts of the methods are the most effective and efficient for science instruction for students with LD and ADHD.

Engineering Problem Solving

Current assessments of educational opportunities and career paths for students indicate that there is a decline in the number of students pursuing engineering careers (Apedoe, Reynolds, Ellefson & Schunn, 2008; Brand, Collver, & Kasarda, 2008). This is more so for students with LD or ADHD who are severely underrepresented in science, technology, and engineering fields

(Alston, Bell, & Hampton, 2002). This may be attributed to a lack of efficient instruction and exposure to K-12 curriculums that discuss engineering concepts involving the application of knowledge to solve real-life problems (McCarthy, 2005). Additionally, the demand for the new generation of students to function in our increasingly technological and global society further challenges teachers to expose students to the concept of engineering by applying own understanding of math, science, and technology to solve real-life problems (TeachEngineering, n.d.). By incorporating applied engineering concepts into K-12 curriculums, teachers can provide students with applied, interdisciplinary units that require the combination of creative problem solving and application of knowledge to address real-life problems. These engineering teaching kits (ETKs) can likely motivate students to pursue a degree and career in engineering (Olds, Harrell, & Valente 2006).

According to the TeachEngineering (n.d.), the engineering problem solving process involves the following steps: (a) problem identification, (b) research of existing solutions, (c) applying knowledge of relevant fields to brainstorm solutions, (d) designing a solution, (e) testing the solution including data collection and data analysis, (f) reiterating the process as needed, (g) determining the social and ethical impacts of the design based on specified design constraints and criteria, and (h) implementing the design. Explicitly instructing and engaging students in the science and engineering steps will allow students to apply their understanding of the material while differentiating instruction and assessment through the multi-disciplinary units.

Current research on the efficacy of incorporating K-12 engineering applications in the science classroom is limited. Olds et al. (2006) discuss the implementation of an ETK in middle school classrooms aimed at informing students about what engineers do, engaging students in the engineering design process, and exposing students to real-world problem solving issues. Specifically, this ETK included a series of lessons and activities involving designing a functioning prosthetic arm. In the activities, the students followed the engineering design process while applying creativity and problem solving skills. The authors argue that based on the change in pretests and posttest scores, the students increased their understanding of the concepts addressed. However, this study lacked an experimental design; therefore, empirical conclusions about the effectiveness of a science ETK is not possible.

Clearly, the current literature lacks empirical research that examines effective methods for teaching science and engineering to students with LD or ADHD. The purpose of this study was to determine the effects of three different science-teaching methods on the performance of basic Earth science and the engineering problem-solving process of middle school students with LD and/or ADHD. These three treatments include: (a) explicit instruction (EI), (b) ETK, and (c) a combination of the two methods (ETK+EI). Specifically, this study was designed to evaluate (a) the differential effects of EI and ETK+EI on the science quiz scores of students with LD and/or ADHD (Class A), (b) the differential effects of ETK and ETK+EI on the science quiz scores of students with LD and/or ADHD (Class B), and (c) the differential effects of ETK or EI and ETK+EI on the pretest and posttests on the engineering problem solving process of students with LD and/or ADHD.

Method

Participants and Setting

The participants for this study were 12 sixth grade students in two science classes (i.e., Class A and Class B) in a suburban, private K-12 school in the southeast, United States. All participants were Caucasian males with LD and/or ADHD as defined by the state guidelines and were between the ages of 12 and 13. Class A had seven students; of whom, two were diagnosed with LD (Students A1 and A3) three were diagnosed with ADHD (A2, A6, and A7), and one had both LD and ADHD (A5). One student with ADHD was removed from the study due to extended absences. Class B had six students, including two students with ADHD (Students B4 and B5) and four students with LD (B1, B2, B3, and B6). All students diagnosed with LD had a significant learning deficit in written expression or reading comprehension. The participants were selected based on regular attendance, parental consents, and low science achievement.

The instruction at the school is specially designed for students with LD and ADHD. At the time of the study, there were 264 students attending the school, 12% of the student body was receiving financial aid, and 2% described their ethnicity as “other than Caucasian.” In both science classes, there was one special education teacher, who was also the primary experimenter. Both classes met four times each week for 45-min periods. The classroom was arranged with a whiteboard at the front of the room, three tables seating two students arranged in a horseshoe shape, and a LCD projector installed on the ceiling.

Experimenter

The primary experimenter and primary data collector was a state-endorsed highly qualified and certified special education teacher of the two participating science classes. At the time of the study she had 5 years of experience teaching middle school math and science to students of all abilities. She had a bachelor degree in mechanical engineering with experience in the engineering problem solving process. During the study, she was seeking a master’s degree in special education. The director of the school assisted in collecting procedural integrity data and interobserver reliability data.

Dependent Variables and Measurement

There were two dependent variables in this study that were measured using a permanent product recording method. The first dependent variable was the students’ ability to correctly answer questions relating to material covered from the McDougal Littell Science *Earth’s Surface* (Trefil, Calvo, & Cutler, 2005) textbook including three units: (a) technology used to view Earth and the Earth’s systems (unit 1), (b) weathering and soil formation (unit 2), and (c) minerals (unit 3). This was measured using a written assessment asking the students to answer 10 short questions requiring one- or two-word responses (e.g., “What is one example of something that is in the biosphere?”). All questions covered the material taught on that day. For baseline and maintenance data collection, questions were randomly chosen across quizzes used during interventions within the same unit. Students were given 5 min to complete a quiz at the end of each class period. The experimenter read aloud all quizzes to ensure students received the required accommodations. On some days, the students received up to two assessments on two different units in order to simultaneously collect baseline and intervention data across units.

The second dependent variable was the students' ability to correctly answer 10 questions about the engineering problem solving process in 5 min three times throughout the study (i.e., beginning of the baseline [pretest], following the first EI or ETK condition [posttest 1], and at the conclusion of the study [posttest 2]). These questions measured the students' understanding of: (a) the engineering design process, (b) possible careers in engineering, (c) required coursework for students pursuing engineering, and (d) possibilities for students who complete an engineering degree. The experimenter developed the questions based on the components of the engineering design process as well as the goals of engineering (i.e., to apply knowledge of math, science, and technology and creativity to design a solution for a defined problem). Items for the three assessments addressed the same material but were worded differently and randomly sequenced.

Interobserver Reliability

Interobserver reliability was measured for 32% of all unit quizzes and 33% of engineering quizzes across participants and experimental conditions by a trained adult volunteer using an answer key. An item-by-item method was employed to calculate the interobserver reliability by dividing the number of agreed items by the total number of questions (i.e., 10) and multiplying by 100. The results indicated a mean 99.1% agreement (range 80%-100%).

Social Validity

Social validity data were collected at the conclusion of the study. All participants completed a 15-item questionnaire that required the participants to rank each of the 12 items on a scale of 1 to 5 with 5 being strongly agreed and 1 being strongly disagreed. The areas included the degree to which the participants viewed engineering was important, they learned about what engineers do, and whether they liked and learned best from guided notes, brainstorming sessions, group work, class discussion, and/or explicit instruction. The last three items of the questionnaire were open-ended questions that asked the participants to describe the type of instruction in which they learned the most, the least, and their overall learning experience with science and engineering. The experimenter read these questions aloud to the entire class.

Experimental Design and Procedures

Two separate experiments were concurrently conducted in two different classes in this study. For Class A, we examined the differential effects of an ETK and the combination of ETK and explicit instruction (EI). For Class B, we examined the effects of EI compared to the effects of ETK+EI. This was designed to yield results that would help determine which method, or a combination of methods, was the most beneficial. For both experiments, the experimental design was a single-subject multiple probe (Horner & Baer, 1978) across three science units (unit 1: earth, unit 2: soils, unit 3: minerals). For both experiments, there were four conditions of baseline, intervention A, intervention B, and maintenance.

Baseline. During this phase, students received no science instruction. Baseline data were collected to determine students' pre-knowledge of the science contents.

Intervention A (ETK) for Class A. The ETK instruction for Class A consisted of a series of activities that were either adapted from the Engineering Teaching Kits from the TeachEngineering Resources for K-12 (TeachEngineering, n.d.) or developed by the experimenter. The lessons and activities published on the TeachEngineering website were peer-

reviewed and classroom tested. The activities chosen or developed for this study met the following criteria: (a) provided students access to the material from the McDougal Little Science *Earth Surface* textbook while including at least one aspect of the engineering design process, (b) were age and grade-level appropriate, and (c) were implemented in one 45-min class period.

The experimenter spent the first 5 min of class by presenting the students with the engineering design process worksheet and defining engineering problem of the day. The experimenter then spent 15 min providing students with background information needed to solve the problem and the opportunity to brainstorm possible solutions as well as defining expectations for the tasks to be completed. This information was dictated by the ETK that had been selected for that day to cover the relevant material. The students then spent 15 min completing the daily worksheet as they conducted the associated engineering activity. During this time, the experimenter circulated throughout the room to ensure that students stayed on task. Students were allowed to ask questions about the procedures during information collection, but the experimenter did not explicitly instruct the students on data analysis or the engineering process. The next 5 min were spent meeting as a class to discuss results and ideas. In the last 5 min of class, the students turned in their completed work and completed the daily quiz.

During this phase, the daily lessons were planned to address at least one step in the engineering design process. Due to the depth of this process and the time it would take to have the students complete the entire lesson, the entire engineering design process could not be implemented in one 45-min class period. However, at the end of the three science units, the students had been exposed to all steps of the engineering design process. For example, one lesson in the soil unit required students to focus on defining various problems that could occur with soil (e.g., not enough nutrients for plants to grow or poor composition that would easily erode in rain fall). The next lesson required the students to research existing solutions to the defined problem. In the third lesson, the students had to brainstorm possible solutions that would work better based on what they had learned about the properties of soil. Each of these lessons focused on one aspect of the engineering design process; but across lessons, students had the opportunity to build upon their previously knowledge to master the entire engineering design process.

Intervention A (EI) for Class B. The explicit instruction for Class B consisted of a series of activities developed by the experimenter that included the required components of explicit instruction (i.e., model-lead-test). Similar to Class A, daily activities chosen for this study meet the following criteria: (a) provided students with access to the material from the McDougal Littell Science *Earth Surface* textbook (Trefil et al., 2005), (b) were age and grade-level appropriate, and (c) could be implemented in one 45-min class period.

The experimenter spent the first 4 min of class introducing the topic. The next 36 min were separated into three 12 min segments. In each segment, the experimenter modeled the guided notes for the lesson. Guided notes were premade notes with blank spaces that the students completed. These notes were projected on the whiteboard so the experimenter could fill in the correct answers while soliciting student responses. The experimenter then led the students through the practice problems. Finally, the experimenter tested the students with the relevant independent practice. During this time, the experimenter circulated throughout the room to ensure that students stayed on task and explicitly instruct the students if questions arose. For

example, while the students were answering questions about the different properties of minerals following guided notes on this topic, the experimenter would guide the students to the correct answer by leading questions. Then, the experimenter would reinforce the concepts by asking the students questions about what was just discussed. In the last 5 min of each class, the students turned in their completed work and completed the daily quiz.

Intervention B (ETK+EI) for Classes A and B. The intervention B for both classes combined the ETK with EI in basic Earth science and the engineering problem solving method. During this phase, the experimenter spent the first 5 min explicitly instructing students about the engineering design process and defining the engineering problem of the lesson. The next 5 min were spent with the students brainstorming possible solutions to the problem. The experimenter then spent 10 min presenting relevant background information using the “model-lead-test” method. Following this, the students had 15 min to complete the related engineering activity in a group. As the students conducted the activity, the experimenter circulated the room and asked probing questions (e.g., “What if the design constraints required the engineer to choose a mineral that had a hardness greater than 5?”) to monitor students’ understanding. The final 5 min were spent taking the daily quiz.

Maintenance. The maintenance phase began when the students had completed the material covered in each unit. Maintenance of these skills was measured using the same format as the daily quizzes with randomized selection of questions across lessons within that unit. Instruction on the specific unit during the maintenance phase was unavailable.

Procedural Reliability

Procedural reliability was established through the use of three pre-made checklists to ensure that each intervention was implemented correctly. Each checklist corresponded to the type of instruction that was implemented: ETK instruction (13 items), EI instruction (22 items), and ETK+EI instruction (18 items). The director of the middle school employed procedural reliability measurements by conducting observation sessions during 30% of the intervention sessions to determine the extent to which the experimenter conducted the instructional procedures correctly. The director chose the observed sessions randomly, blind to the experimenter. The procedural reliability was calculated by dividing the number of components completed correctly by the total number of components possible and multiplying this by 100. The procedural reliability indicated a mean of 98.9% with a range of 92.3% to 100%.

Results

Science Quiz Scores

Differential effects of ETK and ETK+EI for Class A. Students A1 through A6 received the ETK instruction, followed by the ETK+EI instruction in a staggered format across the three science units, therefore allowing the experimenter to evaluate the additive effects of ETK+EI over the ETK instruction. During the baseline condition, the quiz scores for all participants were equal to or lower than 3.0 across all units with the exception of one data point of the Minerals unit for participant A4, A5, and A6 (see Figure 1). During ETK, all participants made improvements in quiz scores for all units with the class mean scores of 7.46, 7.39, and 6.57 for

Earth, Soil, and Minerals units, respectively (see Table 1, upper panel). A visual analysis of the graphs indicates that there were no overlapping data points between the baseline and ETK conditions, except unit 3 for participants A4 and A6, suggesting that ETK had a clear positive effect on students' quiz scores. During the ETK+EI condition, all but participants A5 and A6 slightly improved their mean quiz scores when compared to those during the ETK instruction, with the class mean of 7.92 for Earth unit, 8.67 for Soil unit, and 9.29 for Minerals unit. However, such improvement was not conclusive for all participants based on visual analyses of the data. During the maintenance condition, the majority of participants in Class A remained at a level of correct responses similar to that during ETK+EI, with the overall class mean of 8.88, 8.39, and 8.78 across the three units.

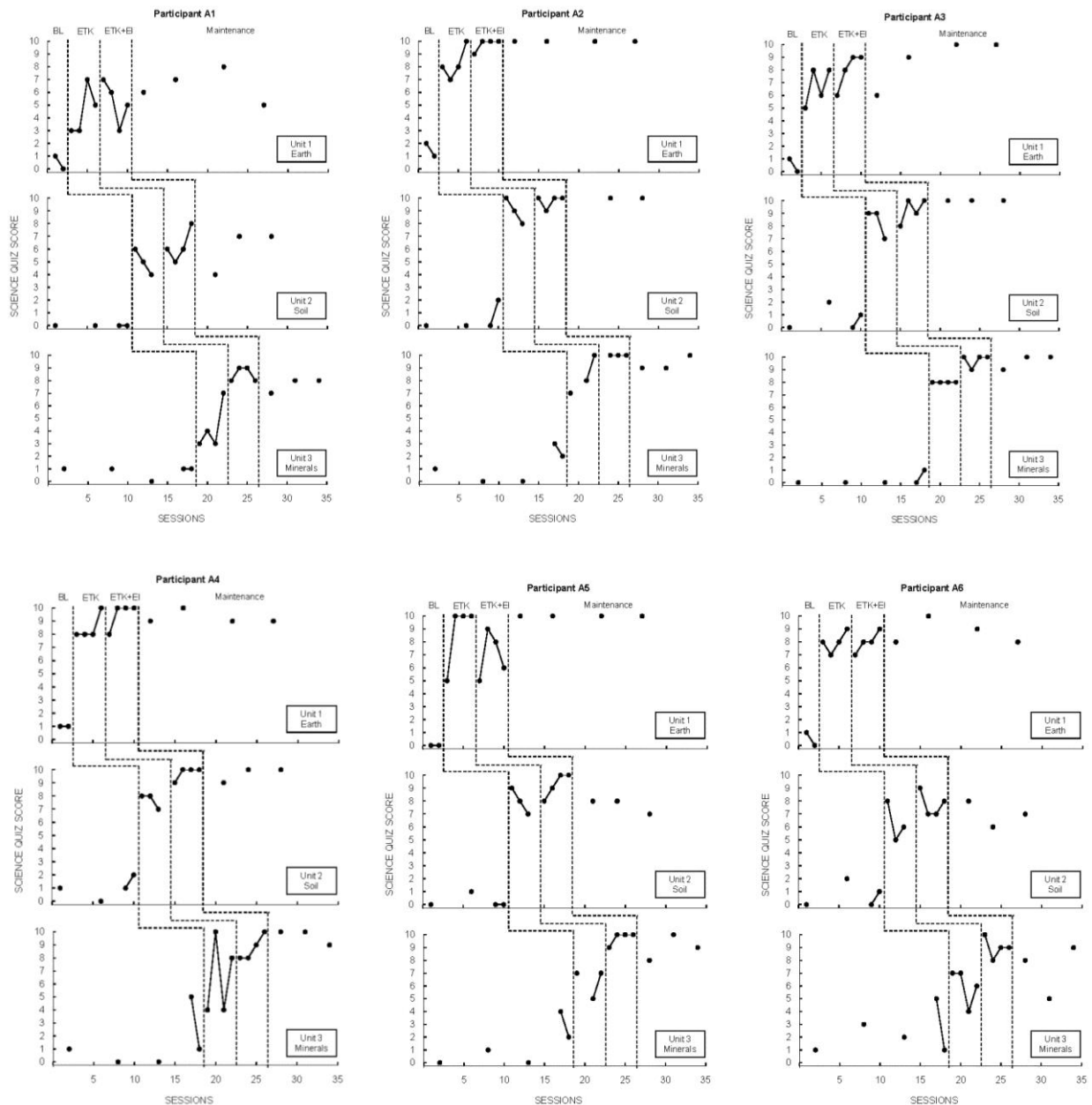


Figure 1. Participants' science quiz scores across experimental conditions in class A.

Table 1

Participants' Mean Scores on Science Quizzes across Three Units and Experimental Conditions in Classes A and B

<i>Class A</i>												
Stud.	Unit 1: Earth				Unit 2: Soil				Unit 3: Minerals			
	BL	ETK	+EI	Maint.	BL	ETK	+EI	Maint.	BL	ETK	EI	Maint.
A1	0.50	4.50	5.25	6.50	0.00	5.00	6.25	6.00	0.80	4.25	8.50	7.67
A2	1.50	8.25	9.75	10.00	0.50	9.00	9.75	10.00	1.20	8.33	10.00	9.33
A3	0.50	6.75	8.00	8.75	0.75	8.33	9.25	10.00	0.20	8.00	9.75	9.67
A4	1.00	8.50	9.50	9.25	1.00	7.67	9.75	9.67	1.40	6.50	8.75	9.67
A5	0.00	8.75	7.00	10.00	0.25	8.00	9.25	7.67	1.40	6.33	9.75	9.00
A6	0.50	8.00	8.00	8.75	0.75	6.33	7.75	7.00	2.40	6.00	9.00	7.33
Class Mean	0.67	7.46	7.92	8.88	0.54	7.39	8.67	8.39	1.23	6.57	9.29	8.78

<i>Class B</i>												
	Unit 1: Earth				Unit 2: Soil				Unit 3: Minerals			
	BL	EI	+EI	Maint.	BL	EI	+EI	Maint.	BL	EI	EI	Maint.
B1	0.00	5.50	8.75	8.75	0.50	7.67	9.25	8.67	0.80	6.00	8.00	6.00
B2	0.50	5.50	8.25	8.75	0.00	6.33	8.50	7.00	0.00	5.75	9.50	7.33
B3	0.00	5.00	8.75	8.75	0.50	7.00	8.25	8.00	0.80	5.25	7.00	7.00
B4	0.00	9.50	8.00	9.50	0.25	9.33	9.50	9.00	0.20	7.50	10.00	9.33
B5	1.00	7.50	7.50	8.50	0.25	8.33	9.25	8.50	1.20	7.25	9.33	8.33
B6	0.50	7.25	8.00	8.50	0.75	8.67	9.25	9.00	1.40	6.25	9.50	8.33
Class Mean	0.33	6.71	8.21	8.79	0.38	7.89	9.00	8.36	0.60	6.35	8.77	7.60

Differential effects of EI and ETK+EI for Class B. In contrast to Class A, students B1 through B6 received the EI instruction, followed by the ETK+EI instruction allowing the experimenter to evaluate the additive effects of ETK+EI over the EI instruction. During the baseline conditions, all students' data remained low and stable with only two data points (i.e., for participants B5 and B6 on the Minerals unit) that were above 2.0 correct answers. During EI, all participants achieved clear improvement in quiz scores (see Figure 2) for all units with the class mean scores of 6.71, 7.89, and 6.35 for Earth, Soil, and Minerals units, respectively. A visual analysis of the graphic displays shows that there were no overlapping data points between the baseline and EI conditions across all units, except for participant B3. This suggests that EI contributed to the improvement of students' quiz scores for all units. During the ETK+EI condition, all participants except B4 and B5 slightly improved their mean quiz scores when compared to those during the EI instruction, with the class mean of 8.21 for Earth unit, 9.00 for Soil unit, and 8.77 for Minerals unit (see Table 1, lower panel). However, such improvement was clearer for participants B1 and B2 than others according to visual analyses of the data. During the maintenance condition, the majority of participants in Class B remained at a level of scores similar to that during ETK+EI, with the overall class mean of 8.79, 8.36, and 7.60, respectively.

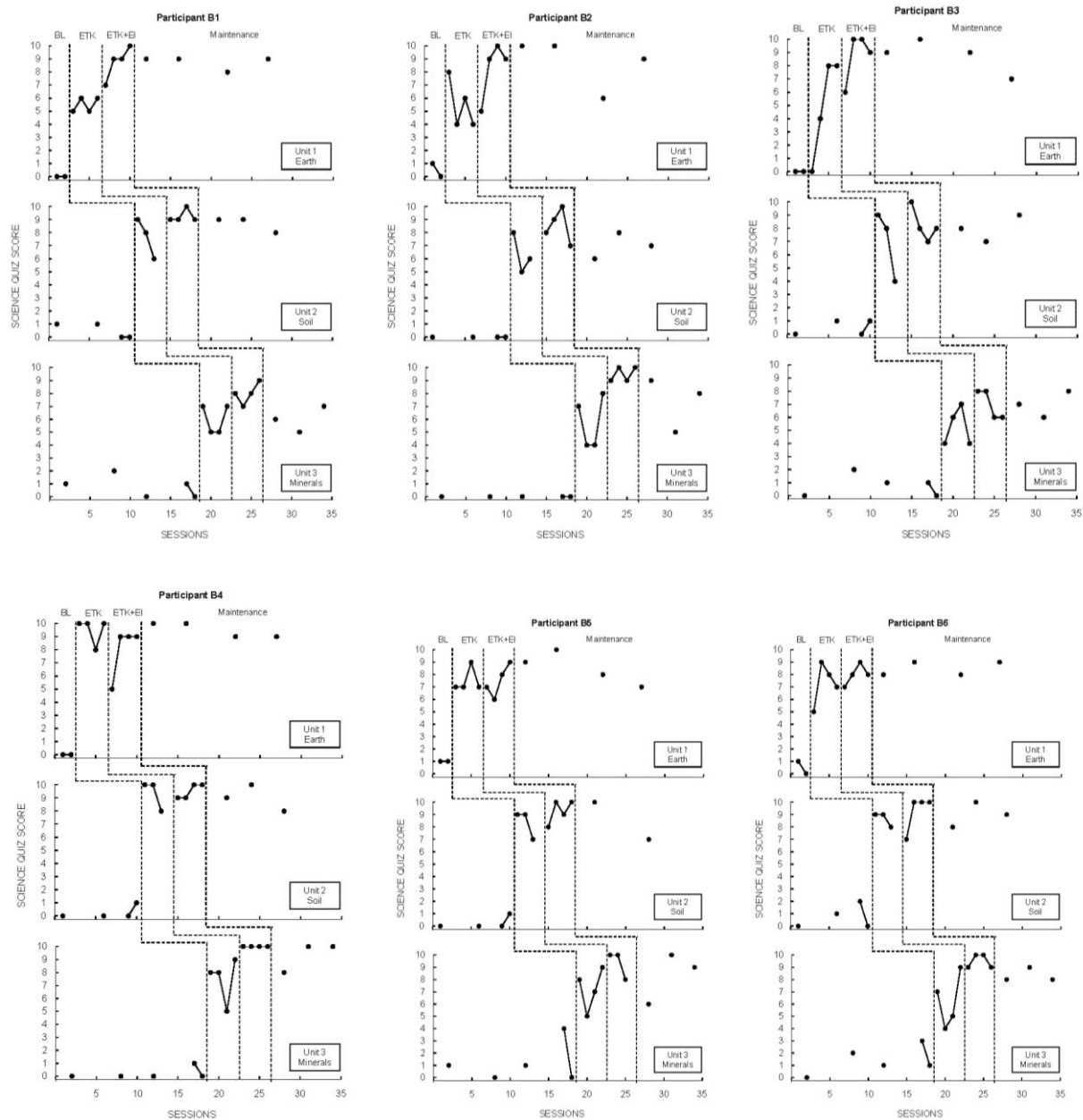


Figure 2. Participants' science quiz scores across experimental conditions in class B.

Engineering Problem Solving Knowledge

Class A. The pretest data collected for Class A indicated that participants A1 through A6 answered zero to two questions correctly, with the class mean of 0.8 correct responses on the engineering problem solving knowledge test. In the first posttest, all participants except A1 improved their accuracy in the engineering problem solving process, with a range of 2.0 to 7.0 correct and a class mean of 4.0 correct after receiving four sessions of ETK instruction. On the second posttest, all participants in Class A improved their score by at least 3 correct answers (see Figure 3).

Class B. Similar to Class A, the pretest results for participants in Class B indicated that majority of the students did not have a clear understanding of the engineering design process. Participant B6 received the highest number of correct responses of five among his peers. At the end of the initial four sessions of EI instruction (i.e., Earth unit), three of the six participants in Class B scored lower on the first posttest when compared to their pretest scores. On the second posttest, the five participants who completed the test all scored higher by at least 30% more than the pretest and first posttest, with a class mean of 9.2 correct responses (see Figure 3).

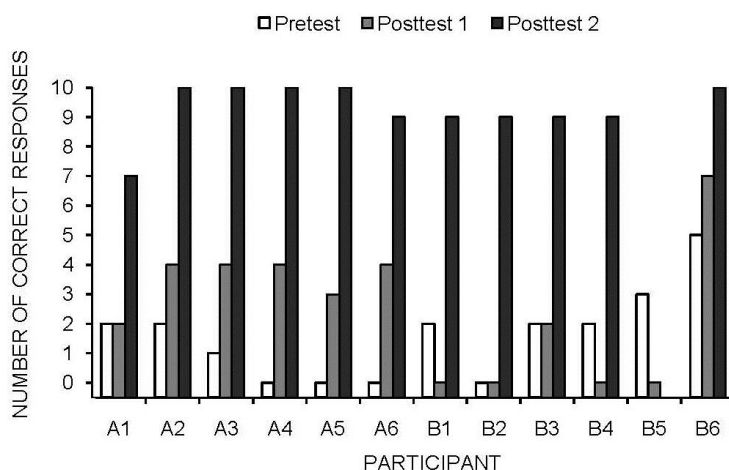


Figure 3. Number of correct responses on the pretest and posttests of the engineering design process.

Social Validity

Class A. Overall, the data from the social validity questionnaire indicated that the participants in Class A agreed or strongly agreed that learning about engineering is important. They also agreed that guided notes, class discussion, learning problem-solving process, and explicit instruction helped with their understanding of science and engineering concepts, and that they better understood what engineering entails. Furthermore, three of the six participants in Class A strongly agreed that working in groups helped their learning. The activity students disliked the most was working in groups. For the open-ended questions, most students responded that they had positive experiences with the engineering based activities and guided notes. For example, participants A1, A3, A5, and A6 all listed “activities” as a part of instruction that helped them learn the science concepts the best. Three students expressed that guided notes did not help them as much as the activities. When asked about their learning in science and engineering concepts, five of the six participants in Class A responded positively. For instance, participants A1 and A3 both expressed that they want to become engineers when they get older. Student A5 expressed dislike of the engineering concept by indicating “I didn’t like engineering because other things interest me more.”

Class B. The data for Class B indicated that students agreed or strongly agreed that guided notes, class brainstorming sessions, and explicit instruction helped them better understand the concepts in class. Additionally, five out of the six students agreed or strongly agreed that they understood

what engineering is. Five students agreed or strongly agreed that working in groups to solve an engineering problem helped them better understand the material. Out of these four students who responded to the open-ended questions, all indicated that they thought the engineering based activities helped in their learning of the concepts. Only one student, B1, expressed dislike of the guided notes. When asked to describe their learning in science and engineering concepts, two out of the four students, responded “great” and “fun.”

Discussion

The purpose of this study was to determine the differential effects of three different science-teaching methods (i.e., ETK, EI, and ETK+EI) on the basic Earth science performance and the engineering problem-solving process of 12 middle school students with LD and ADHD. The results of this study showed that both ETK and EI alone helped students gain an understanding of the science concepts when compared with the baseline condition. Additionally, the combined method of ETK+EI produced further improvements for most students on their quiz scores when compared to the individual interventions. Participants’ understanding of the engineering design process also improved as a result of being exposed to the ETK instruction. This study extends previous research in empirically investigating the effects of multiple science instructional methods for students with LD and ADHD, by specifically integrating engineering problem-solving process in the instruction.

Effects of ETK

The results from Class A suggest that using an ETK is an effective teaching method. These results are consistent with previous studies by McCarthy (2005) and Dean and Kuhn (2006) supporting the benefits of hands-on, application based instruction that can allow students to connect with science materials and offer them a multi-sensory approach to learning. In the current study, students received added instruction on the engineering design process during the ETK instruction. This component requires the students not only to become actively involved with the material, but also to apply their creativity to solve real-life problems. For example, in the soil unit, the students had to apply what they know about the properties of soil to assess the soil in their own yards and design a way to make their soil hold water for a pond. This required the students to implement the engineering design process to apply what they learned in previous lessons about soil properties, to test and determine the quality of their soil sample, and to brainstorm ideas to make their soil more viable for the defined design problem. These types of connections between what students have learned and real-life problem solving opportunities make the material more relevant and accessible to the students (Olds et al., 2006).

In addition to the improved science scores, the effectiveness of the ETK instruction is further supported by students’ demonstration of knowledge in the engineering design process as shown on the posttest results. Specifically, none of the students in Class A answered more than two items correctly on the pretest. On the first posttest, five of the six students increased their number of correct responses by two to four responses. Greater improvement was observed on the second posttest when the students had received 24 ETK lessons that covered the entire engineering design process. These results may be attributed to the repetition of the engineering design process and the student involvement in the various steps throughout the ETK and ETK+EI lessons. Contrarily, students in Class B did not improve their engineering problem-solving

knowledge until they received the ETK+EI instruction (i.e., posttest 2). This finding is not surprising as students' knowledge is unlikely to improve until they are directly taught.

Effects of EI

The results from Class B indicate that using EI in isolation is effective in improving students' science achievement. The data show that all students improved their daily quiz scores from baseline to the EI phase across all three science units. These findings are consistent with the study conducted by Klahr and Nigam (2004) indicating that explicit instruction is a beneficial way to teach students science concepts. Although explicit instruction does not allow the students to directly interact with real-life problems or apply their understanding of the material to daily situations, it requires students to actively respond to questions about the concepts explained explicitly. The repetition and systematic use of guided notes may have helped students understand the science concepts. This is supported by Klahr and Nigam, acknowledging that the provision of multiple exemplars and explicit explanations during science instruction can foster better students' understanding of difficult concepts than discovery learning.

Effects of ETK+EI

The purpose of examining the combination of ETK+EI was to determine if the combination of the two teaching methods would allow students to better access and employ the material. The combination of ETK+EI yielded greater improvement in daily quiz scores for most students in both Class A and Class B, when compared to ETK or EI alone. These results are consistent with the findings of McCleery and Tindal (1999), demonstrating that a combination of explicit instruction and hands-on learning experiences produced better student test results. In Class A, students' improvement in quiz scores was not substantial, which indicates that the additive ETK+EI instruction supports a continuation of students' understanding of the material. However, most students in Class B showed greater improvement in quiz scores during ETK+EI condition than those during the EI condition. This possibly suggests that the ETK component of the instruction has a stronger effect than the EI component because the ETK allows the students to use a multisensory approach to interact with the material while connecting the concepts to their every-day lives. Such interpretation needs to be made cautiously because the results are compared across two different classes.

Limitations and Recommendations for Future Research

There were three main limitations in this study that warrant future research. First, the study did not allow us to compare the effects of the ETK and EI alone because Class A and Class B received a respective intervention. Due to the limited number of lessons available within each unit and the nature of the experimental design, it is difficult to structure three conditions where we might compare ETK, EI, and ETK+EI within each class without possible carry-over effects. We chose to investigate the effects of ETK and EI separately in two classes to allow for more rigorous experimental control. Future research should compare the effects of these two interventions alone.

The second limitation concerns the implementation of the daily quizzes. This type of daily quizzing was a novel approach for most participants; thus, the written quizzes may not accurately represent what they know. We employed written assessments because we felt that it would help

prepare students for similar types of testing situations (e.g., standardized tests) in the future. Due to repeated measurement, students also may have become more accustomed to the type of testing, as shown in the slightly increasing scores during baseline for unit 3. Additional research is warranted to determine if different types of assessment would yield similar results.

The third limitation is related to the student demographics. In this study, all students were Caucasian males with LD or ADHD in a private school setting where class sizes were no larger than seven students per class. As a result, subject generalization is limited. Future research needs to determine if a similar study would yield similar results with participants of a more diverse demographic background, such as female students, students with different disabilities, students of different ethnicity, and students attending public schools.

Implications for Practice

Based on the results of this study, it is apparent that students who have been diagnosed with a LD or ADHD benefit from being exposed to a combination of explicit instruction and the applied engineering problem-solving process in the sixth grade science classroom. It is important to provide students with structure, guided notes, and repetition of the material. It may be more important to provide students with the opportunity to not only interact with the material in hands-on experiments, but also apply what they have learned to solve real-life problems using the engineering problem-solving process. The availability of structured and peer-reviewed online sources of engineering teaching kits, such as www.teachengineering.com, makes it more accessible for science teachers to engage students in engineering problem-solving process in daily instruction. These sources provide engineering background for teachers who may not be familiar with engineering concepts. Additionally, most of these ETK lessons require minimal time to prepare and few extra materials. By combining these readily available ETK lessons with teacher resources provided by state science textbooks, teachers can easily include both ETK and EI in science classrooms. This combination will provide students with a multisensory approach to access the content. It will also expose students to what engineering is, hopefully inspiring them to pursue careers in engineering to solve real life problems.

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***Service Delivery for High School Students with High Incidence Disabilities:
Issues and Challenges***

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Abstract

High schools throughout this country are as heterogeneous as the students they serve in size, location, tax base, student make-up, and teacher quality. However, they must all follow the mandates of NCLB and IDEA. While these policies affect all schools, high schools continue to face many challenges implementing these laws effectively for students with disabilities for several reasons. This article examines three broad issues surrounding these mandates in the context of serving secondary students with disabilities, particularly those with high-incidence disabilities: an overview of challenges facing secondary schools, models of service delivery, and the contemporary roles of the special and general educator. In conclusion, the authors address recommendations specific to secondary campuses.

***Service Delivery for High School Students with High Incidence Disabilities:
Issues and Challenges***

The approaching reauthorizations of the No Child Left Behind (No Child Left Behind [NCLB], 2002) and Individuals with Disabilities Education Improvement Act (IDEA, 2004) will no doubt force reform of the current school system in this country as it did nearly a decade ago when these laws were most recently re-authorized. While these policies affect all schools, high schools continue to face many challenges implementing these laws effectively for students with disabilities (Greer & Meyen, 2009; Nichols, Dowdy, and Nichols, 2010; Therein & Washburn-Moses, 2009) for several reasons. This article examines three broad issues surrounding these mandates in the context of serving secondary students with disabilities, particularly those with high-incidence disabilities: an overview of challenges facing secondary schools, models of service delivery, and the contemporary roles of the special and general educator. In conclusion, the authors address recommendations specific to secondary campuses.

Statement of Problems and Challenges

High schools throughout this country are as heterogeneous as the students they serve in size, location, tax base, student make-up, and teacher quality. However, the mission of these schools, inclusive of maximizing the final four years of the students' academic careers, preparing students for a life beyond high school, and affording opportunities for students to graduate with a diploma, is the same. While some outcome data suggests that students in specific disability categories are graduating more and dropping out less than before (Cortiella, 2011), by and large students with disabilities continue to lag behind their non-disabled peers in this area (Shiftner, 2011). Exacerbating the issue is the connection of high stakes state assessments to graduation and diploma options for students with disabilities (Burdette, 2007), and students with disabilities failing to meet the lofty accountability goals of NCLB (Harr-Robins et al., 2012). Other school reform initiatives such as response-to-intervention (RTI) and other multi-tiered models are often difficult to implement at the high school level when compared with elementary and junior high school (Fuchs, Fuchs, & Compton, 2010; Vaughn & Fletcher, 2010).

Characteristics of students and environmental structures unique to high schools interfere with implementing many of the school reform efforts (e.g., RtI, NCLB, IDEA). There exists a much wider variation in the academic skill set of a high school student as compared to students in lower grades. For example, when compared to an elementary student where a 3rd grade student who has difficulty reading can only be behind three grade levels, a high school student who struggles to read may be up to six grade levels behind with only a few years left to graduate (Hawkins, Hale, Sheeley, & Lingis, 2011; King-Sears & Bowman-Kruhm, 2011). Academic difficulties experienced for many years of school are often exacerbated with learned helplessness (Gotshall & Stefanou, 2011) and low self-efficacy beliefs (Margolis & McCabe, 2006). In addition to the academic challenges and related consequences, 20% of high school students meet the DSM-IV criteria for a mental disorder (Centers for Disease Control, 2013).

Environmental structures inherent to high school, along with individual student characteristics must be considered when planning curriculum and assessments. High school students generally have more control over their environments due to their age and level of responsibilities (e.g., maintaining a job, driving). High school academics are in direct competition with the adolescents' extra-curricular activities whether it is school-sponsored or not. High schools also have scheduling variations (block, flexible), vocational programs, and graduation credit requirements. All of these factors must be considered when planning the most effective model of service delivery.

Models of Service Delivery

To meet the demands of Highly Qualified Teacher (HQT) provision of NCLB and IDEA, high schools have had arguably the biggest challenge. Traditionally, content area general education teachers were certified in their respective content areas and special education teachers were certified by either a specific category of disability such as learning disabilities, emotionally disturbed or generally certified to be qualified to work with students with all disabilities (Brownell, Sindelar, Kiely, & Danielson, 2010). Often, special educators would take the primary instructional role in teaching students with moderate and severe disabilities. Since NCLB requires that highly qualified teachers teach students, special educators must now be certified in a specific content area if they are the primary teacher in addition to being the special educator

(Quigney, 2009; Therein & Washburn-Moses, 2009). The inclusion of the majority of students with disabilities in statewide assessments, per NCLB, and the access to the general education provisions in IDEA, have resulted in more students with disabilities being taught in general education classrooms. The result has been many special education classrooms are being utilized primarily for students with more severe disabilities. This combination of accountability and access has posed significant challenges to the contemporary high school (Carpenter & Dyal, 2007; Therein & Washburn-Moses, 2009) and has resulted in a number of collaborative models of service delivery including co-teaching, collaboration, supportive resource classroom, inclusive supports and multi-tiered instruction.

Co-teaching

Co-teaching is broadly defined as a collaborative effort between a general education and special education teacher in which both teachers share the instructional responsibility for students in the classroom (Kloo & Zigmond, 2008). This approach has been advocated as a way to ensure students with disabilities have access to the general education curriculum and also meet the HQT standard of NCLB (Friend, Cook, Hurley-Chamberlain, & Shamburger, 2010; Nichols, Dowdy, Nichols, 2010; Rice, Drame, Owens, & Frattura; 2007). Six major approaches to co-teaching are generally used in a co-teaching arrangement:

1. *One teach, one observe*, in which one teacher leads large-group instruction while the other gathers academic, behavioral, or social data on specific students or the class group.
2. *Station teaching*, in which instruction is divided into three nonsequential parts and students, likewise divided into three groups, rotate from station to station, being taught by the teachers at two stations and working independently at the third.
3. *Parallel teaching*, in which the two teachers, each with half the class group, present the same material for the primary purpose of fostering instructional differentiation and increasing student participation.
4. *Alternative teaching*, in which one teacher works with most students while the other works with a small group for remediation, enrichment, assessment, preteaching, or another purpose.
5. *Teaming*, in which both teachers lead large-group instruction by both lecturing, representing opposing views in a debate, illustrating two ways to solve a problem, and so on.
6. *One teach, one assist*, in which one teacher leads instruction while the other circulates among the students offering individual assistance (Friend, Cook, Hurley-Chamberlain, & Shamburger, 2010, p. 92).

Consultation

The consulting teacher model is a service delivery method that delivers services to students within the general education classroom both directly and indirectly. These teachers are sometimes referred to as “inclusion” teachers (Carpenter & Dyal, 2007). In some situations the consultant works indirectly with selected students by directly working with the teacher (Idol, 2006). For example, the special educator may provide materials to the teacher for modified or accommodated instruction or assist with designing data collection systems (Ling, Barton-Arwood, & Jolivet, 2011). Special educators may also spend time in certain classes providing direct or supplemental instruction in a traditional co-teaching situation.

Supportive Resource Classrooms

Supportive Resource Classrooms are classrooms in which the general education curriculum is taught by specialists outside the general education classroom. In a truly supportive program, general and special educators collaborate to provide instruction to be learned in the special education classroom and then transferred to the general education classroom (Idol, 2006). Examples of these supportive resource classrooms are found in the professional literature concerning secondary schools. Scanlon and Baker (2012) describe a resource classroom where students with significant skill deficits learn specific academic skills and study strategies. Students with high incidence disabilities such as SLD need intensive, explicit instruction. Aguilar, Morocco, Parker, and Zigmond (2006) describe a high school where 23% of students with disabilities have additional supports beyond the general education classroom in the form of self-contained basic skills and content classes to support learning. This is often very difficult to deliver in the general education classroom due to the necessity to significantly reduce group size in addition to the specialized set of skills required by the teacher (McCleskey & Waldron, 2011).

Supportive resource classes are often called *content mastery*. In this type of classroom, students with disabilities receive their primary instruction in the general education classroom. Students then receive supplemental instruction in either a scheduled manner or on an “as needed” basis (Vannest, Hagen-Burke, Parker, & Soares, 2011). While many content mastery classrooms serve only students with disabilities, some schools have used this approach for non-identified or “at-risk” students (Jenkins, 2005).

Inclusion Supports

Providing inclusion supports by teachers is a variation of the consultation and co-teaching models (Carpenter & Dyal, 2007). The primary difference is that “inclusion supports” are often provided by a paraprofessional or a special education teacher. Paraprofessionals (or teachers) in this arrangement accompany students with disabilities attending general education classes (Idol, 2006). The balance of “power” is heavily tilted to the general education teacher in this arrangement versus a traditional and truly co-teach situation. Inclusion supports can also be in the form of systematically arranged peer support as an alternative to adult support (Carter, Cushing, Clark, & Kennedy, 2005; Carter, Sicscom, Melekoglu, & Kurkowski, 2007).

Multi-tiered Instruction

Multi-tiered instructional service delivery models (e.g. RTI, PBS) have increased in their use in this country in order to meet the legislative requirements of IDEA and NCLB and to serve an ever-growing population of diverse learners (Fuchs, Fuchs, & Stecker, 2010). This model is characterized by matching the intensity of supports to the intensity of student needs. It has also been used to prevent and remediate learning difficulties as well as a method of SLD identification. While RTI has been studied extensively in the elementary setting, relatively little research has been done at the secondary level. Fuchs, Fuchs, and Compton (2010) attribute this void in the research due to scheduling problems and compliance issues related to working with adolescents. Interestingly, scheduling issues have been identified as a major consideration in the difference in how RTI is conceptualized and delivered at the secondary level (The National High School Center, 2010).

Challenges

Several broad themes regarding the challenges of providing effective instruction to students with high-incidence disabilities when using an approach or combination of approaches described above at the high school level have been identified in the literature. The models of service delivery described above are designed to be collaborative, meet the legal requirements of current educational policy, and address the needs of individual students. Each of these models contain many of the essential best practices of inclusive schools such as curriculum and instructional design to accommodate the diverse needs of students, collaboration, and providing supports (see Jorgensen, McSheehan, & Sonnenneier, 2009). As well intended as these instructional delivery models might be there is often disconnect between recommended and actual educational practice. For example, several problems with supportive resource classrooms have been identified by McCleskey and Waldron (2011) including:

- (1) Instruction in the resource classroom tends to supplant rather than supplement core instruction.
- (2) Instruction delivered in the resource was of lower quality and rarely connected to the general education classroom.
- (3) Accountability for student performance is also unclear when the teaching responsibility is dispersed across two or more professionals.

Accountability for student performance permeates all of the models and poses significant challenges to teachers and students alike. Often these models of instructional delivery are implemented with little research of effectiveness. For example, the effectiveness of common educational practices such as co-teaching is yet to be determined at the secondary level (Friend, Cook, Hurley-Chamberlain, & Shamburger, 2010; Kloo & Zigmond, 2008). Much of the literature on co-teaching is focused on logistics, delivery, and teacher perception of co-teaching. This incomplete and inconsistent knowledge base regarding co-teaching has practical implications. To illustrate, high levels of teacher satisfaction have been reported in the literature (Kloo & Zigmond, 2008) concerning co-teaching while other teachers who have an unfavorable experience with co-teaching and compare it to an “arranged marriage” (Murawski & Hughes, 2009). As traditional teaching roles are transformed into collaborative teaching roles, it is important to have clearly defined teaching roles and responsibilities.

Collaborative teaching models assume equality between general education and special education; at the high school level this is not always the case. Simmons and Magiera (2007) studied co-teaching at the high school level and regarding teacher roles, reported general education teachers being the “lead” or primary teacher and special educators serving as monitors and reviewers. Special educators reported having a limited role in the classroom and felt as if they were instructional assistants doing menial tasks and only serving students with disabilities in the classroom (Keefe & Moore, 2004). Role confusion can be exacerbated by the complexities of the secondary content; in addition, special education teachers often have varying degrees of content knowledge (Friend, Cook, Hurley-Chamberlain, & Shamburger, 2010; Nichols, Dowdy & Nichols, 2007). Other typical classroom issues such as who is responsible for grading and managing students (Keff & Morre, 2004; Nichols, Dowdy, Nichols, 2010) can also lead to role confusion as well.

The use of multi-tiered instructional models has expanded the role of the contemporary special education teacher. In this type of arrangement, special education teachers support students throughout all tiers of instruction including in the general education classroom at Tier 1 (Hoover & Patton, 2008). A significant amount of teacher time is spent doing collaborative activities and providing direct and indirect student support. Mitchell and Deshler (2011) analyzed the roles of special education teachers through extensive observations in RTI systems and reported that special education teachers spend 27% of their time in collaborative activities such as assisting in the classroom, consulting with students and providers about their IEPs and behavior, and providing support to the general education teacher. It was also reported that teachers spent 27% of their time serving as an interventionist with the remaining time spent as a manager (33%) and diagnostician (13%).

A recurring theme found throughout the literature on collaborative instruction is teachers not having adequate time to plan and collaborate (Keff & Morre, 2004; Nichols, Dowdy, Nichols, 2010). Mitchell and Deshler (2011) identified the largest consumer of time of the special educator as when they function as a “manager” at 33% of total time with 53% of that time spent on paperwork and other “non-teaching duties.” In addition to the time spent on instruction, meeting the assessment demands of NCLB has consumed a large part of the school day and consequently, a large portion of the year. Vannest, Hagan-Burke, Parker, and Soares (2011) examined four types of instructional arrangements (self-contained behavior classes, co-teaching, content mastery, and resource) and explored the issue of how teachers spend their time. Four distinct “time” profiles emerged for each arrangement. For example, teachers in “content mastery” spent more time completing paperwork and less time instructing than teachers in co-teaching arrangements. The authors also reported that both general and special educators are concerned about the time they spend on assessments (Vannest, Hagan-Burke, Parker, & Soares 2011) and not enough time on strategic instruction.

Strategic Instruction for Secondary Learners

Because a comprehensive best practices accommodation model is elusive at best (Scanlon and Baker, 2012), it would be difficult to attempt to compile an all-inclusive list. However, when discussing accommodations for high school students, most experts in teacher education and professional development would agree that effective instruction is universally designed. Teachers have noted that providing class-wide appropriate accommodations is a pragmatic approach that benefits all learners in the classroom, not just the students with special needs (p. 222). For that reason, a lesson designed to address varied learning styles and the range of abilities in any given classroom would naturally reach a majority of the learners in that class.

Many of the research-based best practices in education are highly effective with students with disabilities and can engage reluctant learners, appeal to a variety of learning styles, and increase student achievement across the board. In addition to these strategies being best-practices in instruction, they also serve to help students with disabilities develop life skills that will be beneficial inside and outside of the academic setting. Several instructional best practices worth mentioning in this context include cooperative learning, advance organizers, nonlinguistic representations, identifying similarities and differences, hypothesis testing, and setting learning goals and providing feedback (Jorgensen, McSheehan, & Sonnenmeier, 2009). Below, several of these best practices are addressed in further detail.

Cooperative Learning An abundance of research supports cooperative learning's strengths as an instructional method. Effective cooperative elements include group processing, teamwork, and a reliance on interpersonal skills. The collaborative nature of this structure can lead to higher achievement, higher levels of reasoning, increased self-esteem, greater intrinsic motivation for learning, and improved peer relationships, especially for students with special needs (Johnson & Johnson, 1998, 1986). These features make cooperative learning not only an effective instructional strategy but also assist in helping students develop strong communication and collaboration skills which are essential to living and working in the 21st century.

Advance Organizers Advance organizers are tools that provide a structure into which new information can be integrated into prior knowledge about a subject. Effective advance organizers that are visual like flow charts and other graphic organizers assist in making abstract concepts more concrete, and they enhance learning and promote the transfer of knowledge to new situations especially when the material is difficult or unfamiliar (Luiten, Ames, & Ackerson, 1980) as well as help students learn new concepts and vocabulary (Stone, 1983). Students with special needs benefit greatly from activities that allow for the accessing of prior knowledge, are concrete in nature, and provide multiple opportunities for transfer of difficult or newly introduced concepts.

Nonlinguistic Representations Nonlinguistic representations help students acquire knowledge through auditory modes, movement activities such as dance and dramatizations and through the use of visual imagery like pictures, symbols, graphic organizers, and concept maps. When combined with traditional modes like note-taking, hearing a lecture, or reading, students are better able to process and recall what they have learned, in addition to, making connections between topics and concepts (Marzano, Pickering, & Pollock, 2005).

Identifying Similarities and Differences Identifying similarities and differences is a key cognitive process for conceptual understanding (Gentner & Markman, 1994). It allows students to recognize patterns, make sense of new information by developing connections with learned material, as well as classify and group. Teacher modeling of thinking about similarities and differences helps students develop metacognitive processes by having them actively recognize and use what they already know in order to understand something new. Classic structures like t-charts and the Venn diagram are especially effective by employing both the classification activity itself while using a visual representation (Marzano, Pickering, and Pollock, 2005).

Systems

In addition to classroom-specific best practices, a Modified RTI framework has been proposed as an option for high schools to adopt for addressing the academic needs of special needs students (Fuchs, Fuchs, & Compton, 2010). Often, by the time a student reaches high school, sizeable academic deficits exist which require immediate, decisive, and intensive intervention. In contrast, elementary grade teachers using RTI are encouraged to move students through increasingly intensive levels of intervention. The modified RTI model moves to place students with severe deficits in the most intensive level immediately without first moving them through lower levels of the framework. The purpose then would be for secondary schools to assist students in decreasing academic deficits and subsequently "transitioning students down the RTI

pyramid in the direction of less intensive and more standard or normalized levels of the prevention system” (p. 26).

Other best practices that schools may adopt for the benefit of students with special needs are making certain students have access to as many general education classes as possible and that a wide range of elective courses that are tailored to the students’ interests and future plans are available. Students are made aware of, have access to, and are encouraged to participate in the extracurricular activities of their choice. Students with disabilities are proportionally represented in all aspects of the school and there are no places or programs that isolate students with disabilities. Students with disabilities progress through grades and participate in graduation and other school functions the same as their peers without disabilities. Careful planning and career exploration that includes the student takes place so that the transition from high school into higher education or the workforce is successful. The school is proactive in making certain that the student plays an integral role in both their academic decision-making in addition to setting goals that are attainable but which ultimately lead to success after graduation (Jorgensen, McSheehan, & Sonnenmeier, 2009).

Perhaps the most significant change any secondary school can make is a change in philosophy about students with disabilities. In adopting a perspective that encompasses putting the student and their needs first is evidenced in “people first” language (Jorgensen, McSheehan, & Sonnenmeier, 2009) and the attitude that students with disabilities have a fundamental ownership in the school culture that contributes to the "esprit de corps." And lastly, but most importantly, schools focus on and celebrate what students can do instead of what they cannot.

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Teaching Children with Autism to Ask Questions

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Abstract

Children with autism have impairments in communication that make it difficult for them to acquire the ability to ask appropriate wh- questions. This is a very important skill, and one that clinicians often do not know how to target. Search terms were entered into several databases to locate studies published in peer-reviewed journals. The studies had to include a wh-question as the dependent variable. Thirteen studies were located and described. This article reviews the literature in regards to teaching children with autism to ask questions and provides opportunities for clinicians to obtain an evidence-base from which to build their practice.

Teaching Children with Autism to Ask Questions

Recent research suggests that as many as one in 88 children will be diagnosed with some form of Autism Spectrum Disorder (ASD; Baio, 2012). Children with ASD have impairments in social interactions and communication, and display restricted, repetitive, and stereotyped patterns of behavior (NINDS, 2009). Children with autism have many difficulties learning to produce and respond to language. One such challenge is in acquiring the skill of asking questions. Questions beginning with why, who, where, when, and what (also known as “wh” questions) are especially difficult for this population to ask. This skill is important because it enables children to develop appropriate conversational strategies and to request needed information; however, children with autism are typically not motivated by verbal information (Sundberg & Michael, 2001). Many researchers have attempted to teach children with autism this important language skill. However, because this area has not been extensively researched, practitioners have difficulty knowing what research exists and how to best apply it to their own clients. Therefore, people working with children with autism do not yet have a preferred method to teach question-asking behaviors. Thus, the purpose of this paper is to examine published studies that teach question-asking behaviors to children with autism and to identify features that seem most salient in a successful intervention.

Method

An electronic search of the databases *ERIC*, *CINAHL Plus with Full Text*, and *PsychInfo* was conducted using combinations of the following terms: “question, questions, question asking, requesting communication, requests for communication, imitations, verbal imitations, coping strategies, strategies, teaching, teaching materials, training, training methods, training materials, learning methods, teaching methods, Autistic Disorder, PDD, Developmentally Delayed, autism, and autism spectrum disorder (ASD)” and yielded results from multiple peer-reviewed journals. Upon inspection of the abstracts of the articles, 13 articles met the inclusion criteria. Articles

were not included if they focused on a population other than children with autism or pervasive development disorder and if the population was of high school age or older. Studies were also excluded from this review if they only measured the child's ability to mand (request) an object by saying, "I want ____." The dependent variable had to be a question that the child formulated on his/her own rather than following a specific script.

Typical Acquisition of Question-asking

In a qualitative research study conducted almost 50 years prior to this review, Brown (1968) observed the spontaneous speech of three typically developing preschool children to discover whether there was anything in their unprompted speech to suggest that they learned operations that governed their ability to ask questions much like children learn grammar. The author concluded that children do develop a structure for asking "wh" questions (who, what, where, when, why) much like the grammar structure they learn. The researcher noticed recurrent discourse patterns and proposed that these patterns may constitute the basis of a learning process. Furthermore, for typically-developing students, there is an order of acquisition of question asking skills. "What" is the first acquired wh- question word, followed by "where, who, why" and finally, "when" (Bloom, Merkin, & Wootten, 1982). Typically developing children acquire the ability to ask wh- questions through natural language development; however, that is not the case for children with ASD. Most of these children must learn this skill by way of specific interventions and strategies (Ostry & Wolfe, 2011). Indeed, many of the researchers in the following studies provided children with ASD a framework to guide them in their ability to ask questions and measured whether that newly learned skill generalized to other situations. However, the approaches to teaching children how to ask questions varied. These approaches will be examined in further detail.

Early Research on Question-asking in Children with Autism

Almost a decade after Brown's article appeared, Hung (1977) wanted to measure the ability of four children with autism to ask spontaneous questions. These children (one female and three males) ranged in age from 8 years, 1 month to 11 years, 9 months. In this seminal study, Hung taught the children question-asking using modeling, cueing, and reinforcement. The training occurred over a three-week period in which all the children were enrolled in a summer camp specifically for children with autism. There were four experimental conditions. The first experimental condition consisted of obtaining baseline measurement for the children's spontaneous question-asking and rewarding each unprompted question with a token. After obtaining baseline data for three days, each child received 45 minutes of direct instruction in question-asking five days a week. This direct instruction consisted of multiple steps in which the child was guided to ask questions about events from picture cards, objects, and actions, again being rewarded initially with token reinforcers, and later with praise. The third condition attempted to promote generalization of the question-asking skill to other conditions beyond the classroom and without using picture cards by providing opportunities to earn novelty items by spontaneously asking questions. In the fourth experimental condition, the token value was manipulated to assess whether it would affect spontaneous question-asking during non-training time. Hung's study attempted to examine the generalization of spontaneous question-asking responses from training to non-training situations, from question-asking to question-answering as

well as maintenance of question-asking and answering after the summer camp ended. Hung discovered that, although during the training sessions the children's use of spontaneous question-asking increased, the children did not spontaneously ask questions outside their training sessions. He hypothesized that the children may have learned to ask questions in order to receive the reinforcers, but did not generalize the question-asking behavior to other settings once the reinforcement was taken away.

Learning From Question-asking

Although question-asking is an important skill, it is not the end goal. Ultimately, students should be able to learn from asking questions. In 1995, Taylor and Harris sought to examine the extent to which children with autism could be taught to ask the question "What's that?" when pointing to an unknown picture, learn new information by asking the question, and generalize question-asking to a less structured context. Participants included two males and one female child who ranged in age from five years to nine years. The children had similar scores on a standardized measure of vocabulary, with age equivalency scores ranging from three years, two months to four years, two months. The researchers provided three teaching sessions in each child's classroom in which they presented 10 trials. Each trial consisted of four pictures – three known and one unknown – and verbal directions to the child to label the items pictured on the table. A time delay procedure was used along with modeling and cueing. In this first experiment, all of the children demonstrated rapid acquisition of the question-asking skill during teaching. Criterion was met when the children were able to spontaneously ask, "What's that?" within 10 seconds after being presented an unknown picture. They all met mastery criterion of 80 percent accuracy within four to seven sessions and maintained that level of criterion for 15 to 24 sessions.

Generalization probes were conducted to assess whether the question-asking behavior of "What's that?" extended to different settings, people, and three-dimensional objects as opposed to pictures. The children traveled to the school kitchen where they met new adults and were exposed to novel items. Prior to receiving direct instruction in question-asking, the children did not ask any questions during a generalization probe. After receiving training, the children's question-asking generalized to a different setting (kitchen), people (cooks and kitchen help), and objects (blenders, appliances) with 78% - 82% accuracy. As Hung had previously suggested, this ability to ask the question in different settings, with different people, and about different objects implies that children with autism can generalize question-asking behaviors and reinforcement does not have to be tangible.

A second experiment was conducted to assess whether the children could learn novel labels by asking the question "What's that?" A mix of unknown and known pictures was presented to the children. When a child asked, "What's that?" in reference to an unknown picture, he was immediately verbally reinforced and given the picture's name. Expressive and receptive posttest sessions were conducted to determine if each child acquired expressive and/or receptive labels. Receptive labeling tasks involved the child being able to point to a correct picture. Expressive tasks required the child to provide a correct label for the picture. The authors found all three children acquired receptive labels, and two of the three children acquired consistent expressive labels. The third child required discrete training to learn expressive labels. These findings

suggest that the children used the question “What’s that?” not just as a rote response, but also as a means for them to gain information.

In the third experiment, the children walked around the school building where they were introduced to new stimuli. After an instructional period in which training consisted of modeling asking the question “What’s that?” when being exposed to a novel stimuli and using a time-delay procedure, the children met baseline criteria of asking three questions unprompted within a 10 second time restriction. The children then went on a walk and their questions were tallied. All three children’s question-asking increased to criterion (80%) performance. The authors concluded that children with autism are able to learn to initiate a query to request information about novel stimuli, to ask a question in instructional contexts, and to learn new verbal labels from their questions when given instruction and provided with modeling.

In a study conducted by Esbenshade and Rosales-Ruiz (2001), researchers investigated whether a five-year old male with autism could be taught to ask, “What is that?” The procedure used the presence of an unknown object and measured whether the child was able to retain the knowledge he gained from asking the question. This study used natural reinforcement where the child was given the answer to the question in return for asking the question. Stimuli consisted of 114 items (either a 3-dimensional object or a flashcard), 51 of which the child already knew. The child was presented with a mixture of known and unknown items. If the child was able to independently ask, “What is that?” when presented with an unknown item, he was given a correct score. The intervention took place in the child’s home and consisted of six stages beginning with:

- 1.) finding which objects the child could and could not label,
- 2.) teaching the child the task,
- 3.) taking baseline measures,
- 4.) teaching the child to name known stimuli and ask “what’s that?” in the presence of unknown stimuli,
- 5.) giving generalization probes, and
- 6.) providing generalization training.

The training task took place in phase four (i.e. teaching the child to ask “What’s that?” in the presence on an unknown stimuli) and used a procedure that employed answers as the consequence to teach and maintain question-asking. The researchers found that the question-asking behaviors generalized to unknown items, but when the experimenter asked the child to do something with the unknown item (e.g. Put the ___ on the table), he was unable to perform the task. While the child did succeed in learning a new language behavior, he was limited to using it only under very specific stimulus conditions.

Koegel, Camarata, Valdez-Menchaca, and Koegel’s research (1998), also suggests a correlation between question-asking behaviors and vocabulary acquisition. Two males and one female participant, ranging in age from three to six years, were invited to participate in a study that combined the used of motivational procedures and the use of a targeted question, “What’s that?” Intervention took place in a therapy room, while generalization was assessed in each child’s home. The children were presented with an opaque bag holding an item of interest. Once the child asked “What’s that?” the researcher would take the item out, label it, and give it to the child

to play with. If the child did not ask the question right away, the researcher asked the child to imitate the question form. Once the child began spontaneously asking the question, “What’s that?” the preferred items were gradually changed to neutral items and generalization to other settings was assessed. After intervention ended, all three participants continued to ask questions in novel settings and were able to label items that were previously unfamiliar to them. This suggests that gains in these spontaneous language interactions could be correlated with an increase in expressive vocabulary labels.

In a similar study, Williams, Donley, and Keller (2000) proposed a treatment package consisting of modeling, prompting, and reinforcement to teach three types of questions to a couple of 4-year old girls with autism. Instead of teaching the children to ask just one question (i.e. “What’s that?”), the researchers worked with the girls in their homes to teach them to ask three types of questions about a hidden object (What’s that? Can I see it? Can I have it?) The training began with the examiner piquing interest in a box by playing with it in front of the girls. Once they began to show interest, the examiner modeled a question type to them. When the girls repeated the question for two consecutive opportunities, the experimenter faded the modeling to a prompt. The prompt was gradually reduced until the child asked the question independently. When the child asked a question, she was appropriately rewarded (being told the name of the object inside the box, being able to see the object, and being able to play with the object). After each session, the procedure was repeated in another room of the house with the girls’ mothers. The mothers followed the same protocol as the examiner. For both girls, the question-asking generalized to a different person and setting. Twenty days after the treatment phase ended for one girl, and 11 months after it ended for the other girl, the experimenter conducted a follow-up observation. Both girls responded the same way post-treatment as they did during treatment. The authors concluded that their training package demonstrated an effective procedure to establish and maintain high levels of different forms of question-asking.

Most researchers include preferred items, or items of interest to the child, when teaching question-asking behaviors. However, Endicott and Higbee (2007) investigated whether students with autism would inquire about the location of an item, even if the item was not of interest. Four males, between the ages of three and five years and enrolled in a university preschool participated in the study. During the baseline sessions, the children were given noncontingent access to a preferred item for no longer than 30 seconds. The child was then removed from the area for a brief interval while the item was moved to another location. Upon return to the area, the instructor told the child to retrieve the missing item. If the child asked where the item was, the instructor would verbally provide the location (e.g. in the backpack, on a shelf, in the toy box). If the child did not inquire about the item’s location within 30 seconds, the participant was given the item again. Five trials were conducted with a highly preferred item and five trials were conducted with a non-preferred item.

During the intervention sessions, the same basic procedures were followed. The child was given non-contingent access to an item, was removed from the location of the item, and was brought back to the location after the item was moved. This time, if the child did not ask, “Where?” within 30 seconds, he was verbally prompted to imitate the instructor in asking “Where?” Once the child imitated the modeled question, the instructor told the child the location of the item. Again, five trials were conducted with both the highly preferred and non-preferred items.

After intervention, two of the three children were able to ask “Where?” to find out the location of an item with 100% accuracy for three consecutive sessions in just four sessions. These two children were also able to ask “Where?” at home, thereby showing generalization to another environment. One child’s performance was much more variable, and it took 14 sessions before he met the mastery criterion.

The second experiment examined whether these same students could be taught to ask, “Who has it?” The procedures from the first experiment were followed with the addition of a second component. When the child asked, “Where?” the experimenter replied, “I gave it to somebody.” If the participant did not respond, the experimenter verbally prompted the child to say, “Who has it?” Ten trials were conducted (five with a preferred item and five with a non-preferred item). After intervention was complete, all three participants were able to ask “Who?” with 100% accuracy for three consecutive sessions within five sessions.

Interestingly enough, it made no difference for two of the participants whether high or low preference stimuli were used. They learned how to ask the questions regardless of the status of the items that were missing. This suggests that receiving information was sufficient motivation. What is unknown is whether the children were actually motivated to learn the information about the object’s location, or if the idea of playing a word game with the instructor was the motivating factor.

Researchers Koegel, Koegel, Green-Hopkins, & Barnes (2010) investigated if preschool children could be taught to ask the question “Where is it?” whether the question would generalize to novel situations and people, and whether improvement in other early emerging language structures would result. The study took place at a university clinic and included three males between the ages of three and five, diagnosed with ASD. Intervention focused on teaching the child to ask for a desired hidden item (e.g. toys, candy) by saying, “Where is it?” Initially, verbal prompts were provided and once the child asked the question, the interventionist modeled a response using a targeted language structure (prepositions or ordinal markers) and provided the child with the item. In subsequent trials, the prompts were faded. Two dependent measures were recorded: the number of times the child independently asked, “Where is it?” and the number of prepositions or ordinal markers the child produced.

Results revealed the intervention strategy was successful in eliciting the targeted response from the children. Additionally, all children exhibited an increase in expressive language, specifically in the targeted areas of preposition use or ordinal markers. Finally, all three children were able to generalize their newly acquired skills to their home environments. This suggests that instilling intrinsic motivational procedures may be helpful in promoting spontaneous question asking in natural environments.

Roy-Wskiaki, Marion, Martin, and Yu (2010) designed a study to examine if generalization could occur to a natural environment. These researchers taught a five-year old male with autism to ask the question “What?” while he participated in preferred activities in his home. A script was used to elicit the desired response from the child. For example, while he was playing with a preferred item, the experimenter hid an item. The experimenter announced what he did (e.g. “I hid

something”), and the child had to respond by asking the question “What?” Likewise, in another situation, the child started an activity but need more of a particular item. The experimenter said, “We need more of something” to which the child was verbally prompted to ask, “What?” Training was conducted in each of the activities, with the examiner modeling the question and asking the child to repeat it. Verbal prompts were faded over subsequent trials. The child was reinforced with tokens after each desired response and after the child accumulated 10 tokens he received a reinforcer of his choice. Once the child learned to respond to the scripts in the desired way, different scripts were used to assess generalization to different activities and settings.

Results revealed that the scripted training of the question “What?” generalized to untrained scripts and settings. The student significantly increased in his abilities to independently ask “What?” after receiving the training. These results were maintained at a four-week follow up assessment.

The following year, this study was extended by researchers Marion, Martin, Ye, and Buhler (2011). The training scripts and scenarios were similar to the previous study, but this time, three students between the ages of four and nine who attended an Applied Behavior Analysis program for children with autism were taught to ask, “What is it?” in response to the script. Using objects that the children in the study preferred, the researchers would randomly present four scripts across four trials within a session using a prompt fading technique. Natural reinforcement was used in that the child received the item for which he wanted and a hierarchy of prompts was used to ensure errorless learning. Upon mastery of the skill, all three children showed generalization to natural environments, novel activities, and scripts. Although the results of this study suggest that the training was effective because generalization and maintenance over time occurred, it is possible that the children learned to ask, “What is it?” solely for the purpose of receiving the item instead of asking to receive information.

The participants in this study consisted of two males and a female who attended a preschool for children with autism. In accordance with the design of the study, each child was assessed on how teaching procedures could promote generalization across novel settings and stimuli (Betz, Higbee, & Pollard, 2010). The children were between the ages of 3;5 and 5;0. During the baseline sessions, each child was allowed to play with a preferred item for up to 30 seconds. The child was then distracted while the item was removed from sight. After the item was hidden, the instructor said, “Let’s play. Get (item).” If the child did not respond, “Where + item?” the trial ended and a new trial began after 2 seconds. If the child responded appropriately, the child was told where to find the item.

The intervention sessions were conducted in the same manner with a few additions. If the child did not inquire about the item’s location, the instructor repeated, “Let’s play. Get (item). Where’s item?” Up to two verbal prompts were given per trial. If the child did not respond to the second prompt, the trial was terminated and a new one began. However, if the child did respond appropriately to the first or second verbal prompt, the instructor would give verbal praise and repeat the instruction. If the child asked, “Where + item?” the instructor provided the item’s location. Otherwise, the prompting hierarchy was repeated.

All three participants successfully learned how to inquire about an item's location after intervention. The researchers assessed generalization across stimuli and settings and discovered that as long as the procedures were similar to the ones used during training (i.e. verbal cues), the children were able to mand for information. However, if the children were not provided with verbal cues (i.e. "Get item"), they were not able to request the information. This finding suggests that these children may have been focusing on the verbal cues as the controlling stimulus for their response instead of the actual missing item.

Shillingsburg, Valentino, Bowen, Bradley, and Zavatkay implemented a study in 2011 to examine strategies that would aid in teaching children with autism to ask a variety of questions including "When?" "Who?," "Where?," and "Which?" in order to request information. In addition, the researchers also wanted to examine generalization and maintenance of this task and therefore compared teaching a specific topography (i.e. Where is my toy?) to teaching a general topography (i.e. Where is it?). Two males with autism, ages 7;9 and 11;11, participated in the study. The younger participant received intervention in an individual therapy room while the older participant received intervention in his classroom. During treatment, the therapist presented a paired verbal and nonverbal stimulus (i.e. telling the child to listen to the CD player but not providing headphones for him to do so) followed by verbal prompt (i.e. "Where are the headphones?") if the child did not react to the stimulus by asking the appropriate question. If the child gave a correct response, the therapist would give the child the preferred item. When the child could produce the target independently, he would receive further reinforcement. Upon mastery of the skill, generalization and maintenance were assessed over a period of five trials. The experimental design was successful in teaching the two participants to use the "wh" questions independently to request information. In addition, both students acquired both the specific and general topography questions.

Ostryn and Wolfe (2011) developed a procedure to teach children with autism to ask, "What's that?" using *The Picture Exchange Communication System (PECS)* (Frost & Bondy, 2002) initially and then learning to vocalize the words. The multiple baseline design across participants study took place in a public preschool for children with developmental disabilities in a self-contained classroom. The participants consisted of a three year-old male with pervasive developmental disorder (PDD) and two females of a similar age but with a diagnosis ASD. All three children already used pictures as their main form of communication, but were not using the pictures to request objects.

Before choosing stimuli, the researchers surveyed typically developing students to find a picture that most accurately depicted the question "what's that?" in the minds of children that age. The three children were first taught to ask, "What's that?" using a picture of a girl pointing at something unseen. The instructor presented the child with an opaque bag containing a toy that moved, made music, or lit up. If the child did not initiate a question, the instructor employed a hierarchy of physical and verbal prompts to engage the child in verbally inquiring about the item. When the participant would say "what's that?" the instructor would name the toy and give information about it. Results of the study showed that all participants transitioned from the current picture communication system to vocalizations or approximations of the question "what's that?" in fewer than two days. Additionally, the children demonstrated evidence of being able to generalize this skill to different stimuli, people, and settings. The data from the study may

suggest that most-to-least prompting may be an effective and efficient way to teach children with autism to request information. Furthermore, students who have used PECS to communicate can be taught to use PECS to mand and with training, be taught to vocalize mands.

Questions in Conversations

Most of the research in this area concentrates on educators or researchers teaching children with autism how to ask single basic question structures (e.g. “What’s that? Where is it?”) in response to researcher contrived situations. However, typically developing children use a variety of wh-questions to request social information in an ongoing reciprocal social interaction. The next study investigated whether a self-management intervention designed to elicit acquisition and discrimination of questions in the context of conversation could be effective with two elementary school-age children with autism.

Two females, ages 7;6 and 9;10, participated in Doggett, Krasno, Koegel, & Koegel’s study (2013) which took place in their classrooms after school with a familiar clinician. The clinician began by building rapport with each of the children. Explicit teaching for when it is appropriate to use the words “what,” “where,” and “who” followed this rapport building. The girls were taught that the word “what” is used when asking a question about a thing, “where” is used to ask about a place, and “who” is used to ask about a person. For example, the clinician might say, “I went somewhere fun this weekend. What would you ask?” Verbal and visual prompts were used to elicit the appropriate questions. To teach self-management, the clinician used a specific protocol that used a point system as reinforcement. The children were allowed to earn points by asking appropriate questions of the clinician during a reciprocal conversation. Probes were taken with other conversational partners to measure generalization and between 6 months and a year post-intervention to measure maintenance of skills.

For both participants, there was an increase in appropriate “what, where, and who” questions during conversations after intervention that was maintained across settings and time. The self-management intervention package resulted in increased levels of correct question-asking behaviors in both girls. The findings from this study suggest that reciprocal social conversation in children with autism can be improved and that self-management procedures can provide the motivation necessary to learn these verbal behaviors.

Conclusion

Clinicians working with children who have autism often set goals for their clients to be able to ask wh-questions because it is through asking questions that children obtain important, unknown information from their environment, increase social interactions with others, and facilitate language development. This paper looked at the research of individuals who successfully taught students with autism to ask questions.

Children participating in treatment programs consisting of modeling, prompting, time-delay procedures, and tangible reinforcers were able to learn to ask wh- questions, generalize those skills to other settings, and maintain the skills over time. Contrary to popular belief, some children learned to ask for a non-preferred item just as quickly as a preferred item. Additionally,

even though children may appear unmotivated to access verbal information, several students did acquire new vocabulary by asking questions and others asked questions solely to receive a verbal answer. While the majority of studies used very specific stimuli to obtain a very specific response, some results implied that students can learn general rules about when to ask certain types of questions and apply those rules to conversations, thereby expanding the opportunities of these students to participate in reciprocal communication.

Teaching children with autism to ask questions is an important area of research. This paper highlighted studies that were successful in facilitating this vital skill. Clinicians, therapists, and educators can use the information provided to drive their evidence-based practices so that their clients and students can obtain similar success.

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The Principals' Impact on the Implementation of Inclusion

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Abstract

The principal is the key element in shaping and sustaining educational programs that provide children with disabilities the opportunity to be educated in the general education setting. Federal mandates require compliance in educational services for children with disabilities. This has changed the role of principals in education. As schools strive to meet the challenge of implementing the Individuals with Disabilities Education Improvement Act (IDEA) and No Child Left Behind (NCLB) requirements, the principals' role is essential for the success of these programs. Principals must personally lead the implementation of the inclusion process. Principals must be effective leaders in regard to curriculum, resources, staffing, professional development, and instructional practices. They must be knowledgeable about special education history, laws and policies, and services pertaining to special education. The purpose of the article is to emphasize the importance of the principals' special education understanding, knowledge, and attitude toward successfully implementing inclusion schools.

The Principals' Impact on the Implementation of Inclusion

Children with disabilities did not have many options before special education gained momentum in the 1950's and 1960's (Rothstein & Johnson, 2010). These children were forced to stay at home, be institutionalized, or be educated in separate, special classes at select schools. Parents of children with disabilities began the movement to improve the educational opportunities for children with disabilities, their movement for equity in education paralleled with the Civil Rights movement. The struggle for equity for minorities in the 1950's and 1960's paved the way for the changes in the way our educational and legal system regard individuals with disabilities. Millions of children with disabilities were not being served appropriately in public schools (Rothstein & Johnson, 2010).

In 1975 United States Congress passed what was known as the Education for All Handicapped Children Act, or Public Law 94-142 (Walsh, Kemerer, & Maniotis, 2005). This law was passed to make certain that all children with disabilities had access to public education. Provisions of this Act mandates that all children with disabilities have equal access to a free and appropriate public education (FAPE) in the least restrictive environment (LRE), regardless of the disability. This act mandated the provision of special education programs and services for all children with disabilities. Public Law 94-142 which was renamed the Individuals with Disabilities Education Act (IDEA) in 1997 states, "One of the primary goals of the Individuals with Disabilities Education Act (IDEA) is the concept of educating children with disabilities along with children without disabilities to the maximum extent appropriate, ideally in the regular classroom" (Rothstein & Johnson, 2010, p. 171).

The regular classroom is commonly referred to as inclusion for children with disabilities. Inclusion implies the presumption of placement in the regular classroom with children without disabilities (Rothstein & Johnson, 2010). Federal law expresses a sustained commitment for placing the child with disabilities in the setting in which that child would be served if there were no disability (Walsh, Kemerer, & Maniotis, 2005). The intention of inclusion is to provide children with disabilities equitable opportunities to receive effective educational services in the general education setting with the appropriate support services. Educational programming for children with disabilities is based on the assumption that a variety of service delivery options must continue to be available. The Individuals with Disabilities Education Act (IDEA) mandates that children with disabilities are educated in the least restrictive environment (LRE), which is to be chosen from a continuum of alternative placements (CAP; Hallahan & Kauffman, 2006).

The quality of education for children with disabilities has been a focal point since the emergence of special education. Federal law, as outlined in the Individuals with Disabilities Education Improvement Act (IDEA) and No Child Left Behind (NCLB), has made an effort to improve the delivery of services for these children. Children with disabilities should be provided services in the setting that the child would be served if there were no disability. The Individuals with Disabilities Education Improvement Act (IDEA) and No Child Left Behind (NCLB) admonishes schools to utilize a wealth of pedagogical adaptations and strategies to assist all children in attaining the highest standards (Sailor & Roger, 2005). The law expresses a preference for the least restrictive environment (LRE), mainstream, or inclusion setting. Inclusion is a philosophy that all children have the right to be educated with their non-disabled peers in the general education setting.

Accountability

Special education services have evolved slowly over the years. Children with disabilities have progressed from being denied educational services, to being segregated on school campuses, and now they are educated alongside their age-appropriate peers in the general education classroom with accommodations and modifications. Some give credit to these changes and the recent call for higher accountability standards for schools. Large numbers of children with disabilities were not receiving appropriate instruction, accommodations, or modifications in the general education classrooms (Short & Martin, 2005). The No Child Left Behind (NCLB) legislation is firmly anchored in accountability (Sailor & Roger, 2005). Therefore, there has become a need for additional programming options to meet the needs of all children with disabilities and the trend supports the move toward more inclusion within the public school setting (Short & Martin, 2005). The current model of inclusion is an effort to increase academic and social gains for children with disabilities. The school experiences of children with disabilities can be positively or negatively influenced by the attitudes and behaviors of students, staff, and by general school policies (Milsom, 2006). The philosophy of inclusion, or placing children in regular classrooms, is based on many concerns. One concern is that separation in education is inherently stigmatizing. Another concern is that once a child is placed in a separate special education setting, the self-fulfilling prophecy occurs and the child will only be expected to perform at a particular level, and the expectations will generally be lowered (Rothstein & Johnson, 2010). The premise of inclusion is that students will succeed when the instruction is more rigorous and the expectation is higher.

Inclusion

The No Child Left Behind Act (NCLB) has the well-defined objective of enhancing education for children with disabilities, closing achievement gaps, and increasing accountability for children in special and general education programs. The Individuals with Disabilities Education Improvement Act (IDEA) has a fundamental principle which is the goal of ensuring that education is provided in an inclusive setting for all students. Inclusion has become essential in the effort to improve the delivery of services to children with disabilities by focusing on the placement of these children in general education classes with effective programs of support (Praisner, 2003). Inclusion is not intended as a placement of children with disabilities, the discontinuance of labeling, or the conclusion of special education classes; it is a supportive collaboration by general and special education teachers to assist children with disabilities in the general classroom (Praisner, 2003). Idol (2006) discovered that most administrators agreed with classroom who would provide assistance to all children in the classroom.

Those who advocate for inclusion base their premise on the fact that separation, or special education pull-out programs, have been ineffective. There are a backdrop of publications citing a barrage of studies associating separate classrooms, pull-out programs and practices with negative outcomes (Sailor & Roger, 2005). Hallahan Kauffman (2006) acknowledge the assertion of some educators that state children with disabilities have better, or least no worse, scores on cognitive and social measures if they stay in regular classes than if they are put in special education for all (self-contained classes) or part (resource rooms) of the school day. However, research findings and logical analyses overall support inclusion as a placement for children with disabilities. The social interaction that inclusion allows is a valuable resource for children with disabilities, children without disabilities, teachers, faculty, and staff (Milsom, 2006). Children with disabilities often have negative school experiences related to their having a disability, and administrators and teachers can help to create more positive school experiences that promote their academic, career, personal, and social growth (Milsom, 2006). According to Short and Martin (2005), some of the benefits of inclusion are academics, social acceptance, self-concept, self-control, and increased student ownership. The general purpose of inclusion is to close the achievement gap and create a positive learning environment for children with disabilities in the general education setting.

The philosophy of the Individuals with Disabilities Education Improvement Act (IDEA) is that all children are active, fully participating members of the school community, and that schools understand the benefits of inclusive education for all children (Venn, 2007). Venn states, "More specifically, full inclusion refers to full membership in the general classroom with all of the supports necessary for successful inclusion" (Venn, 2007, p. 43). According to the courts there are substantial benefits of inclusion. Inclusion is a right, and success in separate, pull-out settings does not negate successful functioning in integrated settings (Cole, 2006). Inclusion shifts children with disabilities into the general education setting and offers them the opportunity to achieve closer to that of their nondisabled peers.

A common issue among parents, educators, and other stakeholders is whether children with disabilities should be placed in separate classrooms with specially trained teachers, or should they be placed in the general education classroom with their age appropriate peers. There are

good arguments for placement in both settings. Some parents, educators, and stakeholders believe there is an unrealistic expectation placed upon general education teachers to meet the needs of such diverse children in the general education classroom (Volonino & Zigmond, 2007). They also believe there are unrealistic expectations placed upon children with such diverse needs to achieve high expectations in the general education classroom. On the other hand, those in favor of inclusion focus on the benefits of inclusion which are the increased academic expectations, positive social interactions, mutual respect, and tolerance for children with diverse needs and abilities (Volonino & Zigmond, 2007). In accordance with the Individuals with Disabilities Education Improvement Act (IDEA) and No Child Left Behind (NCLB) educators have designed research-based instruction to facilitate instructional enhancements to benefit all children in the general education setting (Sailor & Roger, 2005).

Since the early introduction of inclusion, the role of educators' has been in a constant state of change. In the inclusion setting, the general education teachers and the special education teachers work cooperatively to provide quality programming for all children in the general education setting. Children with disabilities are no longer removed from the general education setting to receive one-on-one tutorials or placed in "resource rooms" for below grade level lessons. Following the logic of integration, all services and supports are provided in general education setting and benefit general and special education children (Sailor & Roger, 2005). This instructional arrangement has created challenges for the teachers and administrators.

The Principal

Recent education reform initiatives have changed the image of the typical classroom and student population. Children with disabilities have been placed in the general education classroom to improve their academic achievement and service delivery. This has created a challenge and changed the roles for principals. The leadership role has increased due to recent demands placed upon schools. The principal, as the instructional leader, must take on new responsibilities. Additionally, Idol (2006) indicated in her study that principals need to assume the instructional leadership role by supporting their teachers by providing professional development in the area of special education. The principal must understand the legal and technical aspects of special education, evaluate and support staff, provide needed supports, services, and adaptations to children with disabilities.

The role of the principal is more complex and requires expertise in many areas when working to achieve school goals. Principals must possess necessary leadership and interpersonal skills when working with their staff to accomplish school goals, supervising and communicating effectively with students, parents, and community. The principal's role has expanded to include monitoring curriculum and instruction, conducting teacher evaluations, coordinating district and statewide testing, attending meetings for students with disabilities, collaborating with the general and special education teachers in regards to students with special needs in the inclusive setting, and developing activities for staff development.

The principal's leadership role is distinctive in the inclusion process. A principal's leadership is one of the most important factors to implementing inclusion successfully. To ensure the success of inclusion, principals must exhibit conduct that will advance the integration, acceptance, and success of children with disabilities in general education setting (Praisner,

2003). Garrison-Wade, Sobel, & Fulmer (2007) found that principals lack minimum knowledge needed to implement inclusion such as knowledge of special education law, behavior management, and specific topics that present authentic strategies and processes to support inclusion. Many principals lack knowledge of special education legal issues, specifically in compliance and procedural requirements (Garrison-Wade, Sobel, & Fulmer, 2007). The lack of special preparation for school principals challenges their ability to implement inclusion schools (Garrison-Wade, Sobel, & Fulmer, 2007).

Conclusion

The principal's preparation in leadership programs in special education law is usually conducted as a small part of a more comprehensive education law course in leadership preparation programs (Jacobs, Tonnsen, & Baker, 2004). As accountability increases, the need for principals to be trained in the legal requirements of special education is vital (Jacobs, Tonnsen, & Baker, 2004). The corner stone of the No Child Left Behind (NCLB) and Individuals with Disabilities Education Improvement Act (IDEA) are accountability. The tenets of No Child Left Behind (NCLB) and Individuals with Disabilities Education Improvement Act (IDEA) are to include children with disabilities in the general education curriculum, classroom, and accountability systems (Cole, 2006). Villa and Thousand (2005) contrasted the traditional model and the inclusion model for school management. In the traditional model, the principal places special education programs within the general education facilities. In the inclusion model, principals exercise responsibility for managing the general education program, articulates the vision of inclusion and nurtures the staff, students, parents, and community through the process of implementing inclusion. Principal preparation in leadership programs relative to knowledge and laws in special education is paramount to the successful implementation of inclusion programs.

Principals' attitudes have been linked to the success of inclusion programs in other studies. Praisner's (2003) study demonstrated the importance of principal attitudes for the successful implementation of inclusion. Praisner's (2003) study suggested that principals must display commitment to, support, and have a positive attitude toward inclusion for the successful implementation of inclusion. Inclusion challenges traditional roles of principals as leaders. One of the most challenging roles principals must fill is to be an inspiration for inclusion (Styron, Maulding, & Parker, 2008). The chances of successfully implementing inclusion are greatly increased when principals support inclusion and have knowledge about special education.

Principal preparation programs need to implement a diverse range of courses, workshops, and training. There are several characteristics associated with principals who lead inclusion schools. Principals need training in courses specific to inclusion such as characteristics of students with disabilities, behavior management class for working with students with disabilities, academic programming for students with disabilities, crisis intervention, life skills training for students with disabilities, teambuilding, interagency cooperation, family intervention training, supporting and training teachers to handle inclusion, change process, eliciting parent and community support for inclusion, fostering teacher collaboration, and field based experiences with actual inclusion activities (Praisner, 2003). Knowledge in these areas will provide practical strategies for principals assisting them in becoming better leaders of inclusion schools. Principal

preparation programs must teach leaders to develop a vision for students with disabilities by implementing professional development activities, assigning personnel, strategies used to assign students to classes, identifying resources available for professional development, specially designing curriculum and instruction, and teaching collaboration and team building efforts to ensure the execution of the schools' instructional vision.

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Fostering Special Education Certification through Professional Development, Learning Communities and Mentorship

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Abstract

The purpose of this article is to present mixed methodology evaluation data regarding a professional development initiative designed to offer non-certified special education teachers specialized classroom and teacher certification support. The project was grounded in evidence-based strategies that resulted in direct implications for teacher preparation, retention, and certification. To maximize benefits of participation in this project, access to instructional resources was provided. Participants benefitted from face-to-face communities of practice and a virtual learning environment designed to establish a shared culture of improvement and collaboration. Teacher participants generally felt factors such as “*encouragement, motivation, and support they received from their colleagues contributed to their decision to pursue a special education teaching career.*” The evaluation findings informed a professional development model incorporating the essential components of professional development, learning communities, and mentorship. The findings further indicated that teacher professional development should specifically address instructional strategies, understanding of special educational issues, and skill attainment.

Fostering Special Education Certification through Professional Development, Learning Communities and Mentorship

The purpose of this article is to present mixed methodology evaluation data regarding participants' satisfaction of the effectiveness and overall project success of a Department of Education (DOE) professional development initiative. This initiative was designed to offer specialized classroom and teacher certification support to teachers of students with disabilities who are teaching without the appropriate certification, and in some cases without any teacher certification. Teacher participants either had no special education certifications, held temporary teaching certificates, or only general education certificates. As a result, many students with disabilities were often being taught by teachers without the appropriate certification and in some cases without any teacher certification. The project was based on evidence-based strategies resulting in direct implications for practice. Evaluation questions were designed to elicit teacher perceptions of impact on teacher preparation and retention, special education certification resources, benefits of participating in a community of practice, and confidence in special education instructional strategies.

Educational research consistently shows multifaceted relationships between professional development, teacher growth, and student achievement (Yoon et. al, 2007). Annual evaluation results showed that new special education teachers often felt alone during their first days as a new teacher. To maximize benefits of participation in this project, it was deemed important to provide access to resources and instill a culture of improvement and collaboration. In identifying factors that best impact student achievement, project developers also considered the need to nurture teacher learning and instill a sense of belonging. The teacher/advisor professional learning community intentionally provided a collaborative culture of ongoing professional learning with desired outcomes for both teacher and student growth.

The successes of this initiative can be replicated through a professional development model focusing on quality programming and encouraging collaboration that captures a sense of strength in numbers. As part of the evaluation, recommendations were offered for initiation, implementation, and sustainability of a learning community that reinforces program goals as well as offers a structure to address critical issues shaping teacher education. A major goal of this initiative was to create supportive cohorts for special education teachers having limited professional development opportunities concentrating on specific needs of special education students. The notion of community is aligned to NCLB 2001 school reform initiatives and it was anticipated that collaborative and targeted assistance would increase the number of newly certified special education teachers meeting highly qualified educational standards. While this evaluation was extensive to numerous project components, findings relating to the initiation and processes within the advisor/teacher and virtual advisor learning communities will be highlighted.

Overview of the Professional Development Project

The impetus for the project was to provide specific professional development and certification support for non-certified special education teachers. In the developmental stages, advisors were selected based on their expertise in the field of special education to mentor the teacher participants. The initial project expanded from 4 districts to 15 school districts over a period of three years.

Project coordinators identified factors impacting student achievement through thoughtful consideration of staff development design and conceptually focused on: (1) awareness of special education issues, (2) understanding of educational pedagogy, (3) skill attainment, and (4) coaching and team elements. Project developers also recognized the importance of aligning essential aspects and objectives to both education policy and standards for highly qualified special education teachers as defined by the Louisiana Department of Education (2009).

Since students with disabilities are expected to meet the same standards as other students, teachers who deliver instruction to special needs students are required to meet the same standards for content knowledge. Students with disabilities receive instruction in core academic subjects from a teacher who is highly qualified to teach the core academic subjects. In addition, teachers of students with disabilities must meet the state's special education certification requirements for the grade level that they are teaching in order to be identified as highly qualified (§ 2).

Project Need

The daily challenges for teachers of students with exceptional learning needs are overwhelming especially when the general education system offers little opportunities for services or professional development opportunities. Special education teachers often have limited opportunities to attend professional development programs that clearly concentrate on the specific needs of special education teachers and their students; more often educational workshops focus on mainstream pedagogy. This persistent lack of resources and specialized special education professional development support combines to create obstacles to successful growth of these professionals. Above all, it is essential that new special education teachers receive targeted support and guidance in effective teaching strategies which positively influence the academic development of their special need students. Without quality teaching that addresses the unique needs of special education students, student achievement will almost certainly be negatively impacted.

Project Goals and Objectives

Increasing the pool of highly qualified special education teachers directly impacts the special education classroom and students with disabilities. Specific project goals were:

1. To offer mentorship, resources, and support to new un-certified special education teachers seeking special education certification.
2. To enhance preparation of new un-certified special education teachers through comprehensive educational practices and instructional strategies for special needs students.
3. To build district-level capacity by creating supportive cohorts of special education teachers, thereby, increasing the number of newly certified special education teachers, as well as establishing ongoing relationships at the state, district, and individual school level.

Project Components and Characteristics

The overall objective of this project was to provide specific resources for new non-certified special education teachers on their path toward certification. The project was designed based on three main components. The first component was *mentorship* in which the state project coordinators assisted the advisors who served the teacher participants. These district advisors, along with the program coordinators, conducted face-to-face meetings, managed online professional discussion forums, and communicated special education and certification information directly to the teacher participants.

The second component was the creation of two *virtual communities*: one connecting new uncertified teachers of special education with advisors and the other establishing a link among all advisors through a *Virtual Advisor Learning Community*. Online resources were posted to a Learning Management System (LMS) and provided ongoing 24/7 teacher/advisor collaborative sharing across the geographic regions. Online discussion forums were intended to facilitate communication among state facilitators, advisors, and teachers while serving as an avenue for networking and collaboration. The *Virtual Advisor Learning Community* was implemented to foster the development of a professional learning community of advisors across the state as a

way to involve teachers in web-based professional development (Knapczyk, Frey, & Wall-Marencik, 2005).

The third component was the *professional development support sessions*. Participating non-certified teachers were exposed to skill building activities and resources uniquely designed to assist them in their certification process and overall development as special education teachers. This project created an effective avenue for open discussion as an integral part of any professional development initiative. Moving beyond the basics, many participants expressed hope that this opportunity would surpass their expectations of certification and provide the necessary tools to address future concerns and issues faced by special educators.

NCLB (2001) encourages the development of site based professional learning communities as a way to promote teacher capacity and improve student outcomes. Over the life of the project, teacher and advisor participants have consistently reported that collaboration has decreased their sense of isolation. This finding matches prior research on the benefits of collaborative professional development (Dettmer, Thurston, Knackendoffel, & Dyck, 2009; Friend & Cook, 2010; Hord, 1997, 2004). Fullan, Rolhesier, Mascall, and Edge (2001) further conceptualize that implementation and sustainability of ongoing professional development is rooted in collaboration. Fullan, et al. (2001), endorse capacity building as everyone's responsibility from all levels, individual teacher, school, district, to the larger. Essentially, this vision for increasing teacher capacity, and thus improved student achievement, is anchored in creating a systemic sense of purpose followed by strategic direction. As a result of offering supportive leadership and targeted assistance, a corresponding increase can be anticipated in the number of newly certified special education teachers.

Research Questions

The following research questions provided direction for evaluating the project's professional development goals and objectives:

1. How does project participation impact teacher retention by enhancing a sense of self-efficacy through the learning community infrastructure?
2. What are teachers' perceptions of the impact of training and certification on students with disabilities' academic performance and personal growth?
3. Do project participants feel more confident with instructional strategies as a result of the professional development project?

Research Methodology

Data from advisor and teacher participants were collected and analyzed to assess project compliance and success. Formative and summative evaluation reports provided stakeholders with critical findings, as well as offered additional recommendations to enhance project goals.

Participants

A critical shortage of certified special education teachers in this southern state inspired the creation of this initiative. Priority certification support issues identified in the pilot project included: (1) help with passing the Praxis exam, (2) networking opportunities that could eventually lead to certification, and (3) benefiting from the experiences of certified peer mentors.

Annual results from needs assessments consistently indicated that additional need for support included: (1) help in securing instructional materials, (2) preparation of individual education plan (IEP) and other special education documentation, and (3) understanding legal issues and responsibilities surrounding teachers of students with disabilities. In accordance with the goals and objectives of the grant, the project provided an opportunity for the target population of new uncertified special education teachers to learn new information on instructional strategies, development of individual education plans, and in-depth guidance on special education certification pathways.

Advisor/Mentor Participants. To launch the program, project advisors from each school district participated in a *Train the Trainers* session designed to introduce project goals, objectives, and initiate shared vision. Although advisors maintained flexibility in support session topics to meet individual district needs, a topical listing of cogent special education issues (detailed in the professional development support sessions) was recommended to ensure consistency in *evidence-based practice* offerings. Advisors are critical to the success of the project and were chosen based on their experiences and educational qualifications. Selection criteria for these mentors included extensive knowledge of state initiatives relating to classroom instruction including grade level expectations, content standards, and the state comprehensive curriculum and assessment materials. Advisors were chosen based on having high levels of skills and abilities as behavior interventionists, special education supervisors, staff development specialists, and instructional coaches. The number of years' experience in special education related positions ranged from a minimum of seven years to 26 years. This diversity in positions greatly enriched the sharing of experiences and knowledge of their relationships between the advisors/mentors and teacher/mentees.

Non-certified Teacher Participants. Students with disabilities are often taught by teachers not meeting the NCLB guidelines for highly qualified teachers. Instead, a large percentage of special education teachers hold several types of temporary, non-standard teaching certificates including: (1) Temporary Authority to Teach (TAT), (2) Out-of-Field Authority to Teach (OFAT), and (3) Temporary Employment Permit (TEP). In total, the evaluation revealed participant teachers holding TAT, OFAT, and TEP temporary certifications ranged from approximately 45% to 72% across the districts. On the other hand, 20% of teachers who identified themselves as holding multiple teaching certificates, including PK-K, elementary, middle school, or secondary school teachers. These statistics clearly illustrated the great need for professional development activities that promote special education certification. Since this trend has not yet been totally reversed, outreach efforts, such as this initiative, could stimulate further support to those teachers serving children with disabilities and exceptionalities. Approximately 800 teachers joined this initiative to address critical issues shaping the future of special education teacher training. The evaluation captured the following grade, experience levels, and special education teaching positions demographics.

Grade level and experience diversity. Outreach efforts of the project were successful in recruiting a full range of teachers from different grade levels including: PK-K, 9.87%; Elementary, 35.40%, Middle, 25.83%, Secondary, 18.20%; and other participants, 10.7%. Teachers generally reported education experience levels of one year or less ranging from 64% to 74% confirming the great need for increasing the pool of certified teachers.

Special education teaching positions. Teachers of students with Mild/Moderate disabilities (62%) represented the largest category participating in this professional development followed by teaching positions in self-contained classrooms (19%). Other teacher participants (19%) included representatives from Early Intervention and Severe/Profound.

Data Collection and Analysis Methods

A mixed methodology research design using a variety of quantitative and qualitative data collection methods was developed to assess each of the primary goals of the project. Paper and pencil surveys were initially used to collect data. The questionnaire items were primarily Likert scales; however, open-ended structured interview questions were also included to provide qualitative data. As the program grew across the state, data collection shifted to the online professional learning community LMS created to capture advisors' perceptions of the program. *Survey Monkey* was also used to collect data over the expanded geographical regions.

Study Results

The primary goal of this project was to provide learning and sharing opportunities for the participants focusing on resources and skills needed to meet the unique needs of students with disabilities. According to the goal set forth, survey questions were designed to elicit participant opinions regarding the project's impact on teacher retention (Research Question 1); special education certification efforts (Research Question 2); and confidence in instructional strategies and documentation procedures (Research Question 3). The findings were analyzed according to the major components of the initiative and focused on enhanced professional development and support for new uncertified special education teachers, collaborative practices supported by mentorship, and enhancement of ongoing learning through virtual learning communities. The project coordinators hoped to make a difference in helping new teachers to meet the standards of highly qualified and certified special education teachers by embedding research based practices into the professional development instruction. Ultimately, it is believed that as new uncertified special education teachers become more proficient, a corresponding increase in student achievement outcomes will be evident. The study analyses resulted in identification of three major findings.

Major Finding 1: Enhanced Professional Development and Support Addressing the Needs of New Uncertified Special Education Teachers

Interactive support sessions were facilitated during the project year and addressed special education key issues including classroom management and behavior modification (behavior intervention plans, maintaining student discipline and motivation); inclusive practices (differentiation of instruction, curriculum accommodations and modifications); exceptionalities (individualizing the educational program to meet individual needs); intervention and assessment (reading, mathematics, and writing strategies, individual and group assessment/measurement); and technology integration (within curriculum and instruction, software application, assistive technology supports). Participants were provided activities and resources expressly designed to assist in their certification process and overall development as special education teachers. Participants also engaged in skill building exercises and encouraged to reach beyond their normal daily activities.

In total, each school district dedicated four support sessions throughout the program. In addition to the central topics above, other areas needing attention were determined by a Needs Assessment Questionnaire designed to understand what teachers needed most. This instrument allowed districts to individualize participants' needs and target professional development and specific levels of assistance in selected areas such as instructional needs, organization and classroom management, and communication with families and colleagues. Three primary themes surfaced in relation to enhancing professional development and support: motivation, support sessions, and special education documentation.

Motivation. A review of the average scores, open-ended responses, indicated teachers consistently reported needing motivation strategies. Teachers also expressed concern they were lacking in resources and information on accommodations and/or modifications to prepare their students for standardized tests even though they were generally satisfied with their school districts level of support in the provision of study and test taking workbook tools. Several teachers approached motivation from a behavioral perspective asking for information about rules and consequences. Teachers asked for samples of effective and detailed age-appropriate behavior management plans; some were looking for more positive ways to establish consequences and *“how to handle different behaviors from different students.”* The greatest area of need was Motivating the Unmotivated Learner. Respondents were concerned they did not have *“workable and novel approaches to try!”* Overall, teachers recognized the challenge of motivation and showed a willingness to understand the critical dynamics of teacher and student interaction. In addition, a need for more training, classroom strategies, and instructional materials was expressed for reading, writing and math strategies. Conflict resolution and time management strategies were other types of interventions most requested.

Support sessions. As part of the summative evaluation, participants responded to questionnaire items regarding professional development. Although most comments were favorable, the support session topics and networking opportunities had the highest average mean ($m = 4.30$ to 4.45 on a 5 point scale). Teachers generally felt the topics presented at the support sessions were exceptionally informative and a successful aspect of professional development. Participants appreciated certification resources and IEP information, *“from start to finish, it gave and provided helpful information and the need for more in-depth information on IEPs and certification.”* Participants felt the presenters were responsive to questions and comments. Respondents enjoyed and valued the experience and the information presented throughout the life of the project. Similarly, teacher participants gave numerous examples of how their advisors helped them to better understand the specific needs of their students. They believed their advisors offered important suggestions and clarification of special education topics.

Special education documentation. A recurring theme directly related to the project's objective of providing assistance was guidance in completing special education documentation. Teacher comments demonstrated the importance of this aspect, *“She has been extremely helpful in helping to keep me organized and on track with IEPs and I feel more knowledgeable as well as somewhat comfortable with completing the IEP plans and identifying students' needs.”* Another teacher commented, *“I have gained a better understanding of the needs of SPED children and*

the importance of the IEPs that we write.” A majority of new uncertified teachers surveyed consistently felt strongly that their advisors offered important suggestions and clarification regarding a variety of special education topics. However, these new uncertified teachers of exceptional children especially gave high praise to their advisors in explaining specialized curriculum strategies, understanding special education students’ needs, classroom management strategies, ways to motivate and challenge their students, and in the preparation of special education documentation.

Major Finding 2: Mentorship Enhanced Collaborative Practices

The establishment of a sustainable learning community is critical to continued success and consistency of any professional development project (Aber, Kelly, & Mallory, 2009). Comments such as these describe the significance of a professional learning community, *“I think some of the most important values that must be incorporated into a professional learning community are teamwork and working toward a common goal. Collaboration between members of a group ensures that all participants have input into the groups’ shared vision. Participants feel valued in a program if their ideas and concerns are heard and addressed. All members of the program are valued and the program facilitates the exchange of ideas in a nonthreatening environment.”*

The majority of new uncertified special education teachers enthusiastically embraced the opportunity to learn from experienced mentors in the field of special education. Learning from each other and the opportunity to establish working relationships with their peers was probably the most cited source of satisfaction for both teachers and advisors with over 86% of all participants during all time frames, rating the aspect, *Networking Opportunities*, as *Good to Excellent*. While the data generated from the Needs Assessment focused on professional development topics, it became evident that over the life of the project teachers had a desire for a greater sense of independence and efficacy. An integral aspect of mentorship is collaborative practices (Ali, 2008); as such, teachers and advisors were asked to respond to questionnaire items regarding the collaborative relationships established as part of the project. The advisor/teacher collaborative experience helped to remind the advisors of the difficulties new special education teachers faced.

Advisor perceptions. One advisor stated that the greatest benefit of being an advisor was becoming aware of *“the level of support and encouragement new teachers needed to remain motivated.”* An understanding of teacher needs was reflected in the comment, *“I have gained a deeper understanding of the thought processes of those new teachers and why they make the certain decisions that significantly impact the educational outcomes of students. The teachers have helped me to understand that you can’t assume that they come in knowing something about teaching students with special needs.”* The advisors generally realized the teachers simply, *“have questions but are not sure how and what to ask.”* These insights were enlightening and helped advisors to more effectively meet their teacher’s needs. One recommendation for choosing future session offerings was to involve all advisors in collective planning in the virtual learning community. Research consistently shows when schools address instructional needs and concerns of their faculty through collaborative learning experiences, and in an effort to build professional efficacy among faculty members, they also are effective in increasing student achievement (Bray-Clark, 2005; Goddard, LoGerfp, & Hoy, 2004).

Teacher perceptions. Teachers gave numerous examples of how their advisors helped them to better understand the specific needs of their students, *“I have learned so much about special children [not person first] I could have never imagined loving this type of work. The teachers are amazing.”* A short list of benefits cited by the teachers included understanding of students with exceptional learning needs, helpful classroom materials, knowledge of how to better reach their students, perspectives of collaborative teaching, behavior management strategies, documentation instruction, student and parent motivation, and information on certification requirements. As a result of the mentorship relationships, lower levels of stress were reported at year end and seemed to be linked to greater efficiency in the classroom. Another theme that evolved from the feedback was a feeling of support, encouragement, validation, and understanding. Learning from each other and the opportunity to establish working relationships with their peers was a major source of satisfaction. Participants reflected positively on their networking experiences which allowed for sharing of ideas and classroom techniques, face-to-face time with each other, and even friendship building. The teachers felt comfortable asking questions and appreciated the opportunity to see they were not alone.

In summary, the mentorship project component provided special education teachers and advisors a feeling of connectiveness and increased confidence in their teaching abilities. It seemed clear these new uncertified teachers in special education were genuinely grateful for these collaborative opportunities and that the community component successfully strengthened certification efforts.

Major Finding 3: Enhanced Learning through Virtual Learning Communities (VLC)

The special education community can only benefit from a common understanding of standards, student needs, best practices, and individual commitment. As the project grew statewide, it naturally became more difficult to coordinate face-to-face meetings and collaboration efforts. Research continues to provide evidence that online is comparable to face-to-face interaction in a number of ways (Kuo, Song, Smith, & Franklin, 2007). Web conferencing and other synchronous and asynchronous distance platforms deserve consideration for both communication and support (Bonk, Ehman, Hixon, & Yamagata-Lynch, 2002; Rodes, Knapczyk, Chapman, & Chung, 2000). Advisors strengthened their roles as mentors by modeling shared and collective learning strategies. Using the VLC online platform and online discussion questions, advisors collegially discussed multiple program issues and were able to enhance their sense of community via cyberspace.

Teacher/Advisor Learning Community. An online learning management system offered an infrastructure in which high levels of collaboration could occur through sharing of resources and collective learning. Evaluation data indicated that levels of capacity building were enhanced through the online resources provided. Further, an indirect result of the interaction within the online community was increased self and collective efficacy of both the teachers and advisors which should ultimately benefit education at the individual, school, district, and state levels.

Virtual Advisor Learning Community. A Virtual Advisor Learning Community (VALC) was initiated to promote collaborative relationships for sharing of best practices and innovations grounded in applied research and practice. This ongoing 24/7 asynchronous community served to stimulate critical discussion through guiding questions relating specifically to professional

learning community theory and practice. The groundwork for community naturally includes collective learning and shared planning, leadership, support, and structure. In this approach, it is important to solicit ownership by encouraging members to readily share common topics and issues.

Conclusion and Implications

At the end-of-the project surveys, participants were asked to consider how selected student performance measures have been impacted. New uncertified special education teachers responded to a variety of perceptual questionnaire items addressing how test performance, motivation and interest in learning, and increased parental involvement were impacted as a result of their participation. Teachers were able to identify the link between professional development, increased teaching skills, and the impact on student achievement. Approximately 83% to 98% of the teachers overwhelmingly agreed that student outcomes would be improved in direct relationship to professional development. Participants also reported an increase in confidence about their abilities to better assess their students' needs and to understand the unique challenges of this population. They began to appreciate how working as a team with general education teachers was critical to achieving a holistic approach to student success.

Linking professional development to teacher growth and student achievement has long been recognized as educational best practice. The highest level of impact can be achieved by specifying the knowledge, skills, and/or behavioral outcomes to be addressed. The results from this project demonstrate an effective structure initiated through identification of desired student results. This initial identification resulted in designing elements for staff development linked to learning within a culture of improvement, provision of adequate access to resources, and promotion of shared and collegial communication. The project offered an effective learning environment for mentorship, capacity building, and certification support. These findings inform all responsible stakeholders educating children with special needs about critical issues of *"leadership, competence, caring, and commitment"*. Participants recognized that teachers, who have a deep commitment to their profession and clarity relating to the purpose of their roles, tend to study, reflect, and dialogue at higher levels.

This professional development initiative was implemented in response to a critical need for better trained, more informed, more qualified, and more knowledgeable special education teachers who will increase the chances of success for children with special needs. The project offered participants access to an extensive and comprehensive source of professional development instruction throughout the course of the pilot and subsequent years. Not only did each participant benefit from the training and growth, it is also anticipated student achievement will be directly impacted as a result. The initiative also established a learning environment designed to expose new uncertified special education teachers to classroom activities and a variety of educational resources. Ultimately, the goal was to positively impact students as a result of enhanced teacher professional development. Professional development is often fueled by accountability. The absence of a clearly defined and organized professional development initiative that is not based on effective best practices can hamper the development of a common vision of improvement for all involved. According to Buysse, Winton, and Rous (2009), "the role of learners in professional development is to actively engage in learning experiences that

lead to the acquisition of knowledge, skills, and dispositions and the application of this knowledge in practice" (p. 238).

Investment in teacher education and professional development generally yields the greatest increase in student achievement. The learning community as well as the professional development support sessions allowed for increased learning opportunities and sharing of ideas with other special education peers. The topics offered in the support sessions provided information on teacher education, recent changes and requirements in special education, and up-to-date research in the field of special education. Support sessions should be designed to integrate best practices in special education and instructional design with practical knowledge and skills to assist teachers in becoming more effective in promoting student learning.

The overriding intent of this project was to integrate best practices in special education and instructional design with practical knowledge and skills to assist uncertified teachers to become highly effective certified teachers. It was also intended that educators would consider the research evidence from this initiative in planning future professional development. This initiative can be used to inform the creation of a professional development model focused on knowledge, skills, mentorship, and community to promote teacher capacity and personal growth. In this project, new uncertified special education teachers were offered specialized support to promote certification efforts. The evaluation findings have informed a professional development model incorporating the essential components of mentorship, learning communities, and ongoing support through professional development. The findings further indicated that professional development should address instructional strategies, awareness of special education issues, understanding of educational pedagogy and skill attainment.

Given the focus on increasing special education certification, teachers were asked to comment on how their participation affected their efforts toward this overall goal. Awareness of necessary certification prerequisites was a major theme that resounded in the comments. Teacher participants generally felt factors such as *"encouragement, motivation, and support they received from their colleagues contributed to their decision to pursue a special education teaching career."* Working with others was believed to help *"ease some of the frustrations, fears, and stress in their beginning years as new SPED teachers."*

Teachers reported they were able to link increased teaching skills directly to student instructional needs and perceived student achievement would eventually be positively impacted. They began to appreciate how working as a collaborating team with general education teachers is critical to achieving a holistic approach to student success. As an additional benefit, the participants gained confidence in their abilities to better assess the exceptional learning needs of their students, as well as understanding their unique challenges. The results of this evaluation study reaffirmed how professional development, mentorship, learning communities, and collaboration have the potential to positively impact student achievement. The authors recommend extending this study to further examine correlations between related study variables and constructs to specific student achievement scores; these statistical analyses would enhance the validity of the perceptual from this study.

Finally, the authors propose the Professional Development Model presented as Figure 1 to illustrate the relationships between critical aspects of the program found to support special education teachers' efforts toward certification. The theoretical model is conceptualized from the major findings of this study and illustrates the 3 major components of the program (interactive support sessions, mentorship, and virtual online communities) on the arrows followed by each of the major findings (enhanced professional development and support addressed teacher needs, enhanced collaborative practices, and enhanced learning through learning communities) resulting from the implementation of the component. Thus, the model illustrates major findings as successful outcomes of the program components in overall efforts to foster special education certification.

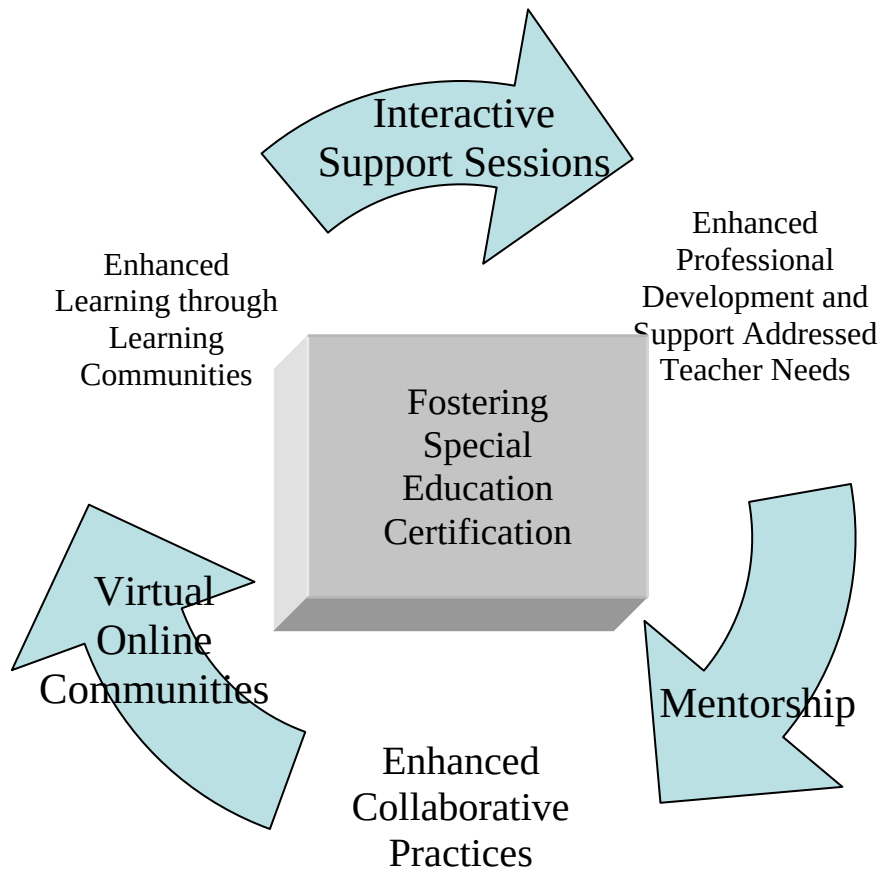


Figure 1. Professional Development Model of Mentorship, Learning Communities, and Support Sessions

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