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Increasing Participation in the Classroom for Children With Autism Spectrum Disorders

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INCREASING PARTICIPATION IN THE CLASSROOM FOR CHILDREN WITH AUTISM
SPECTRUM DISODERS

by

Heather Vining

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Abstract

Active participation is as essential a skill to children with autism as it is for children without autism, as children are expected to engage in these skills both in and outside the classroom. Without participation skills, children are at a disadvantage when it comes to school and other settings, such as extracurricular activities and the workforce. Recent research has shown that there are interventions available that aim to improve the social skills of children in the home and in the school. These interventions can be delivered in varying forms with the primary caregiver as the interventionist, the specialist as the interventionist, and naturalistic interventions. The purpose of this study was to investigate one of the naturalistic interventions, the Competent Learner Model, and determine its effects on the participation and social skills of students with autism. Three middle school male students diagnosed with autism from a rural northeast middle school participated in the study. They were assessed using the Competent Learner Repertoire Assessments of the Competent Learner Model and the adaptive measures of the Vineland-II and ABAS-II. The results showed improvement for one of the three students and little to no improvement for the other two students.

Chapter 1

Introduction

You have got to keep autistic children engaged with the world. You cannot let them tune out. I can remember when I tuned out, I would just sit and rock and let sand go through my hands. I was able to shut the world out. If you let the child do that they are not going to develop (Grandin, as cited in Edelson, 1996, p. 1).

Children with autism often are not engaged with academic or social tasks (Ochs et al, as cited in Koegel, Singh, & Koegel, 2010). When exposed to uninteresting tasks, these children can often have mild to moderate disruptive behaviors in order to avoid or escape the task (Ochs et al, as cited in Koegel, Singh, & Koegel, 2010). When the avoidance or escape happens, the children miss key learning opportunities. Active participation is as essential a skill to children with autism as it is for children without autism, as children are expected to engage in these skills both in and outside the classroom. Without participation skills, children are at a disadvantage when it comes to school and other settings, such as extracurricular activities and the workforce.

Social skills are abilities that are particularly problematic for children with autism. Participation is one such social skill that can be especially difficult for children with autism. It is also receives little attention in terms of interventions in the school systems. Most schools are focused on academics and this leaves little time to teach social skills.

With the rates of autism climbing to 1 out of every 110 children, including 1 out of every 70 boys (Center for Disease Control [CDC], 2010), it is even more imperative that the social needs of these children be addressed in the schools.

Recent research has shown that there are interventions available that aim to improve the social skills of children in the home and in the school. These interventions can be delivered in varying forms such as the primary caregiver as the interventionist, the specialist as the interventionist, and naturalistic interventions.

Research has demonstrated that where primary caregivers were the interventionists there has been increased generalization and the maintenance of skills overtime (Leach & LaRocque, 2011). In addition, increases in the functional developmental level of their children have also been shown. In a joint-attention study conducted by Kasari, Gulsrud, Wong, Kwon, and Locke (2010), it was found that caregivers could help their children improve in their responding to joint attention and in the diversity of their play. Kasari et al. (2010) study found that children in the immediate treatment (IT) group engaged in significantly less object-focused play, showed greater responsiveness to joint attention, and displayed significantly more types of functional play acts compared to the waitlist control (WL) group (Kasari et al., 2010). Although intervention programs where the primary caregiver is the interventionist have been shown to have their benefits, there are also disadvantages. In order to be effective, primary caregivers need to be provided with structured and consistent support, guidance, and

explicit instruction on the interventions to be used (Leach & LaRocque, 2011). They also

need to be properly implementing the intervention (Kasari et al., 2010).

When the specialist serves as the interventionist, intensity is the key. The intensity

of these interventions usually involves 30-40 hours of week (Weiss, 2001). Approaches

that involve specialists, guiding Applied Behavior Analysis (ABA), are the most cited

autism interventions, the most requested and implemented in public schools, and have

some of the highest social validity (Callahan, Shukla-Mehta, Magee, & Wie, 2010). ABA

is one of the most well-known and studied approaches to helping children with autism

learn. ABA has had several decades of development and use with students with autism.

It is scientific approach to understanding behavior and how the behavior is affected by

the environment (Autism Speaks, 2010).

Discrete Trial Training (DTT) is an ABA procedure that is the most extensively

studied (Smith, 2001). DTT is a method that individualizes and simplifies instructions in

order to enhance children's learning. DTT as well as other types of ABA interventions

may not be practical in classrooms with a larger teacher-to-student ratio because they are

labor intensive (Smith, 2001). These therapies can cost between $25,000 to $60,000 per

year (Solomon et al., 2007). These types of treatments can become very expensive, since

it is recommended that their duration be over a few year period.

Creating an environment that is rich with opportunities to apply social skills is

exceptionally important for acquisition of new skills and generalization (Sperry, Neitzel,

& Englehardt-Wells, 2010). This is why naturalistic environments play an important role

in the treatment of children with autism. When services are provided in the natural environment, the capacity of family, caregivers, and teachers are supported and enhanced. The Competent Learner Model (CLM), developed by Vicci Tucci, is an intervention that utilizes the natural environment of the school and rearranges it in order to increase social skills. The CLM addresses the same goals of ABA, such as increasing attention, play, social, self-help, academic, and language skills; however it addresses these goals differently. Rather than a traditional skills training approach, the CLM focuses on teaching children with autism "learning to learn" competencies (Tucci et al., 2005). The CLM teaches learners to become competent observers, listeners, talkers, problem-solvers, participators, readers, and writers.

The current study examined the Competent Learner Model (CLM) and its effects on three students' participation skills in an autistic support classroom. This study focused on the participation skills of children with autism in the structured setting of the classroom. The participation curriculum was comprised of tasks that required the learners to be teacher-directed, self-directed, peer-directed, and non-directed in his or her interactions, all of which were examined in this study.

The participation skills of three middle school-aged boys who were diagnosed with autism and were receiving support in an autistic support classroom were studied over a six month period. These children with selected due to their current diagnosis of autism and their placement in an autistic support classroom. The classroom teacher and

aides delivered the CLM intervention after being trained by the CLM internal coach. The CLM internal coach was the school psychologist for the school district.

The data was collected using the Competent Learner Repertoire Assessment (Tucci, 2005). The Competent Learner Repertoire Assessment (CLRA) (Tucci, 2005) monitors the progress of each student as he or she progress through each participation task. The CLM Performance Assessments, also known as the Competent Learner Repertoire Assessments (CLRAs) provide a profile of the student's strengths and weaknesses across the CLRs. A CLRA is an instructional-based assessment tool that is used to determine if a learner has mastered the repertoires in CLM to the desired level of proficiency (Tucci & Hursh, 2004). Base-line participation levels are established for each child based on the CLRA. The CLRA was completed again at the end of the study. In addition to the CLRAs, adaptive measures were also completed. Either the Vineland-II or the ABAS-II was used to assess the area of social skills/socialization of the students at the end of the study.

Each student was considered separately and not compared to the other students in the study. The purpose of this is to see the child as a whole and the progress each made throughout the study. Background information, teacher information and present levels were provided for each child.

This study was an investigation of whether the Competent Learner Model's (Tucci, 2005) method of teaching participation skills to students when provided by the classroom teachers and autism support aides in the classroom could result in increased

participation of students with autism within their classrooms. It was hypothesized that the

CLM would increase the participation levels of students with autism.

Chapter 2

Literature Review

When children participate and are actively involved in school and in their interactions with others they gain information about the world, learn the roles of society and the culture, and learn skills to evaluate situations (Zingerecich & LaVesser, 2009). Active involvement is essential for good learning and is important for both cognitive and social learning. Crick and Dodge, as cited in Bauminger (2002) defined social cognition as:

> "A child's ability to spontaneously read and correctly interpret verbal and nonverbal social and emotional cues; the ability to recognize central and peripheral social and emotional information; the knowledge of different social behaviors and their consequences in diverse social tasks and the ability to make an adequate attribution about another person's mental state (i.e., "theory of mind" abilities)" (p. 283).

Children with autism often have difficulties in the area of social cognition. They may not know how to initiate conversations, negotiate needs, or make an entry into a group. Children with autism also have difficulty with the Theory of Mind concept. This is the ability to think about what another person what might be thinking (Bauminger, 2002). Because of their difficulties with social cognition, they also face difficulties when it comes to social interactions. Social interactions are defined as "a reciprocal process in which children effectively initiate and respond to social stimuli presented by their peers"

(Shores, as cited in Bauminger, 2002, p. 284). It has been recognized that children with autism often have a low frequency of peer interaction and poor quality in the interactions that they do have (Bauminger, 2002).

Without participation skills, children are at a disadvantage when it comes to school and other settings, such as extracurricular activities and the workforce. Unfortunately, participation is often difficult for children diagnosed with autism spectrum disorders (ASD) yet it is a task that is required in many areas. The difficulties children with autism experience with expectations to participate can be seen in the home, school, and community setting. Since this study focused on the participation skills of children with autism in the structured setting of the classroom, this literature review includes the characteristics of autism, how autism affects social skills, with an emphasis on the social skill of participation, and research interventions that have been shown to increase social skills in children with autism.

Behavioral Characteristics of Autism

The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision [DSM-IV-TR] (2000) discusses pervasive developmental disorders, which include autism. According to the DSM-IV-TR, pervasive developmental disorders are "characterized by severe and pervasive impairment in several areas of development: reciprocal social interaction skills, communication skills, or the presence of stereotyped behavior, interests, and activities" (DSM-IV TR, 2000, p.69). The impairment in the area of reciprocal social skills includes difficulties in interpreting what other people are feeling or thinking, recognizing social cues, avoidance of eye contact, and difficulties

understanding tone of voice and facial expressions (National Institute of Neurological Disorders and Stroke, 2010). Children with autism often are unsuccessful at building developmentally appropriate relationships with their peers. This results in part from a perceived indifference to the interests of others which is often demonstrated. Children with autism will often respond to communication attempts by their peers by talking about something of interest to themselves rather than engaging in a reciprocal interaction. Children with autism cannot carry on a conversational interchange of thoughts and information about the same topic with another person (National Institute on Deafness and Other Communication Disorders, 2010). According to the DSM-IV-TR, children with autism have deficits when it comes to spontaneously seeking to share enjoyment, interests, or achievements with others. They often have a narrow range of favorite topics and do not understand that others may not necessarily share the same interests (National Institute of Neurological Disorders and Stroke, 2010). These children are often able to deliver an in-depth monologue on a topic but unable to sustain an in-depth back-and-forth interaction with another.

Along with the lack of spontaneity in reciprocal communication, children with autism frequently lack social or emotional reciprocity (Siegel, 2003). They may have delayed or a total lack of spoken language. They may exhibit social impairments that can be seen in the lack of spontaneous make-believe play or imitative play that is appropriate to their developmental level.

Their ability to focus on one topic to the exclusion of other topics is one way in which children with autism perseverate. Perseveration, or the uncontrollable repetition of a particular response, can take on different forms depending on the child. Some forms include, repetitious vocalizing, hand-flicking or wrist-turning, and reenactments (Siegel, 2003). Children who are perseverating often are not receiving new stimulation (Siegel, 2003).   When children are not receiving new stimulation, they are not learning how to habituate to new activities, people, and situations. This can then lead to difficulty with classroom tasks and transitions.

 Social interaction and communication are usually the areas that are most severely affected in children with autism (Bauminger, 2002). A child with autism has a difficult time understanding what other's expectations are, particularly when it comes to the social behaviors of initiating conversations, negotiating needs, and understanding consequences (Bauminger, 2002). They do not understand what composes an appropriate social interaction.

The parents of a child with autism usually begin to recognize some developmental delays or problems during their child's first three years of life. Autism is congenital, therefore present at birth, but the signs are difficult to identify in infancy (Siegel, 2003). Some of the early indicators of autism are a lack of big smiles or joyful expressions by six months or thereafter, a lack of back-and-forth sharing of sounds, a lack of smiles or other facial expressions by nine months or thereafter, a lack of babbling by 12 months, a lack of back-and-forth gestures such as pointing, showing, reaching or waving by 12

months, no words by 16 months, no two-word meaningful phrases (without imitating) by 24 months, or any loss of speech or babbling or social skills at any age (Autism Speaks, 2010). In addition to these deficits as early indicators, children with autism may respond inappropriately to auditory, olfactory, tactile or visual stimuli (Kelly, Garnett, Attwood, & Peterson, 2010).

Prevalence

According to recent studies, autism is said to affect 1 out of every 110 children, including 1 out of every 70 boys (Center for Disease Control [CDC], 2010). This is over a 600% increase in the past 20 years. The improvement in diagnosing autism as well as discovering it earlier in children has accounted for some of the increase, but not all of it. Most parents express concerns about the development of their children before the age of 36 months, but the average diagnosis is made around the time the child is 53 months. This diagnosis is earlier than it had been in previous years. However, in 2007, the same methodology that was used in 2010 was used to assess the prevalence of autism, which at that time was 1 in 150 (Autism Speaks, 2010). Although nothing had changed in regards to the method of assessment of autism between the years 2007 and 2010, the increased rates were still seen. The CDC published the following statement:

> While it is clear that more children than ever before are diagnosed as having an
> ASD, it is unclear how much of this increase is due to changes in how we identify
> and diagnose ASDs, or whether this is due to a true increase in prevalence. A real
> increase in prevalence would mean that there are actually more individuals per

capita who are being affected by autism than there were in the past (Oller & Oller, 2010, p. 18).

The changing diagnostic criteria for autism have also had an impact on its prevalence estimates. Each time that the Diagnostic and Statistical Manual has been revised there have been more diagnostic categories, such as Asperger's disorder and Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS), added as part of the autistic spectrum. Seigel (2003) noted that each time the Diagnostic and Statistical Manual has been updated there have been increases in autism diagnoses. Children who might have been previously diagnosed as having mental retardation but had autistic features may have received new diagnoses of autism, as might children who had normal intellectual abilities with autistic features. In addition children who may have been diagnosed as having schizoid or schizotypal personalities, language disorders, and social awkwardness were often re-diagnosed as having autism spectrum disorders, most of these children being given the diagnosis of Asperger's Disorder (Siegel, 2003). Although there has been an increase in the diagnosis of autism spectrum disorders, this shift may have provided children with better access to specifically designed services in the educational setting that might better address their needs. It is important to note that autism is viewed differently depending on the model from which one is working.

Etiology

Although there are many theories on the causes of autism, there is no single cause that has been pinpointed. According to the National Institute of Child Health and Human Development (2010), autism is likely the result of multiple factors. These factors can be genetic, infectious, neurologic, metabolic, immunologic, and environmental.

Early theories of the causes of autism centered on the concept of emotional deprivation. It was believed that autism was caused by a lack of maternal warmth (Kanner, as cited in Waterhouse, 2000, p. 27). Leo Kanner diagnosed the first cases of autism in 1943 and set the first known criteria (Oller & Oller, 2010). It was Kanner who stated that "emotional refrigeration has been the common lot of autistic children" (Waterhouse, 2010, p. 27). This statement caused unnecessary stress on the parents and has never been substantiated.

Immunizations during childhood have also been in the public eye as a potential cause of the increasing rate of autism. In 1988, Dr. Andrew Wakefield reported that there was a possible association between autistic symptoms and the vaccine for measles, mumps, and rubella (MMR) (Lewis, 2010). Wakefield had a sample size of 12 and seemed to confuse association with causation when talking about his results that found that nine of his participants had a diagnosis of autism. In 2006, Canadian researchers found that the vast majority of studies regarding autism and vaccinations showed no causal association between the MMR vaccine and autism (Doja & Roberts, as cited in Lewis, 2010). In early 2010, the editors who published Wakefield's article retracted it. In

early 2011, the British Medical Journal demonstrated through interviews and medical records, that Wakefield falsified data deliberately (Washington Post, 2011).

Currently, studies are being conducted to determine the role that gene and protein abnormalities may play as a causal factor of autism. Although genes and proteins have been implicated, too little is known about their functions and role in brain development to make any hypotheses as to how they affect the brain dysfunctions associated with autism (Muhle, Trentacoste, & Rapin, 2004). It is clear that genetics do play some role in autism spectrum disorders. Twin studies have indicated a 2-6% concordance rate with dizygotic twins and a 66% concordance rate in monozygotic twins (London & Etzel, 2000). The 2-6% rate is also the rate estimated for family reoccurrence, while the general population rate is 0.01%-0.15%. Although some children may be predisposed to autism they may not ever inherit autism. This seems to indicate that there are environmental factors that may play a significant role in the expression of features associated with autism in addition to genetics.

The environment has long been pinpointed as a potential cause of autism, since the environment can have an effect on genetics. Environmental toxins such as lead and mercury, as well as contaminated water and pesticides have been blamed for some of the increase in the rates of autism (Altevogt, Hanson, & Leshner, 2008). Chemicals and toxins have been shown to interrupt the normal development of the brain during fetal development and early childhood (Altevogt, Hanson, & Leshner, 2008). Environmental toxins are usually blamed for this interruption. The toxins can act as triggers which cause

genes to act, which therefore can cause disruptions in fetal and child development

(Altevogt, Hanson, & Leshner, 2008).

Metabolic disorders and allergies have also been implicated as a possible cause of

autism. The Allergy-induced Autism (AiA) group initiated research searching for a

possible link between allergies and autism (Waterhouse, 2000), believing that autism may

be a result of intolerance to many kinds of food and/or chemicals which manifests itself

when the child is around the age of 18 months. They believe that the main culprits are

gluten, cow's milk, sugar, and citrus fruits (Waterhouse, 2000). Metabolic disturbances

may be a factor in children with autism, but enough relevant research has not yet been

conducted. Currently, researchers are looking into whether or not immune responses to

proteins may affect some of the symptoms of autism spectrum disorders (Dochniak,

2007).

Neurologically, children with autism are often found to have irregularities in

several regions of the brain. Postmortem and imaging studies have demonstrated the

involvement of the limbic system, cerebellum, corpus callosum, basal ganglia, and

brainstem (Bauman & Kemper, 2005). Other studies have suggested that these children

have abnormal levels of serotonin or other transmitters (National Institute of

Neurological Disorders and Stroke, 2010). The National Institute of Neurologic Disorders

and Stroke states that

These abnormalities suggest that ASD could result from the disruption of normal

brain development early in fetal development caused by defects in genes that

control brain growth and that regulate how brain cells communicate with each

other, possibly due to the influence of environmental factors on gene function

(2010).

Although these are interesting findings, research in this area is new and requires further

investigation.

Educational Definition of and Service for Autism in Schools

Autism is defined somewhat differently in the educational setting than it is in the

DSM-IV-TR. The DSM-IV-TR places more of an emphasis on the characteristics

associated with autism, such as the child's communication difficulties, social interactions,

and restrictive patterns of behavior. The educational model of the Reauthorized

Individuals with Disabilities Education Improvement Act of 2004 (IDEIA) places an

emphasis on how the child's learning is affected by the lack of verbal communication,

socialization, and environmental issues.

In the educational setting, children diagnosed with an ASD are provided with

support services to help them interact with others both socially and academically when it

is determined that their ASD is affecting their learning. According to regulations adopted

by the Pennsylvania State Board of Education:

The Individualized Education Plan (IEP) for these students must address needs as

identified by the team which may include, as appropriate, the verbal and

nonverbal communication needs of the child; social interaction skills and

proficiencies; the child's response to sensory experiences and changes in the

environment, daily routine and schedules; and, the need for positive behavior

supports or behavioral interventions (Commonwealth of Pennsylvania,

Department of Education, 2009, p.48).

Within the school setting, an IEP is developed for a student with autism when it is

demonstrated that the student's disability is affecting his or her learning and ability to

achieve academically without supports.

Some services that a child with autism may receive in the school are assistive

technology as well as "autistic support services." Assistive technology service is defined

as "any service that directly assists a child with a disability in the selection, acquisition,

or use of an assistive technology device" (Commonwealth of Pennsylvania, Department

of Education, 2009, p.1). An assistive technology device is defined as an "item, piece of

equipment, or product system, whether acquired commercially off the shelf, modified, or

customized, that is used to increase, maintain, or improve the functional capabilities of a

child with a disability" (Commonwealth of Pennsylvania, Department of Education,

2009, p. 1).

When a child with autism is in need of services as determined by the school, the

determination needs to be made as to which type of services and how much of those

services are appropriate. According to the Pennsylvania Department of Education,

autistic support services can be carried out in the general education setting exclusively, in

both the general education classroom and autistic support classroom combined, or the

autistic classroom only. These autistic support placements can be itinerant, supplemental, or full time. Itinerant support consists of special education supports and services that are provided by special education personnel for less than 20% of the school day. Supplemental support consists of special education supports and services that are provided by special education personnel for more than 20% of the day but less than 80% of the school day. Full time support consists of special education supports and services that are provided by special education personnel for 80% or more of the school day. This service is utilized to help children with autism in the areas of communication and social skills or behaviors (Commonwealth of Pennsylvania, Department of Education, 2009).

Implications Over the Lifespan

Autism is one group of developmental disorders that has lifelong consequences. Autism is not just a childhood condition. During childhood and up until the age of 21, children with autism can receive educational services through the school systems and local agencies Commonwealth of Pennsylvania, Department of Education, 2009). This means that there is continued attention to their needs so that progress in areas identified for remediation can continue. However, as those with autism age, families need to start planning for goals beyond secondary school. Taylor and Seltzer (2010) found that programs that had services for adults with autism often had waiting lists and there is typically a lack of opportunities to achieve a maximal level of independence. It was found that autistic symptoms and maladaptive behaviors were generally improving for adolescents and young adults while they were in school, but this improvement was

slowed significantly after transitioning out of secondary school. Taylor and Seltzer (2010) believed that this could be related to the lack of services for adults, such as stimulating adult occupational day care activities or other services that might have been previously available in the school setting.

Although there seems to be a need for programs in the community that meet the needs of adults with autism, there appear to be efforts made to accommodate those higher-functioning students with autism at the collegiate level. Zager and Alpern (2010) reviewed the Campus Based Inclusion Model (CBIM) which involves collaboration between an urban public school system and a local college campus. In the CBIM, the students are helped with their social communication difficulties, educated alongside their peers and provided a positive, post-secondary education as well as vocational experiences that will help prepare them for adult living. Over the past five years, it has been found that the students with autism have benefited from the full inclusion program of the CBIM, and that they have attained success academically, socially, and vocationally (Zager & Alpern, 2010).

 Although there are efforts to help adults with autism, more programs and opportunities need to be established. Autism can result in long-term social burdens as well as economic costs over the life of the affected individual. With diagnoses of autism increasing, so will the social burdens and economic costs to society increase, which is why it will be important to find ways to meet the needs of these individuals (Oller & Oller, 2010).

The Effect of Autism on Social Skills

Impairment in social functioning is one of the defining features of autism (National Institute of Neurological Disorders and Stroke, 2010). Children with autism may have the desire to interact with their peers, but often lack the necessary skills to be able to do so. They need to be taught how to hold a conversation, take the perspective of others and engage in play with others. Sometimes these children also have to be taught how to read the body language and facial expressions of others in order to participate appropriately in social interactions (National Institute of Neurological Disorders and Stroke, 2010).

Turn-taking, generalization, if/then rules, and classroom participation are all social skills that are important in the educational setting. With these skills in place, children with autism can begin to interact more appropriately with their teachers and peers, and in return receive more positive feedback.

Turn-taking is a back and forth interaction needed to have a conversation. Turn-taking can be challenging for children, especially those with autism (LeBlanc et al., 2003). Turn-taking examples include, sharing and taking turns with a toy, waiting to talk, and waiting for an adult's attention.

Generalization is one of the most advanced stages of skill development. It is defined as the ability to "learn certain skills and functions, how to interact and relate to others, and how to take these learned abilities to matrix into or craft new seamless skills and experiences" (Whalen, as cited in Schutte, 2010, p. xv). Without the ability to

generalize, students with autism may not be able to carry over their newly learned skills to different contexts and these newly learned skills therefore will have no social significance.

If/Then rules are an important part of social skill development. If/Then rules refer to a certain condition being met before reward or reinforcement is given. For example, if you eat your dinner, then you can have dessert.

Classroom participation requires a combination of social skills, such as those previously mentioned and will be the social skill, focused on in this literature review. Participation is a key skill that serves as a prerequisite for many other skills that are needed to be successful in the school setting. Participation can involve responding to requests, questions, and directions, sharing, engaging in tasks and activities, and purposeful use of free time (PaTTAN, 2010). Some research has shown that student's classroom participation is associated with their grades and absences (Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008). Valiente et al. (2008) found that classroom participation is positively related to improvements in academic achievement. When children are actively involved in the classroom, absences tend to decrease while academic progress tends to increase. With these findings it is important that students with autism learn how to actively participate in the classroom setting.

Interventions to Increase Social Skills

There are many interventions in the research that have been shown to increase the social skills of children with autism. With the prevalence of autism on the rise, daycares, preschools, and school districts need empirically-based interventions in order to help their students with autism succeed. For the purposes of this literature review, only a few of these interventions will be discussed, with a focus on the Competent Learner Model (CLM). The discussion that follows is presented in terms of who is the designated interventionist.

Primary caregiver as interventionist. Generalization as mentioned earlier is an important skill that is needed for children with autism. Intervention programs where the interventionist is the primary caregiver have shown increased generalization and the maintenance of skills over time (Leach & LaRocque, 2011). In addition to generalization, primary caregivers can help to increase the functional developmental level (FDL) of their children. Solomon, Necheles, Ferch, and Bruckman (2007) found that 52% of their participants made very good progress, an increase of 1.5 FDL or better, and 14% of their participants made good progress, an increase of one FDL. In their study, Solomon et al. (2007) utilized the PLAY Home Project Consultation (PPHC) to train parents of children with autism spectrum disorders. Trained home consultants made monthly half-day visits to all 68 of the families involved in the study to teach the parents how to provide intensive one-on-one play-based services to their children (Solomon et al., 2007). In a joint-attention study conducted by Kasari, Gulsrud, Wong, Kwon, & Locke (2010), it

was found that caregivers could help their children improve in their responding to joint attention and in the diversity of their play. Joint attention refers to "the development of specific skills that involve sharing attention with others through pointing, showing, and coordinating looks between objects and people, as well as the development of attention states that involve mutually sustained joint engagement with others" (Kasari et al., 2010, p. 1045).

Thirty-eight children with autism and their caregivers participated in this study by Kasari et al. (2010). The children ranged in age from 21 months to 36 months, with 29 of the toddlers being male and 9 being female. The participants were divided evenly into two groups by a randomized waist list control design, which used a random numbers list to assign the families. The first group consisted of 19 dyads in the waitlist control (WL) and the second group consisted of 19 dyads in the immediate treatment (IT) group. Once randomization was completed, the children were assessed with the Mullen Scales of Early Learning and then the caregiver and child were observed playing with each other with a standard set of toys for 15 minutes (Kasari et al., 2010). These assessments were repeated after 8 weeks and again 12 months after the intervention was completed. Children in the IT group began the 8-week intervention directly after these assessments, while the WL group underwent a waiting period for 8 weeks. In addition, caregiver diaries and caregiver involvement scales were obtained weekly during the 8 week intervention period (Kasari et al., 2010).

The joint attention intervention consisted of 10 modules. The modules were individualized to each dyad so that the beginning point was determined by the first 15 minute initial caregiver-child interaction session (Kasari et al., 2010). The dyads completed the modules in 24 sessions, three sessions per week for 8 weeks (Kasari et al., 2010). Trained interventionists worked with each caregiver-dyad for approximately 30 minutes each session. The intervention sessions consisted of the interventionists coaching the caregiver through responsive and facilitative interactions, as well as some applied behavior analysis techniques. For example, the caregiver was trained how to follow the child's lead in activities and interest in those activities as well as how to make environmental changes to engage the child (Kasari et al., 2010). The interventionists gave direct instruction, modeling, guided practice and feedback. The caregivers then received handouts that summarized the main objectives of each module (Kasari et al., 2010).

Primary outcome measures consisted of the 15 minute caregiver-child interactions that were collected at the beginning of the study, the start of the intervention, the end of the intervention, and at the 12 month follow-up visit which were also videotaped. The videotapes were coded by researchers who were blind to the group status and at the time point scored; meaning they did not know if they were viewing pre, post, or follow-up sessions. The researchers looked for the percentage of time in engagement states between the caregivers and the children with autism (Kasari et al., 2010). The engagement states consisted of unengaged/other, object engagement, and joint engagement. Interrater agreement ranged from .89 to .98 (Kasari et al., 2010). The researchers also observed the type of play behaviors the children engaged in, functional and symbolic. In addition, the

frequency of the children's joint attention skills was also coded in the caregiver-child interaction (Kasari et al., 2010).

Secondary measures of Kasari et al. (2010) study included the Caregiver Quality of Involvement Scale. This scale is a 4-item experimenter report that measured how well the caregivers performed the strategies that they learned during the intervention session. It also measured their enthusiasm, confidence, and comfort in performing their newly learned skills. Each item was rated on a 1-5 scale, with 1 being not comfortable at all and 5 being very comfortable. The scale was completed at the end of each of the 24 intervention sessions (Kasari et al., 2010). A six item self-report measure was used to assess adherence to treatment and competence measure. This was administered to caregivers at the beginning of each week's intervention session. It consisted of four questions concerning adherence to the treatment protocol and two questions concerning parental competence (Kasari et al., 2010). Each item was rated on a 1-5 scale, with 1 being the lowest level of parental adherence and competence and 5 being the highest level of parental adherence and competence. A Service Utilization Measure was also obtained at the beginning of the study and monitored for changes throughout the intervention. The Service Utilization Measure is a five time parent report that asked the caregivers to list the programs and/or therapies that their children were involved in, type of service that was provided, and amount of time their children spent in each as well as how satisfied they were with these services (Kasari et al., 2010).

Results of the Kasari et al. (2010) study found that children in the immediate treatment (IT) group engaged in significantly less object-focused play, showed greater responsiveness to joint attention, and displayed significantly more types of functional play acts compared to the WL group (Kasari et al., 2010). At a 1-year follow up, gains in joint engagement, joint attention, responding skills, and types of functional play acts were maintained or improved (Kasari et al., 2010). Kasari et al. (2010) also found that the Caregiver Quality of Involvement scores significantly predicted increased joint engagement scores at post-treatment even when controlling for the scores at pre-treatment. The Service Utilization measure did not significantly predict any of the variables of interest, including the caregiver involvement, parental adherence, the level of engagement, play type or joint attention (Kasari et al., 2010).

Like the previously described study by Kasari et al. (2010), the Relationship Development Intervention Program (RDI) was also looking at caregivers as interventionists. The RDI is a cognitive-developmental parent training model. According to Gutstein, Burgess, and Montfort (2007), "RDI attempts to address the distinct patterns of perceptual, cognitive, and emotional difficulties unique to individuals on the autism spectrum" (p. 398). The primary agents of change in this model are the parents. The parents are trained over six days of extensive workshops and then meet with a certified RDI consultant regularly. The core of this program is to teach parents how to perceive and scaffold opportunities daily for their child to respond in more appropriate ways (Gutstein et al., 2007). Research on the RDI shows that "children who participated in RDI became significantly more socially related, engaged in more reciprocal

communication, functioned in school settings with less adult participation, and also were perceived by parents as behaving in a dramatically more flexible and adaptive manner" (Gutstein et al., 2007, p. 409).The gains remained stable over an average of three years.

In the study by Gutstein et al. (2007), data was collected from chart reviews of children whose families began RDI at the clinic were RDI was developed. There were 16 children included in this study. The inclusion criteria were an interval of at least 30 months between initial and follow up testing, a previous diagnosis of autism, Asperger's syndrome, or PDD-NOS, participation in the RDI protocol, age of time at RDI start between 20 and 96 months, and a pre-treatment IQ score of at least 70 (Gutstein et al., 2007). Five children met diagnostic criteria for autism, seven were diagnosed with Asperger's syndrome, and four children were diagnosed as PDD-NOS (Gutstein et al., 2007).

The measures used in the study were the Autism Diagnostic Observation Schedule (ADOS), the Autism Diagnostic Interview-Revised (ADI-R), flexibility interview, and educational placement (Gutstein et al., 2007). The ADOS helps to distinguish individuals with autism from other populations. The ADI-R is a diagnostic interview that examines qualitative abnormalities in social interaction, communication, and stereotyped patterns of behavior. A score of 0 represents no impairment, while a score of 2 represents significant impairment (Gutstein et al., 2007). The flexibility interview is a semi-structured interview that was developed by the authors. It consists of 10 items related to the child's ability to adapt to change and transition. The parents rated

their children across five flexibility categories, ranging from completely rigid to age appropriate flexibility (Gutstein et al., 2007). Changes in educational placement over the course of the study were used to measure the effectiveness of the intervention (Gutstein et al., 2007).

The results of the Gutstein et al. (2007) study showed that after a median of 41.5 months in treatment, no child met ADOS criteria for an autism diagnosis, six children met criteria for an autism spectrum diagnosis, and 10 children fell in the "non-autism" diagnostic category. A repeated measures analysis of variance (ANCOVA) conducted with ADOS scores demonstrated that initial improvements made the first year in the areas in social interaction and communication were maintained over time, and that social interaction continued to improve (Gutstein et al., 2007). The ADI-R pre-treatment scores had an average of 10.6, while the post-treatment scores had an average of 2.4, with some students receiving a 0. This was a significant difference (Gutstein et al., 2007). The flexibility interviews showed the percentage of children in the age appropriate flexibility category at pre-treatment going from 16% to 71% post-treatment (Gutstein et al., 2007). Furthermore, more than half the children attended special education classrooms at the beginning of the treatment, while four were partially mainstreamed. Only two children were mainstreamed without an aide prior to treatment. At the follow-up, 10 out of the 16 children were in the mainstream classroom without an aide. Only one student remained in a special education classroom (Gutstein et al., 2007).

Although intervention programs where the primary caregiver is the interventionist have been shown to have their benefits, there are also drawbacks. In order to be effective, primary caregivers need to be provided with structured and consistent support, guidance, and explicit instruction on the interventions to be used (Leach & LaRocque, 2011). In addition, the caregivers need to be able to have the time available to implement the interventions. Solomon et al. (2007) found that the children whose parents who were not able to spend as much time interacting with them did not make as much progress in their overall FDL. Lack of fidelity is another drawback of caregiver interventions. If caregivers do not like the intervention or have difficulty with the intervention, the implementation may not be done or done properly (Kasari et al., 2010). It is important to recognize all of these drawbacks when trying to implement a caregiver based intervention.

Specialist as interventionist. Intervention programs where the specialist is the main interventionist have been shown to increase IQ scores, visual-spatial IQ, language composition, expressive language, social skills, motor skills and adaptive behavior (Hayward, Eikeseth, Gale, & Morgan, 2009). One of the most important elements of specialist interventions is intensity. Measures of intensity of these types of interventions include 30-40 hours per week of intervention, small teacher-student ratio, and maximization of learning opportunities (Weiss, 2001). Approaches that involve specialists, such as Applied Behavior Analysis (ABA), are the most cited autism interventions, the most requested and implemented in public schools, and have some of the highest social validity (Callahan, Shukla-Mehta, Magee, & Wie, 2010).

In a study conducted by Hayward et al. (2009), progress after one year of treatment was examined for children with autism who received the intensive one-on-one UCLA model of ABA treatment. This treatment utilized the principles of ABA to increase behavioral deficits, taught using discrete trial teaching, natural environment, and incidental teaching (Hayward et al., 2009).. The participants in this study were all children who joined the United Kingdom Young Autism Project between autumn of 1998 and spring of 2005 and met certain criteria. The inclusion criteria were as follows: "(1) a diagnosis of autism, (2) chronological age at intake between 24 months and 42 months, and (3) absence of other severe medical conditions, as certified by a medical practitioner" (Hayward et al., 2009, p. 615). The autism diagnoses were all confirmed by using the ADI-R. The children then were assigned to one of two treatment groups, "intensive clinic based treatment group in which all treatment personnel were provided (i.e. tutors, senior tutors, and program consultants) or intensive parent managed treatment group where tutors were recruited and managed by parents" (Hayward et al., 2009, p. 615). There were twenty-three children assigned to the clinic-based group and 21 assigned to the parent-managed group. These assignments were done based on where the participants lived (Hayward et al., 2009).

In the clinic based program, the child's team consisted of a senior tutor, program consultant, and two to five tutors, while in the parent managed program the child's team consisted of a program consultant and tutors that were recruited and managed by the family (Hayward et al., 2009). The parents in both groups were all given a half-day

course on ABA principles and several days of hands-on training from senior tutors and program consultants prior to the study (Hayward et al., 2009).

All curricula were individualized, teaching skills in all areas of development, including beginning skills, intermediate skills, social language, and socio-emotional development (Hayward et al., 2009). The treatment skills of the tutors and the program consultants were also assessed using videotapes. These videotapes were then scored and approved by one of the directors of the UCLA Multi-Site Young Autism Project (Hayward et al., 2009).

The measures that were used in this study were the ADI-R, treatment intensity, child measures, Bayley Scales of Infant Development-Revised or the Wechsler Pre-school Primary Scale of Intelligence, Revised (WPPSI-R) (depending on age of the child), the Merrill-Palmer Scale of Mental Tests, the Reynell Developmental Language Scales, and the Vineland Adaptive Behavior Scales (Hayward et al., 2009). The outcome for participants was assessed using the a pre-post design comparing scores on IQ, visual IQ, Reynell comprehension subtest, Reynell expressive language subtest, and adaptive behavior (Hayward et al., 2009).

The results of the study showed that on treatment measures the two groups were not statistically different. The clinic based group received an average 37.4 hours of treatment per week, while the parent managed group received 34.2 hours (Hayward et al., 2009). When progress was assessed between intake and follow-up, all participants showed significant improvement on all measures. The mean IQ of the participants

increased by 16 points, the mean Reynell comprehension and expressive language age equivalents increased, and the Vineland composite score increased 6.4 points (Hayward et al., 2009). The Visual IQ measure (Merrill-Palmer Scale of Mental Tests) was shown to be the most consistent predictor of outcome. It predicted follow-up IQ, visual IQ, language comprehension, expressive language and adaptive behavior (Hayward et al., 2009).

Osborne and Corness (2007) compared the impact of existing ABA approaches, special nursery placements, and portage programs on different behaviors shown by children with autism characteristics abilities. The ABA approaches used were the UCLA Lovass approach, verbal behavior, and Comprehensive Application of Behavior Analysis to Schooling (CABAS), which were all overseen by trained supervisors (Osborne & Corness, 2007). Special nursery placements do not usually adhere to just one underlying philosophy, like ABA. They are more of an eclectic approach (Osborne & Corness, 2007). Portage programs are home-based programs where the parent administers the early intervention for children with developmental disabilities.

The participants originally consisted of 53 children who were "1) 2 years 6 months to 4 years old, 2) at the start of their first teaching intervention, 3) received no other major intervention during the period of assessment, and 4) had an independent diagnosis of ASD made by specialist pediatricians following initial referral from a general medical practitioner" (Osborne & Corness, 2007, p. 420). Of these 53 participants, five were excluded from the study at a later date. Assignment to a group

was based on the intervention being offered to a child in the area that they lived (Osborne & Corness, 2007). Although the assignment to the group was not random, the areas studied all had a similar socioeconomic profile (Osborne & Corness, 2007).

The twelve children in the ABA group received one-to-one teaching and each session lasted two to three hours and was comprised of eight to fourteen tasks or drills. These tasks lasted about five to ten minutes each and were repeated until a certain criterion was met with each task separated by five to 10 minute breaks (Osborne & Corness, 2007). The ABA intervention had the highest time intensity (Osborne & Corness, 2007). The twenty children in the special nursery placements received teaching in small groups with the teacher and/or learning support assistants. This usually included a guided song, encouragement to take turns, and individual activities. The materials that were used were considered to be appealing for children with autism spectrum disorders (Osborne & Corness, 2007). The sixteen children received two to three hour sessions each week, but the number of these sessions varied depending on the severity of the child's autism (Osborne & Corness, 2007). The portage intervention was supervised by a trained portage supervisor and consisted of parents following a manual written by the portage service provider. The supervisor visited the parents once every one to two weeks and taught them how to apply the portage system. These training sessions usually only lasted 40-60 minutes (Osborne & Corness, 2007).

Osborne and Corness (2007) used multiple measures in their study. They used the Gilliam Autism Rating Scale (GARS), Psychoeducational Profile Revised (PEP-R),

British Abilities Scale-II (BAS II), Vineland Adaptive Behavior Scales (VAB), and the Conners' Rating Scales Revised (CRS-R).

A MANCOVA was conducted on the baseline scores for the GARS, PEP-R, BAS II, and VAB as dependent variables and the intervention group as the independent variable. Age was used as the covariate. Results showed that there was no statistically difference between groups at the baseline (Osborne & Corness, 2007). Change in overall autism severity (using the GARS) from the baseline to follow-up was not statistically significant different between groups (Osborne & Corness, 2007). The results of a change in overall functioning between baseline and follow up, using the PEP-R, BAS-II, and VAB, revealed that intellectual functioning increased 10-13 points over the 9 month period for the ABA and nursery group. Educational functioning had the largest gain in the ABA group, approximately 18 points, whereas the other interventions had 5-8 point increases (Osborne & Corness, 2007). For adaptive functioning, the nursery intervention showed the largest gain (Osborne & Corness, 2007). When looking at the changes in subscale of each measures of functioning (PEP-R, BAS II, and VAB), the ABA intervention showed the greatest change scores of interventions. The ABAB intervention had six statistically significant improvements in six of the subscales on the PEP-R, and statistically significant gains in all of the subscales on the BAS II (Osborne & Corness, 2007). The nursery intervention produced the most statistically significant improvements over the other two interventions, as measured by the VAB, although the ABA intervention outperformed the portage intervention on this measure. When looking at the CRS-R and oppositional behavior, the nursery and portage programs showed more

improvement, however the ABA group showed more improvement with cognitive problems than did the other two interventions (Osborne & Corness, 2007).

ABA is probably one of the most well-known and studied approaches to helping children with autism learn. ABA has had several decades of development and use with students with autism. ABA is a scientific approach to understanding behavior and how the behavior is affected by the environment (Autism Speaks, 2010). Behavior refers to actions and skills, while environment refers to physical and social events that may impact ones' behavior. ABA aims to increase useful and positive behaviors while reducing unnecessary and negative behaviors. Discrete Trial Training (DTT) is an ABA procedure that is the most extensively studied (Smith, 2001). DTT is a method that individualizes and simplifies instructions in order to enhance children's learning. Studies have demonstrated that it is useful for children with autism because it can teach new behaviors and discriminations (Smith, 2001).

New forms of behavior are actions that children previously did not and could not perform. DTT has been shown to teach children new speech sounds, new signs for sign language, and new motor movements (Smith, 2001). New discriminations involve giving different and accurate responses to different cues. The DTT method uses cues, prompting, and shaping behaviors to help children learn discriminations. Some of the types of discriminations that the DTT focuses on are, imitation, receptive language, expressive language, conversation, and sentences, grammar, and syntax (Smith, 2001).

Although the DTT has many important uses in the treatment of children with autism, it along with other specialist-conducted interventions also has its limitations. One limitation is that the students in the DTT are responding to cues from the teacher and therefore may not learn to initiate behaviors. Another limitation is generalization. DTT conditions are highly controlled, so the skills may not transfer beyond the learning environment. DTT as well as other types of ABA interventions are labor intensive and may not be practical in classrooms with a larger teacher-to-student ratio (Smith, 2001). The cost of such therapies can range from $25,000 to $60,000 per year (Solomon et. al., 2007). When carried out over a period of a few years, which is recommended, these types of treatments can become very expensive.

Naturalistic interventions. Naturalistic environments have played a pivotal role in the treatment of children with autism. Creating an environment that is rich with opportunities to practice social skills is extremely important for acquisition of new skills and generalization (Sperry, Neitzel, & Englehardt-Wells, 2010). The Individuals with Disability Act of 2004, "requires that early intervention services for infants and toddlers with disabilities occur within the natural environment to the maximum extent possible" (Leach & LaRocque, 2011, p.150). When services are provided in the natural environment, the capacity of family, caregivers, and teachers are supported and enhanced. Developmental learning opportunities can be provided within daily routines and activities (Leach & LaRocque, 2011). The environment can also be arranged in order to increase the frequency and type of opportunities for children with autism to communicate. Some strategies that have been shown to work are: giving only a small

amount of a desired item, interrupting a sequence of activities, doing something

unexpected or different while interacting with a child, and placing desired items out of

reach to encourage social communication (Leach & LaRocque, 2011). The Competent

Learner Model (CLM) is an intervention that utilizes the natural environment of the

school and rearranges it in order to increase social skills.

The CLM was developed to address the needs of teachers, administrators, and

paraprofessional staff when working with children with autism. It was designed to

enhance the delivery of best practice instructional programs and services to children with

autism (Tucci, Hursh, Laitinen, & Lambe, 2005). The CLM addresses the same goals of

ABA, such as increasing attention, play, social, self-help, academic, and language skills;

however it addresses these goals differently. Rather than a traditional skills training

approach, the CLM focuses on teaching children with autism "learning to learn"

competencies (Tucci et al., 2005). The CLM teaches learners to become competent

observers, listeners, talkers, problem-solvers, participators, readers, and writers. These

are the seven Competent Learner Repertories (CLR) of the CLM. The competencies are

developed by using explicitly designed programming that allows the learners to benefit

from "increasingly typical instructional procedures, presentations, groupings, and

formats" (Tucci et al., 2005, p. 56). The CLM contains five solutions (components) that

exemplify best practices and how these practices can be learned and applied. These

solutions support educators as they arrange instructional conditions in order to help the

students develop the seven CLRs.

The first component is the Course of Study. The course of study prepares educators and parents to be successful at arranging instructional conditions. This is done through programmed instruction with video examples. It is personalized so that educators and parents can master competencies before implementation. Each educator or parent learns how to select, arrange, and rearrange the environment in a way that is appropriate for the learner. The educators and parents learn how to formulate, deliver and monitor the skills that are needed for the CLM before they actually implement the intervention in their classroom or home (Tucci et al., 2005).

The second component is CLM Coaching. Coaching is used to help parents and educators master the course of study units. The CLM Coaches, usually another staff member in the school, oversee the arranging and rearranging of the instructional conditions in order to ensure that the CLM is being properly implemented. The coaches help the educators and parents develop mastery and fluency of the competencies (Tucci et al., 2005).

The third component is the CLM Curriculum itself. Within the CLM curriculum there are detailed instructional formats that are designed to strengthen the Competent Learner Repertoires (CLRs). The curriculum consists of five levels, but has two levels that help the naïve learner with CLRs that are not established to the establishment and maintenance of all seven CLRs. The first level is called the Pre-1 Level. The Pre-1 Level is appropriate for learners who have not had any opportunities to participate in formal schooling. The second level is called Level 1. Level 1 prepares students with autism to be

successful at the kindergarten or beginning of first grade level curriculum. The

curriculum starts off with what a learner can do and builds from that point (Tucci et al.,

2005). The focus of this study will be on the CLR of Participator.

There are four types of participation according to the CLM. The child can

participate with teachers and instructors, participate with peers, participate in assigned or

required routines, and participate in self-chosen routines or tasks (PaTTAN, 2010).

Teaching these participation skills is accomplished, according to the CLM, by creating an

open and fun environment, finding personally suitable reinforcers, reinforcing the

participating behavior and ignoring the non-participating behaviors.

The fourth component is the CLM Performance Assessment and Performance

Reviews. These assessments and reviews help educators and parents place learners in the

correct curricula. The Competent Learner Repertoire Assessment (CLRA) provides a

profile of each learner's strengths and weaknesses across all seven of the CLRs in the

CLM curriculum.   In addition, both parents and the educators' are assessed on their

performances with the CLM Course of Study and their delivery of the curriculum (Tucci

et al., 2005). The results from the CLM Performance Assessments act as fidelity

monitoring to ensure that the staff is carrying out the interventions correctly. They are

then used as progress monitoring for the students to see where they are in the CLM

curriculum.

The final component is the CLM Collaborative Consultation. Collaborative

Consultation involves the practice of assisting educators and parents, by determining

rearrangements that may aid the development of the Competent Learner Repertoires

(CLR). In this part of the process, both the educators and parents are seen as the experts,

since they spend the time with the students every day (Tucci et al., 2005). The behavior

analyst is there to support and give advice as needed to ensure the development of the

CLRs. The behavior analysts, who are highly trained in CLM, help design direct and

frequent measurement systems and coach the teachers on contingency management in the

classroom (Hursh, 2007). They are part of the instructional team that serves the

classroom, but the goal is for teachers to be able to make functional connections between

interventions and desired outcomes in the absence of the behavior analyst (Hursh, 2007).

Overall, the CLM is designed with the intention of providing the parents and

educators with the necessary training to be able to promote learners' abilities to function

appropriately in the school setting and in everyday circumstances. A review of the

literature resulted in finding no empirical research evidence on the efficacy of the CLM

model. The information that is available has been provided by the authors of the CLM.

This is an intervention that will most likely be researched more frequently in the future.

Autism is a topic that frequently is in the news and will continue to become more

visible to society as public interest in this disorder grows. Research in this area will also

continue to develop. The social skill interventions for children with autism that were

discussed previously were not intended to be an exhaustive review of all of the

interventions available. The purpose of this review was to discuss the major classes of

existing interventions, caregivers as interventionists, specialists as interventionists, and

naturalistic interventions that could help build these children's social skills.

Chapter 3

Methods

This study investigated the effects of the Competent Learner Model (CLM) on behaviors associated with classroom participation of students with autism within the school setting. In particular, this study examined the effect of the participation curriculum of the CLM on the classroom participation skills of three students with autism. The participation curriculum is comprised of tasks that require the learner to be teacher-directed, self-directed, peer-directed, and non-directed in his or her interactions. The classroom teacher and aides delivered the CLM intervention after being trained by the CLM internal coach. The CLM internal coach was the school psychologist for the school district. The data was collected using the Competent Learner Repertoire Assessment (Tucci, 2005). The Competent Learner Repertoire Assessment (CLRA) monitors the progress of each student as he or she progress through each participation task. This is referred to as tracking within this model. It was hypothesized that children with autism will engage in more positive interactions with their peers and teachers in both the general and special education classrooms following being instructed in classroom participation skills through the CLM model.

Participants

  Inclusion Criteria. Participants for this study were chosen under nonrandom

selection. Criteria for participation in the study included a current medical diagnosis of

autism and a current placement in the autistic support classroom, either full or

supplemental. An autistic support classroom is a highly structured classroom that is

designed to meet the needs of students with autism spectrum disorders. Full time support

consists of special education supports and services that are provided by special education

personnel for 80% or more of the school day, while supplemental support consists of

special education supports and services that are provided by special education personnel

for more than 20% of the day but less than 80% of the school day (Commonwealth of

Pennsylvania, Department of Education, 2009). There were no age restrictions. Ten

students met these criteria and were initially invited to participate. Of the ten, three

participated in the study.

  Sample description. The participation skills of three middle school-aged boys

who were diagnosed with autism and were receiving support in an autistic support

classroom were studied over a six month period. All children in the study attended a

middle school in rural Pennsylvania. The students range from sixth to eighth grade. One

student was in sixth grade, one student was in seventh grade, and one student was in

eighth grade. The children who participated received the majority of their instruction in

the autistic support classroom. All children in the study were male and of white, non-

Hispanic descent. Despite having parental consent for the elementary students to

participate, students in these grade levels were not included in the study because of an indefinite delay in the implementation of CLM at the elementary level.

One autistic support teacher, one special education student teacher, and two paraeducators participated in the study. Each served as an interventionist and data collector.

Procedure

Letters were sent home to the parents of all ten children who met the inclusion criteria for the study. Permission to participate was given by the parents for all children. Each child was also asked to give a verbal assent to be a part of the study and the attainment of assent was witnessed by the child's teacher. Teachers and paraeducators were asked to give verbal assent to agree to be part of the study. The teacher and paraeducators were trained on the implementation of CLM prior to commencement of the intervention. Training was completed during two, six hour sessions before the beginning of the school year. The training was provided by the internal CLM coach (the district school psychologist) and completed via computers. Teachers and paraeducators watched videos of interactions between teachers and students and were asked to identify numerous events that were occurring in the videos and to describe what was happening. Each video was followed by a short quiz. When the trainees completed a component on the computer, they demonstrated what they learned in a mock situation. The trainees would act out each component as it was completed on the computer. This was observed by the internal CLM coach who determined whether the trainee had mastered the component of

the CLM. The component was then initially completed with the coach and the student, so the coach was available to help with any issues or questions that arose. When the CLM coach determined a trainee mastered all components, the trainee was certified in the CLM curriculum. Certificates were issued for each completed Course of Study. These certificates were given by a certified coach after completion of the online portion and in the in-classroom checkouts. Ongoing consultation occurred between the CLM coach and the teachers and aides trained in the CLM on a bi-weekly basis, with the CLM coach observing interactions and providing feedback on CLM implementation. This was on-going, as the CLM coach visited the classroom to help with any issues and answer any questions.

The CLM curriculum provides detailed instructional formats designed to support the seven Competent Learner Repertoires (CLRs) (Tucci, 2005). The CLRs consist of observing, listening, talking, reading, writing, problem solving, and participating. The CLR focus for this study was participating. Participating is defined as taking part in something, such as interacting with peers and teachers, as well as sharing in something, such as in play. Participating according to the CLM can be teacher-directed, semi-directed, peer-directed, and non-directed. Teacher-directed participation is when the teacher is facilitating the interaction or engagement in a task. Semi-directed participation is when the teacher asks the learner to perform a task, the teacher remains in close proximity, but there are no additional prompts given to the learner. Peer-directed participation is when a peer or the learner initiates interaction with the other. This could consist of the learner giving or receiving something from a peer. Non-directed

participation is participation that is done on the learner's free time and involves the learner using objects or doing an activity for a certain amount of time. It does not have to involve another person.

The teachers, support staff, and aides who carried out the CLM curriculum were given a description as to what their behavior should be for each CLR. The teacher behavior was clearly described on each of the CLR assessments. In addition, the student behavior was also described as well as what was considered to be mastery of the format. An example of what the teachers were asked to do in a 1:2 work context (one teacher and two students) was to present consecutive sets of firm single-step directions or directions to the learners, set occasions for group responses, and control the pace of the instructional sessions. An example of this can be seen in *Repertoire 0.505 Participator* where the teacher arranges a variety of "potentially" reinforcing objects around the classroom and helps the learner select activities they can do. The learn is to select objects and use the object for 3-4 minutes and put the object away within 5 minutes but may have some annoying behaviors. The teacher knows the pace is 3-4 minutes of use and 5 minutes of time for putting an item away. They also know from previous repertoires and their student's level of mastery how often to give time reminders for transitioning. The teacher also knows they can accept annoying behaviors, i.e. screaming, stomping, and similar, but not injurious behaviors. Other examples consist of the teacher instructing the learner to perform a task, offering help when it's required for the learner to be successful, reinforcing the learner's behaviors that are being taught, promoting peer interaction by

having the learner vary his or her role as a receiver and a giver, and helping the learner select free time activities that he or she can do with minimal assistance.

Instruments

Adaptive Measures.

Adaptive behavior assessment system. The Adaptive Behavior Assessment System, Second Edition (ABAS-II) provides a complete assessment of adaptive skills across the lifespan (Harrison & Oakland, 2008). The ABAS-II assesses three domains, conceptual, social, and practical, while also providing a General Adaptive Composite (GAC). It is a behavior rating scale that can be completed by the parent, caregiver and/or teacher and measures daily living skills and functional academics. Teachers, parents, and others who are familiar with the person about whom the scale is being completed rate whether and how frequently the individual can perform each task. The ABAS-II is particularly useful for people with autism spectrum disorders (Harrison & Oakland, 2008). The ratings are based on a 4-point response scale. A score of "0" means the individual is not able to perform the activity of behavior described and a score of "1" means the individual is able to perform the activity or behavior but never or almost never when needed. A score of "2" indicates that the individual is able to perform the activity or behavior described but only does so sometimes when needed. A score of "3" means that the individual is able to perform the activity or behavior always or almost always when asked (Harrison & Oakland, 2008). The social domain consists of an assessment of social skills and leisure skills and is the domain focused on for this study.

The social domain, as well as the other adaptive domains and the GAC, have a mean of 100 and a standard deviation of 15 (Harrison & Oakland, 2008). The distribution of scores on the three adaptive domains and the GAC closely approximates the normal distribution. The ABAS-II has high internal consistency with the reliability coefficients ranging from .97 to .99 (Harrison & Oakland, 2008). The adaptive domains, such as the social domain demonstrate reliability coefficients ranging from .91 to .98. The average standard errors of measurement for the teacher/daycare provider form for the ABAS-II was 1.57, with the social domain average standard of measurement at 2.60 (Harrison & Oakland, 2008). Test-retest reliability estimates for GAC of the ABAS-II are mostly in the .90s, with the test-retest reliability coefficients of the adaptive domains being in the upper .80s and .90s (Harrison & Oakland, 2008). Inter-rater reliability on teacher/daycare provider forms for the age group in the study was high with .89 for the GAC and .74 for the social domain. The content validity of the ABAS-II was at least .90 for each age group on all rating forms, except for the age group of 0:0-0:3, which was not the age group in this study (Harrison & Oakland, 2008).

Vineland Adaptive Behavior Scales. The Vineland Adaptive Behavior Scales, Second Edition (Vineland-II) is a measure of adaptive behavior from birth to adulthood. It is a behavior rating scale that can be completed by the parent/caregiver and/or teacher (Sparrow, Cicchetti, & Balla, 2006). The Vineland-II is a leading measure of personal and social skills that are needed for everyday living. It consists of 4 domains: communication, daily living skills, socialization and motor skills. The socialization domain, consisting of interpersonal relationships, play and leisure time, and coping skills

is the domain focused on for this study. Interpersonal relationships are how a student interacts with others, play and leisure time is how the student plays and uses leisure time and coping skills are how the student demonstrates responsibility and sensitivity to others (Sparrow, et al., 2006). These areas are measured on a 3-point response scale, based on how often the student performs a behavior satisfactorily and without help or reminders. A score of "0" means that the student never or very rarely performs the behavior. A score of "1" means that the student only sometimes performs the behavior or the student only performs part of the behavior. A score of "2" means that the student usually or almost always performs the behavior (Sparrow et al., 2006).

The end scores that the Vineland-II provides are domain scores in the area of communication, daily living skills, socialization, and motor skills. An adaptive behavior composite is also obtained. The adaptive behavior composite and domains are converted to a standard score. The Vineland-II has a mean of 100 and a standard deviation of 15 (Sparrow et al., 2006). The internal consistency reliability of the Vineland-II domains are very high, ranging from the mid to high .90s for all domains except motor skills and the reliability coefficient for the Adaptive Behavior Composite is .98 at almost every age (Sparrow et al.,2006). The socialization sub-domains, the focus for this study, have the highest reliabilities with the majority (93%) being at .90 or greater. The standard error of measurements for the domains were mostly in the range of 2.5 to 4 standard score points, while the Adaptive Behavior Composite had a standard error of measurement of 2-2.5 standard score points (Sparrow et al., 2006, p. 76). The test-retest reliability coefficients are high, with the domains in the mid .80s and the Adaptive Behavior Composite at .91.

The interrater reliability for the domains ranged from the mid. 40s to high .60s. Content

validity and construct validity have also been established (Sparrow et al.,2006, p. 83).

Competent Learner Repertoire Assessments

The CLM Performance Assessments, also known as the Competent Learner

Repertoire Assessments (CLRAs) provide a profile of the student's strengths and

weaknesses across the CLRs. A CLRA is an instructional-based assessment tool that is

used to determine if a learner has mastered the repertoires in CLM to the desired level of

proficiency (Tucci & Hursh, 2004). It is important to note this is not a standardized test,

formal assessment rules do not apply and you may provide reinforcements for correct

responses The CLRAs assess the CLM level the learner is at and how he or she is

performing at that level. The CLRAs were completed prior to the beginning of the study

and at the end of the study. The CLRAs state what repertoire is being assessed, how the

teacher interacts with the learner, what the learners' behavior should consist of, the

materials that are needed, and what the mastery criteria is. In addition, the CLRAs keep

track of the people, places, and times that are involved to complete that particular

repertoire. The student is rated based on his or her performance on each repertoire. A

rating can be 0 (no opportunity to observe), 1 (repertoire is not established), 2 (repertoire

is established but response is only approximated), 3 (repertoire is established but rarely

performed across people, places, and items), 4 (repertoire is established but requires

further development across people, places and items), and 5 (repertoire is mastered and

performed consistently) (Tucci, 2005). According to Deem, Hursh, and Tucci (2004, as

cited in Tucci, 2005), the CLRA is shown to have concurrent validity with the Vineland

Adaptive Behavior Scales, be sensitive to change in learner behavior, and have high

interobserver agreement among educators using it to assess their learners.

Analysis

A base-line of the participation levels was established for each child based on the

CLRA. The baseline was obtained by the autistic support teacher and paraeducators in the

autistic support classroom. The CLRA was completed again at the end of the study by the

same initial rater. In addition, to the CLRAs an adaptive measure was completed on each

child at the end of the study. The measures are the Adaptive Behavior Assessment

System, Second Edition (ABAS-II) and the Vineland Adaptive Behavior Scales, Second

Edition (Vineland-II).

The results of the CLRAs are presented as graphical representations in order to

see the progress that each child made throughout the length of the study (5 months).

These results are presented individually for each child. The children are not be compared

to each other, but rather examined by themselves. The purpose of this was to see the child

as a whole and the progress each made throughout the study. Background information,

teacher information and present levels were also provided for each child.

Chapter 4

Results

The purpose of this study was to observe whether or not the CLM model improved the participation levels of three middle school boys who were diagnosed with autism. In addition, the study examined the adaptive skills of each student, in the area of socialization, at the end of the study. The results are presented as separate cases. The names of the students were changed to protect their identity. Each case presents current information on the student, developmental and medical history, progress as a result of the CLM model in the area of participation, and a follow-up of a measure of adaptive skill in the area of social skills/socialization. These students are not compared to each other, but rather compared to themselves from where they were at the beginning of the study to where they were at the end of the study.

Case 1: Jacob

Jacob is a 15 year old male in the 8th grade who receives his instruction in a middle school autistic support classroom. His autistic support classroom has one teacher and two full-time aides. There are two other students in Jacob's autistic support classroom. Jacob uses no expressive language other than gestures but he has receptive language skills in that he understands verbal communication from others. He frequently communicates by pointing at or touching what it is he wants. Jacob is social and enjoys interacting with staff and peers. Jacob is usually cooperative when he knows what is expected of him. The teacher and the aides in the classroom have been trying to teach

him to communicate non-verbally through programs on the iPod Touch. The teacher and

aides would like Jacob to use the iPod touch to indicate his needs, such as "I have to use

the bathroom" or "I'm hungry" because this would be a way to communicate with others

who are not familiar with his hand gestures and what they mean. The iPod speaks these

commands so that others know what Jacob is asking for or needs. This will allow Jacob

to have a more functional mode of communication both inside and outside the classroom

setting.

Whereas many children with autism struggle with changes in routine, Jacob can

accept changes in routine and departures from the unexpected with preparation for what

is coming next. As an example of his facility with working with change, he has made the

transition to a new aide very well and he can move on to new tasks after a few practice

sessions and with social stories. Social stories serve as a model for Jacob to imitate as

well as a way of teaching Jacob about the upcoming task.

Developmental and medical history. Jacob lives with his father, mother, and

older sister. Jacob's father was the primary caretaker when Jacob was young because

Jacob's mother was ill during that period. Jacob was born without complications.

Although his early gross motor milestones were met within normal timelines, he was

delayed in language and toilet training. He was not yet toilet trained at the age of five.

Jacob was first diagnosed with Pervasive-Developmental Disorder (PDD-NOS) at

the age of three. His parents and pediatrician noticed that his language development was

delayed. When a Battelle Developmental Inventory (BDI-2) (Battelle Developmental

Inventory, 2011) was conducted, Jacob was found to have developmental skills in the 12-15 month age range which was approximately 2 years behind his chronological age of 36 months. The Battelle Developmental Inventory-2 is a developmental assessment for children. It assesses the attainment of essential developmental milestones associated with motor, cognitive, personal/social, and communication development (Battelle Developmental Inventory, 2011).

Medical testing during this period of his life, found that Jacob experienced extremely high lead levels. He was then treated with iron and calcium vitamin tablets. Jacob also suffered numerous otitis media infections before the age of three and received a tympanostomy tube placement in 1998, at the age of three.

Educational history. When Jacob began school at the age of five, he was instructed in a full time autistic support classroom in another district, because his current district did not have an autistic support room at that time. At that time Jacob was still not toilet trained. He also was delayed in fine and gross motor skills and sensory skill input. Jacob's fine motor issues revolved around bilateral coordination skills, such as cutting and writing. His gross motor skills and sensory skills were also problematic. He was observed at that time to exhibit mild to moderate toe-walking. He was able to use the stairs, but could not jump or balance a ball. He could, however, carry, kick, and catch balls.

During his first year of school, the Vineland Adaptive Behavior Scales, Second Edition (Vineland-II), a measure of adaptive behavior from birth to adulthood, was

conducted (Sparrow et al., 2006, p. 1). The Vineland-II is a leading measure of personal and social skills that are needed for everyday living. It consists of four domains, communication, daily living skills, socialization and motor skills. It is a behavior rating scale that can be completed by the parent/caregiver and/or teacher (Sparrow et al., 2006, p. 1). On the basis of the Vineland- II, Jacob, at approximately 60 months of age, was determined to have the adaptive skills of those of a 15 month child. His scores were well below average in all areas.

In 2004 at the age of nine, Jacob moved into the district that he currently attends. He received instruction in an Intermediate Unit classroom, where he was provided with speech services, social work services, occupational therapy services, and physical therapy services. This classroom was a fulltime autistic support classroom, where Jacob received intensive instruction from trained professionals. He currently receives all of these services, except for the social work services, but in a new autistic support classroom that is not run by the Intermediate Unit. The social work services are being addressed through the CLM curriculum, which addressed the social skills that a social worker would address, such as participation skills. Each year that Jacob has been in school, he has also been part of the Extended School Year services (ESY).

Current educational information. According to Jacob's classroom teacher and most recent Individualized Education Plan (IEP), Jacob is a student who does well with structure and routine. Transitioning from preferred activities was difficult at the beginning of the school year, where Jacob required a fair degree of visual prompting for

transition. Currently he is transitioning well with verbal and picture prompts (Area

School District, 2010). Prompts that are given at least five minutes before the end of

these very preferred activities tend to help him to transition appropriately. Encouraging

him to move to a different area of the playground and swimming pool, for example, at the

warning times has also met with some success.

Jacob requires many opportunities to practice all activities in the classroom.

However, after much practice, the prompts can be faded and Jacob can perform the

actions independently and successfully. Jacob becomes frustrated when he is pressed too

hard to complete an activity (Area School District, 2010). The frustration usually occurs

when he is confused. When frustrated, Jacob will scream and make noises.   The

classroom teacher and the aides are trying to help him to be able to express frustration

using his communication device, which will act as a replacement behavior for the

screaming and noise-making (I-Pod touch). His teacher and aides believe he is

transitioning nicely to use an iPod Touch as his communication device. He appears

interested in this device and will use it without prompting (Area School District, 2010).

When Jacob is provided with time and space to recover and is presented with the activity

again in a modified or more supported form, he can perform successfully.

Jacob is attentive to his surroundings, peers, and activities (Area School District,

2010). He can sit quietly and attentively for at least 20 minutes in group situations in the

classroom with adult support. Jacob can also work independently for 8-10 minutes

periods to complete tasks that are familiar. The classroom teacher and classroom aides

are also helping him with generalizing his skills across adult support personnel (Area

School District, 2010).

      Jacob's progress with the Competent Learner Model. It should be noted that

Jacob was receiving the CLM in a different district one year prior to his enrollment in his

current school district. When Jacob began the Competent Learner Model (CLM)

curriculum in September 2010 at his current school, he was determined to be functioning

at a Pre-1 level. The Pre-1 level of this curriculum is designed for those who may not

have had opportunities to participate in formal education and for those students who may

have had formal teaching, but may have not acquired all of the skills that are taught in the

Pre-1 level. Learners who have not received formal education previously are referred to

as naïve learners. Naïve learners typically do not like to be around adults, do not let

others know what they need or want in a reliable way, seldom follow instructions, and do

not enjoy interactions with others. Jacob is considered to be a naïve learner. Because he is

non-verbal, Jacob could not be assessed on the first two participator repertoires, as these

two repertoires require verbal responses to the teachers' directions and questions.

Therefore, Jacob was scored with zeros on these two repertoires, meaning there was no

opportunity for the staff to observe these behaviors. The behaviors observed for the first

two repertoires would have been (1) the performance of three consecutive sets of ten

responses and (2) responding on signal for three consecutive sets of ten responses. For

example, he may have been answering questions asked by the teacher or naming letters

and shapes.

On the third participator repertoire, Jacob was successful at completing a task of up to 20 repetitions without prompts and with the teacher near, while also accepting assistance from the teacher or the classroom aide. This task involved Jacob folding twenty towels, or setting the table with twenty pieces, or stocking snacks with twenty pieces. This task is personalized for each student. While Jacob's performance on this task was determined to be established, he was judged to require further development across people, places, and items. These skills are targeted so that the student learns how to participate with adults as well as how to participate in activities when the teacher and/or adult are near but not directing the activity. This repertoire helps prepare the student for more difficult tasks in the educational setting.

The fourth and fifth repertoires in the Pre-1 Level are peer-directed and non-directed activities. These activities are designed to teach the child to interact with others as well as to interact independently, skills that are needed routinely in the educational setting. The fourth participator repertoire required Jacob to accept an item from a peer or give an item to a peer within five seconds when directed by the teacher or a classroom aide. Jacob was successful on this repertoire, but like the third repertoire this skill was not yet generalized across people, places, or items. The fifth participator repertoire of the Component Learner Repertoire Assessment required Jacob to select a variety of objects, use each object for one or two minutes for a total of tem minutes and put them away within two minutes of being told to clean up. Jacob mastered and performed this task consistently. Jacob performed best on the fifth repertoire, which was participation in free

time activities and considered a form of non-directed participation. Figure 1 depicts how

Jacob performed on the Participator Repertories at the beginning and the end of the study.

Figure 1
Pre and post-intervention CLRA Participator Results
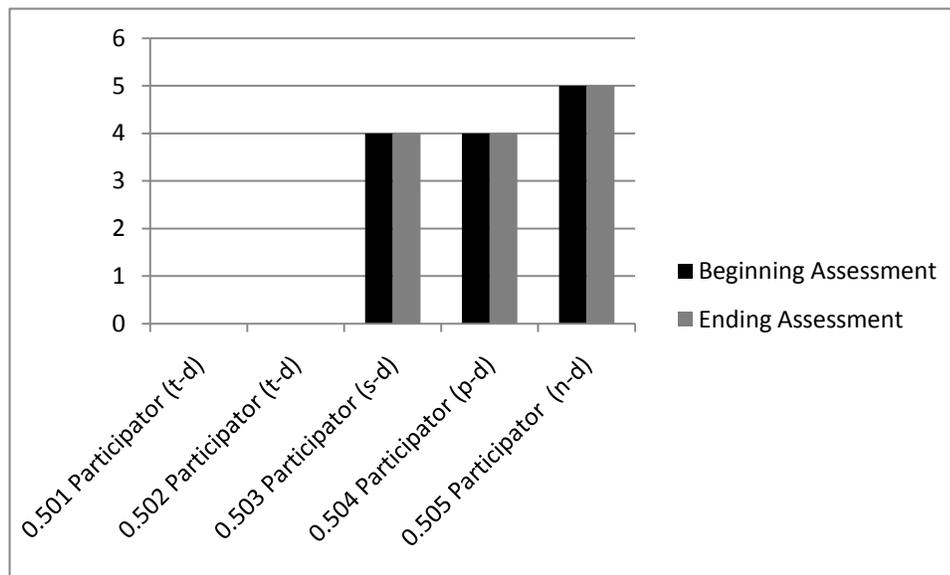
At the end of the study, Jacob demonstrated no measureable improvement in any

of the participator repertoires.

Jacob's end of intervention Vineland-II was completed by the autistic support

teacher. Table 1 provides the scores, percentile ranks, and adaptive levels that Jacob

achieved in each socialization sub-domain as well as his overall scores and adaptive level

in the Socialization domain.

Table 1

Standard Scores and Adaptive Levels for Jacob on the Vineland-II

Subdomain/Domain	v-Scale Score	Domain Standard Score	95% Confidence Interval	Percentile Rank	Adaptive Level
Interpersonal Relationships	5		3-7		Low
Play and Leisure Time	7		5-9		Low
Coping Skills	8		4-7		Low
SOCIALIZATION	18	50	44-56	<.01	Low

The results of the Vineland-II indicated that Jacob is low in all sub-domains as well as the overall Socialization domain. His socialization skills, like those found on the first Vineland-II, are still well below where they should be for his age. Despite 11 years between the first and second Vineland, these results still show that Jacob struggles in this area.

According to a more holistic assessment of Jacob's progress, his classroom teacher reported that Jacob has improved on completing well-rehearsed semi-directed tasks, without prompts. However, she felt he still requires many prompts to complete newly learned tasks and tasks that he is in the process of learning. His teacher also noted that Jacob is starting to generalize in that he will complete tasks across instructors, settings, and activities. He is beginning to select different objects to play with, rather than choosing only those that are familiar. Jacob also is accepting items from peers, even peers whom he previously avoided (Classroom teacher, personal communication, February 28, 2011).

Case 2: David

David is a 13 year old male in the 7th grade who receives his instruction in a middle school autistic support classroom, but attends homeroom in the general education setting. He is a classmate of Jacob and Chad, which means that he also works with the autistic support teacher and two full-time aides. David is verbal, but often chooses to whom he will talk. When David encounters strangers, he often responds in a verbally aggressive manner. He often will ask them when they are leaving and will curse at them. Until he gets to know someone, this is typically the behavior that he exhibits. David does not do well with changes in routine, which is why he utilizes a picture schedule. This picture schedule shows him what is coming next throughout his school day.

Developmental and medical history. David lives with his mother, father, and two siblings. There were no reported complications at birth. However, he received Early Intervention services soon after his birth. These services included occupational therapy, physical therapy, and speech therapy. His records do not state the reasons for these services. At the age of three he received a tympanostomy tube placement. At the age of four, David was not yet toilet trained and was delayed in his speech. When the Battelle Developmental Inventory was conducted, David was found to be functioning developmentally at 15 months, which placed his development almost 3 years behind his chronological age of 4 years (Battelle Developmental Inventory, 2011). Other developmental milestones were not noted. David has had a history of regression when

not getting the services that he needs. He loses the skills that have been taught to him and those skills have to be re-taught when there are lags in services.

Educational history. When David was five years old and in kindergarten at his current district, David was identified with Mental Retardation. The results of the Stanford Binet, Fifth Edition, developed by Roid (2003), showed that David was moderately delayed with an IQ of 50. A Vineland-II was also done at this time and he scored in the low range in the domain of Socialization, with a score of a 50 (Sparrow, Cicchetti, & Balla, 2006). Additional data from the Vineland was not provided in his records.

Starting in first grade, David received instruction in the life skills classroom, which provided one-on-one support and adapted curriculum. This is where he remained until last year. However, in 2003, at the age of six, he was diagnosed with Pervasive Developmental Disorder (PDD-NOS). The school district decided to continue to instruct him in the life skills classroom. During this time, David was provided with occupational therapy services, physical therapy services, speech and language therapy and social work services. He also had a one-on-one aide. David was retained in the fourth grade, in response to parental request. David has received Extended School Year Services every year that he has been in school. Currently, David continues to receive occupational, physical and speech therapies. He no longer receives social work because he is being instructed in the CLM which meets those needs through the social skills taught in the participation repertoires.

Current educational information. According to David's classroom teacher and most recent IEP there are days when David struggles to express his needs and wants appropriately. David attends homeroom within the regular education setting in the same room that he did last school year, with peers in the 6th grade. He requires support from staff to help him maintain appropriate behaviors and to remain in homeroom, so an aide attends his homeroom with him (Area School District, 2010). David follows a written visual schedule which is hanging in the classroom and taped on his desk.

David is adjusting to his new class, the autistic support classroom, which he began towards the end of last school year. It was decided that the autistic support classroom would better fit his needs rather than the life skills classroom. He is also adjusting with his schedule quite well considering his diagnosis of autism, which causes him to struggle with changes in routine. However, he sometimes has difficulty with new people. David usually adjusts to a new person within a few days. Once he is comfortable with a new adult in the classroom he will follow directions on social behaviors. With prompting from an adult, David is learning to express his needs throughout the day. It was typical for David was to convey anger and/or frustration though the use of inappropriate language and physical aggression, but he is starting to verbally express why he is angry or frustrated with prompting from the staff (Area School District, 2010).

Children with autism sometimes respond negatively to transitions. David can go to the cafeteria for lunch with the other students in the classroom and can sit and eat his meal with limited problems. Sometimes David will get upset and will request to go back

to the room, because the noise level and activity inside the cafeteria seem to provide an overload of sensory stimulation (Area School District, 2010). Other transitions in the classroom, such as transitions between activities, go smoother when David is given the choice between two activities and/or tasks.

   David's progress with the Competent Learner Model. When David began the Competent Learner Model (CLM) curriculum in September 2010, he was functioning at the Pre-1 Level. David is classified as a naïve learner due to his difficulty in following instructions and his aversive reactions to being around people. After six months, David established the first two repertoires, (1) the performance of three consecutive sets of ten responses and (2) responding on signal for three consecutive sets of ten responses, earning scores of 1, but the response forms were only approximated. David could complete the task of the third repertoire, completing a task of up to 20 repetitions without prompts and with the teacher near, while also accepting assistance from the teacher or the classroom aide, but rarely performed it across people, places, or items. On the fourth repertoire, accepting an item from a peer or giving an item to a peer within five seconds when directed by the teacher or a classroom aide, David would accept or give items to a peer, but would not perform this task across people, places, or items. On the fifth repertoire, selecting a variety of objects and using each of them for approximately one to two minutes for about 10 consecutive minutes, David received a rating of a 2, meaning that this repertoire was established, but only approximated. Figure 2 depicts how David performed on the Participator Repertories at the beginning and the end of the study.

Figure 2
Pre and post-intervention CLRA Participator Results
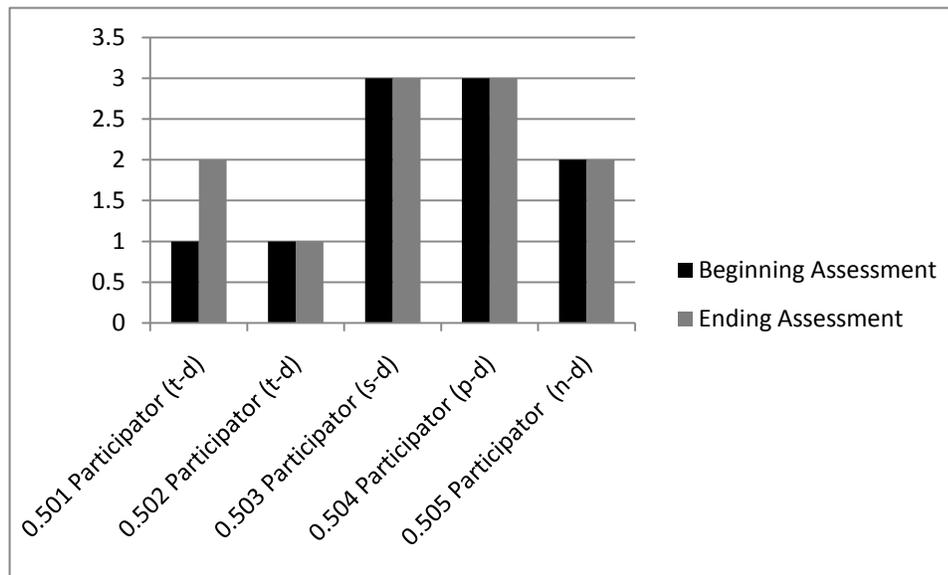
David demonstrated improvement in the first participator repertoire, but remained the same across the others at the end of this study, showing no measureable improvement.

David's end of intervention Vineland-II was completed by the autistic support teacher. Table 2 provides the scores, percentile ranks, and adaptive levels that David achieved in each socialization sub-domain as well as his overall scores and adaptive level in the Socialization domain.

Table 2

Standard Scores and Adaptive Levels for David on the Vineland-II

Subdomain/Domain	v-Scale Score	Domain Standard Score	95% Confidence Interval	Percentile Rank	Adaptive Level
Interpersonal Relationships	5		3-7		Low
Play and Leisure Time	6		5-7		Low
Coping Skills	7		6-8		Low
SOCIALIZATION	18	50	45-55		Low

The results of the Vineland-II indicated that David is low in all sub-domains as well as in the overall Socialization domain. His socialization skills, like those found on the first Vineland-II, are well below where they should be for his age. Despite the eight years between the first and second Vineland assessments, these results still show that David struggles in the area of socialization.

According to a more holistic assessment of David's progress, David's classroom teacher reported that, David formed good relationships with all of the staff in the classroom. David will usually ask for the classroom teacher first, but if she is not available he will work with other staff. This was not the case earlier in the year; he would refuse to work with the new aide, even becoming aggressive to avoid her. At the beginning of the year, a new aide in the classroom was viewed as aversive to David but that also is no longer the case. David now performs tasks, preferred and non-preferred, under semi-directed conditions, with all staff in the classroom. This, however, does not generalize to other settings, instructors, or activities (Classroom teacher, personal communication, February 28, 2011).

Case 3: Chad

Chad is a 12 year old male in the 7th grade who receives instruction in a middle school autistic support classroom and is a classmate of Jacob and David. He receives instruction from the autistic support teacher as well as the two full-time aides. Chad is a verbal student who frequently talks with his teachers and his peers in the classroom. He is described by his teachers as very social and pleasant and enjoys interacting with his peers during regular classes. He uses greetings, comments, and asks for help appropriately. Chad takes great pride in his work and likes to help others. He thoroughly enjoys doing jobs around the school building, such as cleaning the cafeteria tables after breakfast in the morning. At times, Chad can be defiant and stubborn, but he responds well to attention from his teachers. He can become frustrated easily and at times feels like he is being treated unfairly. This is when he becomes defiant and oppositional. He will not always want to participate in activities that he does not view as fun.

Developmental and medical history. Chad lives with this mother, father, and younger brother. There were no reported problems during birth. It was not until the age of three that Chad began to receive Early Intervention services, which consisted of speech therapy and occupational therapy. When he was given the Battelle Developmental Inventory at 54 months of age, he scored at the 47 month age level (Battelle Developmental Inventory, 2011). This placed him seven months behind his chronological age developmentally.

Educational history. When Chad was six years of age he was diagnosed as having Pervasive Developmental Disorder (PDD-NOS) and Attention Deficit/Hyperactivity Disorder, combined type. Chad began kindergarten this same year, 2004, in the autistic support classroom in his current school district. Since this time, Chad has been receiving occupational therapy, speech therapy, and social work. Chad has always had a classroom aide since 3rd grade. His social work services were discontinued at the beginning of the 2010-2011 school year when the CLM curriculum began, as the CLM addressed his social skill needs.

In the 4th grade, Chad was diagnosed with Oppositional Defiant Disorder (ODD). His General Ability Index as estimated by the Wechsler Intelligence Scale for Children-IV (WISC-IV) was estimated at 67 (Wechsler, 2003). In addition the WISC-IV, an Adaptive Behavior Assessment System-II (ABAS-II) was also done (Harrison & Oakland, 2008, p. 9-10). The ABAS-II is an adaptive measure that assesses three domains, conceptual, social, and practical, while also providing a General Adaptive Composite (GAC). It is a behavior rating scale that can be completed by the parent, caregiver and/or teacher and measures daily living skills and functional academics (Harrison & Oakland, 2008, p. 9-10). Chad scored extremely low in all domains (Conceptual-59, Social-61, Practical-69, and GAC- 58).

Current educational information. According to Chad's classroom teacher and most recent IEP, Chad is a student who is included in other classes. Chad goes to regular classes for homeroom, related arts and social studies. However, he does not always want

to go to those classes and requires much prompting. Sometimes he will refuse to go and is provided with an alternative assignment in the autistic support classroom or work is obtained from the regular education teacher and Chad completes the assignment in the autistic support classroom (Area School District, 2010).

Chad requires support and intervention from an aide or the autistic support teacher to maintain appropriate behavior in the regular education classes. At times he becomes very disruptive and must be removed to the autistic support classroom. However, this behavior is not seen in gym class. Chad's gym teacher reports that Chad arrives prepared and remains focused and participates in lessons appropriately. He demonstrates respect for the teachers, lesson and peers (Area School District, 2010).

Chad's progress with the Competent Learner Model. When Chad began the Competent Learner Model (CLM) curriculum at the beginning of the 2010-2011 school year, he was at Level 2, which makes him more advanced in the CLM curriculum compared to his two classmates. Chad is not considered a naïve learner, because he has acquired the skills that are taught at the Pre-1 level. He has also acquired the skills that are taught on Level 1. Level 2 of the Participator Repertoires of the CLM curriculum are focused on helping the students engage with others and asking for help when needed. Chad was not assessed on the first two Participator Repertoires of Level 2 at the beginning of the year due to some defiant behaviors, such as refusing to do his work, hiding out in the bathroom, and arguing with adults. However, he was assessed on the others. On the third participator repertoire, Chad received a rating of 3. Chad was able to

complete the assigned tasks and seek assistance as directed by the teacher; however this was rarely performed across people, places, or items. Some of the tasks that he completed were cutting coupons, sorting items for recycling, and taking messages to the office. On the fourth repertoire Chad received another rating of 3. He was able to participate in a preferred activity with the teacher's assistance, but this was not yet generalized across people, places, or items, for example he played a game of Hangman on the iPad Touch during his speech session, but does not play this game in other settings. On the fifth and sixth participator repertoires that were assessed, Chad received ratings of 2. The fifth repertoire consisted of putting things away where they belong and repertoire six consisted of persisting at getting a task to come out right and asking for help when necessary. Chad had established these repertoires but the response form was only approximated. Figure 3 depicts how Chad performed on the Participator Repertories at the beginning and the end of the study.

Figure 3

Pre and post-intervention CLRA Participator Results
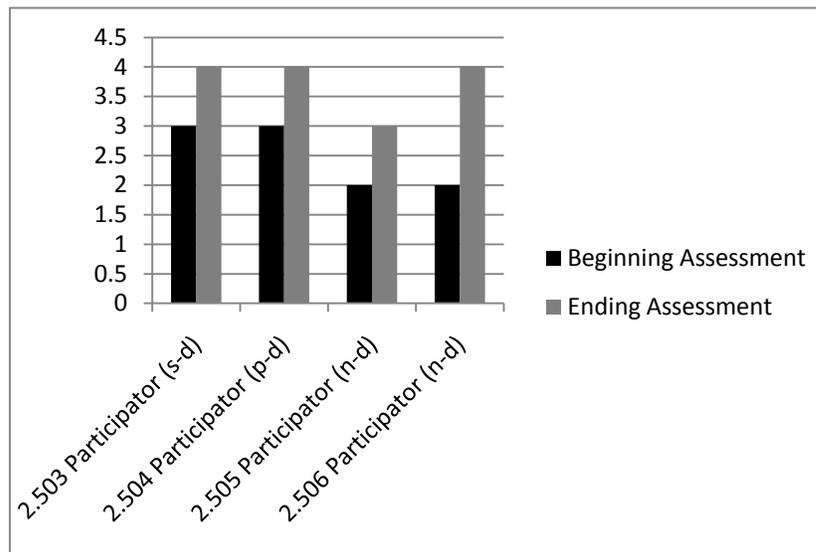
At the end of the study Chad demonstrated improvement in each of the

participator repertoires. He improved at least one rating point in each repertoire.

Chad's end of intervention ABAS-II was completed by the autistic support

teacher. Table 3 provides the scores, percentile ranks, and adaptive levels that Chad

achieved in each domain as well as his overall General Adaptive Composite (GAC).

Table 3

Standard Scores and Adaptive Levels for Chad on the ABAS-II

Composite	Composite Scored	Percentile Rank	95% Confidence Interval	Adaptive Level
GAC	43	<0.1	40-46	Extremely Low
Conceptual	50	<0.1	46-54	Extremely Low
Social	61	0.5	56-66	Extremely Low
Practical	45	<0.1	41-49	Extremely Low

The results of the ABAS-II indicated that Chad is extremely low in all domains. His social skills, which are the focus of this study, are well below where they should be for someone his age. This was also true on the first ABAS-II that was conducted even though these measures were conducted three years apart.

According to a more holistic assessment of Chad's progress, his classroom teacher reported that Chad had anxiety with a new aide in the classroom at the beginning of the school year. However, since the aide was persistent and continued to try to build a relationship with him, Chad will now ask for her to do tasks and activities with him. Chad will play games with peers, but still needs close adult supervision to maintain appropriate behavior. In regards to peer relationships, Chad does have some reciprocal interactions. He will wait for items from peers and will give items to peers. Chad will also help peers when he sees the need to do so. In addition, Chad will select items to play with, without difficulty. If he is working on a difficult task, he will ask for help. Under teacher-directed conditions, Chad will respond to 3 consecutive sets of 10 directions/questions, when the task is highly preferred. This is seen in gym class, shop class, and speech. This skill seems to be generalizing (Classroom teacher, personal communication, February 28, 2011).

Chapter 5

Discussion

The purpose of this study was to examine the effects of the Competent Learner Model (CLM) on the participation and social skills of three students diagnosed in the autism spectrum. The researcher sought to determine if these students would make gains in the area of participation over the course of six months as a result of the CLM intervention. Another purpose of this study was to examine if the Participator Repertoires helped the students to make gains in social skills, as assessed by adaptive measures such as the Vineland-II (Sparrow, et al., 2006) and the ABAS-II (Harrison & Oakland, 2008). It was hypothesized that gains would be made in social skills because the Participator Repertoires address appropriate ways to participate in and out of the classroom. Some of the skills that are taught in the Participator Repertoires are learning to use classroom objects with the teacher's help, completing tasks with limited teacher assistance, following directions and instructions of the teacher, accepting and giving objects to peers, and taking turns with peers. These are all skills considered to be good social skills and can be utilized and applied outside of the classroom setting as well.

Competent Learner Model

The results showed that the Competent Learner Repertoire Assessments (CLRAs) indicated improvement for two of the three students. The student, who made the most progress, Chad, was a student who started out in the CLM curriculum at a more advanced level and had multiple diagnoses. He was not considered to be a naïve learner, as were

Jacob and David, therefore indicating that he was functioning at a higher level at the outset. Chad made progress in each of the Participator Repertoires on which he was assessed. David made improvement on one repertoire, while Jacob did not demonstrate improvement on any of the repertoires.

A naïve learner, as defined earlier, is a learner who typically does not like to be around adults, does not convey to others his or her needs in a reliable way, seldom follows instructions, and does not enjoy interactions with others (Tucci, 2005). In light of this, both Jacob and David may have had a more difficult time with the CLM. These two students not only had to learn many new skills, they also had to learn how to apply these skills across people, places, and settings. This type of progress may be more difficult to make over the period of six months, especially for those who have more deficits at the start. However, Chad, who had already acquired the skills at the Pre-1 Level and Level 1, was working on building upon his learned skills. He had to learn new skills and how to generalize these skills like his two classmates, but he had the background experience and skill set to be able to do so more easily.

The effect of prior knowledge on learning is fairly well-established. Thompson and Zamboanga (2004) found that students in an introductory psychology class performed better when they had prior knowledge of the subject of psychology. It was also established that modest prior knowledge had a facilitating affect on course outcomes rather than a hindering affect. This study was one of many studies that demonstrated that individuals with prior knowledge of a topic understand and remember more than those

with limited prior knowledge (Committee on Developments in the Science and Learning, National Research Council, as cited in Thompson and Zamboanga, 2004). This may help to explain why Chad made the most measurable progress.

Chad also has more developed language abilities than his two classmates. Craig and Washington (1993) found that children with specific language impairment (SLI) had difficulty gaining access to interactions among same age peers and maintaining the interaction when they were able to gain access, compared to peers who were the same age. The ability to join an established social interaction is an important social skill that Chad appears to have learned previously. This may be due to the fact that his language impairment is not as great as the other two students in the study. Both Jesse and David have language impairments that are more severe, which may be significantly limiting their ability to participate in ongoing interactions.

Students with autism often have difficulty integrating language, social understanding, and the emotional intent of messages in the social world (Quill, as cited in Gately, 2008). In social situations it is important to be able to understand and interpret the various cues given. When background knowledge is primed, it helps students connect what they know to new information and skills (Gately, 2008). Without background knowledge, new information cannot be associated as easily. In the case of Jacob and David, their background knowledge and experience with social interactions was less than that of Chad. Since Chad was at a more advanced level in the CLM curriculum, he had more experiences with social interactions and situations and which allowed him to

connect new information and skills with those experiences. Because of this, Chad's progress through the CLM was smoother.

It was expected that the CLM would have helped all of the students make gains in the area of Participation, but that was not the case. The present study lasted a total of six months. It is possible that naturalistic studies, such as this one, may take a longer period of time in order to capture measurable progress. The social validity of the CLM, meaning the social importance and acceptability of treatment goals, procedures, and outcomes also needs to be considered (Foster & Mash, 1999). Although the CLM appears to be socially valid, it does not seem to be improving the participation skills of the students, at least in the short-term or with students with more severe disabilities.

Naturalistic settings rely on ecological validity; they approximate the real-life situation in which behaviors can occur (Shuttleworth, 2009). The CLM has both ecological and social validity, based on the definitions provided previously. However, despite the fact that the CLM is designed to be used in a naturalistic setting and was conducted in such a setting, it resulted in very little improvement for all three students. Social and ecological validity, like the internal validity of experimental studies, may not always translate into progress.

Adaptive Measures

All three of the students in the study were found to be in the lowest adaptive level in the area of social skills/socialization according to the adaptive measures that were completed at the end of the study. Comparisons of their improvement from previous adaptive measures to the present measures could not be made other than to say that they were all still functioning in the lowest adaptive range. When students are delayed socially it is hard for them to catch up to their same age peers. Adaptive measures are based on age norms, so for their ages, the students in this study would be considered significantly behind. Skills such as having good relationships with others, waiting in line, offering assistance, apologizing, congratulating, and complimenting do not come naturally for students with autism. They are skills that need to be taught and practiced in order for them to be applied appropriately. It is not surprising then that the students in this study are still functioning at the lowest adaptive level in the area of social skills/socialization.

Overview of Findings

To the best of the researcher's knowledge, this study is one of the first of its kind to research the Competent Learner Model (CLM) and its effect on children diagnosed with autism. The information that exists is provided by the authors of the CLM. Interestingly, the CLM is now being implemented in many school districts. One state Department of Education has produced videos documenting the effects of the CLM on eight naïve learners. These case studies document and show how these eight students acquired the skills to be successful in the school, home, and community setting (Tucci, 2011). In the video, the students are shown when they began in a CLM classroom and

where they were after having been exposed to the CLM curriculum. However, these case studies did not provide empirically-based, objective evidence, such as data collection of pre-intervention baseline levels and post-intervention levels of academics and behaviors. Rather the video provided testimonials of the CLM. There also was not a control group for comparison.

The findings of the current study show that over a six month period, there was little to no progress for Jacob and David who were the most severely disabled and some progress for Chad who had more language and social skills at the start of the intervention. The CLM may be a successful intervention for those who do not have more severe limitations.

Limitations and Recommendations for Further Research

This research has some limitations which should be noted. Results are based on a very small sample size of middle school students in one school with no control group so no comparisons could be made between those who received the Competent Learner Model (CLM) and those who did not. A larger, more diverse sample in terms of skill level is needed. All participants were taken from the same classroom and were of similar ages and the same gender. Additional research using samples of students with autism from a variety of classrooms, ages and genders is warranted to more definitively determine whether CLM is an appropriate intervention for all children diagnosed in the autism spectrum.

Finally, it is recommended that future studies further investigate the relationship between the CLM and participation and social skills of students with autism. Other studies may find different results.

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